

Carpal tunnel syndrome: The personal injury connection

Although the connection between carpal tunnel syndrome and repetitive stress is cloudy, one cause is clear: Hand injuries and related nerve traumas can result in CTS

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You've seen them worn by grocery checkout workers and office secretaries: wrist splints that advertise the wearer as having "carpal tunnel syndrome," or CTS.

Often described as a painful tingling that first appears during the night, CTS can range from burning sensations to complete numbness. It can be severe enough to wake a person out of a deep sleep. It can occur in just one hand, or both. Ultimately, CTS can become so debilitating that the sufferer can no longer work or even enjoy hobbies.

The cause of this cruel syndrome? Surely, it's repetitive stress ... Or is it?

Cause for controversy

Recent studies of adult workers find that, surprisingly, rates of CTS among those who type for a living are, in fact, no higher than those occurring in the general population. And while a connection with repeated hand motions seems intuitively obvious, according to the CDC's National Institute for Occupational Safety and Health, CTS appears to be more associated with activities using small hand tools, such as cutting, small parts assembly, sewing and cleaning, as well as with tools that vibrate, such as jackhammers and floor polishers.

But if the connection between carpal tunnel syndrome and repetitive stress is cloudy, one cause is clear: hand injuries and related nerve traumas can result in CTS.

In this article, you will learn that carpal tunnel syndrome can be triggered by a personal injury, how injuries to other parts of the body can result in CTS, and why consulting a qualified hand surgeon early on can prevent needless suffering and improve outcomes.

What is carpal tunnel syndrome, anyway?

Carpal tunnel syndrome affects about three percent of American adults. It occurs when the median nerve (one of three major nerves connecting the spinal cord to the hand) becomes compressed or *pinched* within the wrist due to injury or inflammation. Specifically, this *pinching* occurs in the area of the hand called the carpal tunnel. A narrow, rigid passageway surrounded by the wrist bones, the carpal tunnel is tightly covered by the transverse ligament and filled with tendons that flex the fingers and thumb. The median nerve and the blood vessels that nourish it and the rest of the hand pass directly through the carpal tunnel.

In an injury, the membranous sheaths that surround and lubricate the tendons which normally glide through the tunnel become inflamed and swollen. Swelling compresses the median nerve, a problem similar to stepping on a garden hose: if water cannot pass through, pressure builds up behind the constricted area, and the hose will not function. Compression within the carpal tunnel cuts off nerve function as well as the blood supply that nourishes the median nerve itself. And that can lead to serious trouble.

By the pricking of my thumbs

The median nerve is essential to hand health. It's responsible for feelings of sensation as well as hand movement, mainly controlling the thumb and first three fingers. When the median nerve is compressed, it feels as if the hand has "gone to sleep." Such an abnormal feeling is called a *paresthesia*. Other *paresthesiae* include burning, itching, tingling and a prickly pin-like sensation over the palm of the hand. This can move into the thumb, forefinger, middle finger and part of the ring finger. Some sufferers feel a shooting pain that goes from the wrist up the arm, or down into the hand and fingers.

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Unfortunately, it can get far worse. Continued nerve compression can lead to muscle weakness, making it difficult to form a fist, open jars and grip objects. In time, the muscles of the hand served by the median nerve may atrophy and wither. Left untreated, CTS can lead to permanent weakness, loss of sensation and even paralysis of the thumb and fingers of the affected hand.

Adding insult to injury

Many different injuries can trigger CTS. Take auto accidents: Before a crash, the driver clutches at the steering wheel to avoid going through the windshield, while the passenger presses his or her hands against the dashboard.

Depending on hand position at the moment of impact, the wrist either hyperextends (forcing the hand upwards) or hyperflexes (forcing the hand downwards), stretching and damaging the tendons and ligaments. With enough force, wrist bones may fracture. Then, swelling and inflammation begin, compressing the carpal tunnel and squeezing the median nerve. Over time, even minor swelling may worsen as tissue in the entire wrist becomes inflamed. What's more, the sudden twisting of the victim's neck and upper torso can cause other nerve damage at other parts of locations in the body that will contribute to CTS (discussed below).

And it does not have to be as dramatic as a car crash. Think of a speeding taxi on its way to the airport that brakes suddenly. Passengers in the back, brace themselves against the front seat using their hands, which are forced to flex or extend sharply. In fact, any sudden trauma to the hand and wrist can cause injury and set up inflammation in the carpal tunnel. Take the typical slip and fall: As the person tries to stop himself, falling, the hands go out, and bam!

There may not be blood, or even apparent bruising, but the damage has been done.

Double trouble

Nerves are thin, delicate structures that stretch long distances, and damage anywhere along them can cause problems far from the site of injury. A phenomenon called "double crush" syndrome exists, in which a compressed nerve nearer to the spine makes a peripheral nerve that is already compressed at a place close to the spine become more susceptible to a second compression and injury further down. In fact, CTS is sometimes associated with a condition called "cervical radiculopathy," which occurs when a nerve in the cervical (neck) area is compressed as it exits the spinal canal (commonly called a "pinched nerve").

Even if the compression in the cervical (neck) area and the wrist are minor, the combination can impair the nerve, making the patient more susceptible to CTS. In addition to traumas such as accidents, cervical nerve problems can be caused by bone spurs or herniated disks in the spine. Elbow injuries that impact the cubital tunnel (another nerve tunnel, located behind the *funnybone*) can also be involved in a double crush syndrome that can manifest as CTS.

Biting the hand that feeds you

Sometimes, man's best friend has a nasty habit of biting. The hand is often the focus of canine attack, and in an attempt to get the hand free, the victim often flails, snapping the wrist sharply. But a dog's jaws can be very powerful, as anyone who has tried to pry away a chew toy will attest. Again, with trauma and severe compression, the carpal tunnel can become inflamed. Even worse, there may be a series of puncture wounds going all the way down to the nerve, which can cause serious damage.

Most often, dog bites are treated for the obvious problems of lacerations and infection. Unfortunately, well-intentioned emergency room doctors who are simply trying to clean out and suture the wound may not pay attention to the damaged median nerve. Like the car accident and the slip and fall, this is where consulting a hand specialist becomes very important – before the injury gets worse.

Diagnosing the problem

The first part of treating CTS involves understanding how serious it is, and what kinds of strategies will have the best outcome.

Diagnostic tests may include a test for "Tinel's sign," in which the physician taps on the wrist to check for a tingling sensation in the fingers. Also, the patient will be asked to rest his or her elbows on a table and allow the wrist to fall forward freely. People with CTS experience numbness and tingling in the fingers supplied by the median nerve within a minute or less. X-rays may be needed to help rule out conditions such as arthritis. And electrical studies (EMG) may be required to assess nerve conduction.

Another logical step in evaluating CTS is to try a cortisone injection into the site. Admittedly, cortisone has gotten a bad reputation in recent years, as it can cause unwanted side effects if used indiscriminately. But a localized cortisone injection into the carpal tunnel can help shed light on the problem, and even be curative.

Cortisone can decrease the swelling in the carpal tunnel enough to allow the inflamed tendons to slide freely, in some cases acting as a complete treatment in one shot. More often, cortisone will alleviate the condition only for a few weeks. Still, this is useful information, because by alleviating the compression and allowing the symptoms to abate, it shows that ultimately, the problem can be resolved. When cortisone provides no relief, the problem is more complex and will require additional testing, such as an MRI and additional nerve conduction tests.

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Finding the solution

Physicians have tried many strategies to cure CTS, with varying results. In my practice, I may prescribe a regimen that involves keeping the hand splinted in the "neutral position" for six weeks along with a strong anti-inflammatory medicine. Generally, the tunnel needs to rest and to return to normal, without additional stress or injury. In many patients, the syndrome will recur as soon as the splint comes off and the medication is stopped. Here, surgery may be indicated.

Although many carpal tunnel procedures are performed today using local anesthesia, I generally advise my patients to have theirs done in a hospital or surgicenter under general anesthesia. After all, this is delicate surgery involving a crucial nerve, and the smallest movement of the hand could have unfortunate results.

Surgery involves an incision at the base of the palm, allowing access to the transverse carpal ligament. The ligament is cut, and the incision closed with stitches. The hand is then immobilized in a large dressing and wrist brace for two weeks to stabilize the area. During recovery, the patient needs to start moving the fingers and thumb immediately to prevent scar tissue from attaching to the tendons. Interestingly, this scar tissue reattaches the cut ends of the ligament back to each other, forming a new tunnel. I usually recommend a thorough course of physical therapy to regain hand function and strength. Recovery usually takes two to four months, after which most patients get back their full range of motion. Sensation should return as the numbness and tingling go away.

Before it's too late

If treated without a long delay, prior to the onset of permanent damage, about 70 percent of CTS sufferers can be cured. Sadly, many patients lose precious time by ignoring the problem, seeking treatment from non-specialists, and trying remedies that just do not work (or in some cases, make matters worse).

Hand health is an important part of life, as is being free from pain and disability. For an attorney with a client involved in a personal injury case with any kind of hand involvement, the best advice is to refer them to a hand surgeon who can look for signs of CTS, try to abate the problem early on, and treat it as expeditiously as possible.

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