



FOCUS

No Tunnel of Love: Carpal Tunnel Syndrome

Carpal tunnel, dubbed by some as “tennis elbow of the wrist,” accounts for the highest number of work days lost among all work-related injuries. Almost half of the cases reported account for 31 days or more of work loss. With some 850,000 new cases diagnosed in 1994, the last year for which the National Center for Health Statistics has figures, carpal tunnel syndrome is the most common and best known of the repetitive stress injuries, or RSIs. Research suggests that it may affect one out of every ten people in the United States over the course of a lifetime.

A fair number of sufferers resort to surgery when other methods of relief fail. Approximately 260,000 carpal tunnel release operations are performed each year, and about half of those are considered work-related.

Carpal tunnel syndrome has become something of an “in” diagnosis over the past decade, says Daniel Wautlet, DC. Dr. Wautlet is in private practice in Green Bay, Wisconsin, and is board certified in rehabilitation. “Because of the media, there’s a lot more awareness based on OSHA requirements for safety, greater understanding of office ergonomics, and other health information in the news.” Although we might think of the 100-word-a-minute office worker—eyes glued to the screen, hands frozen above the keyboard—as the typical carpal tunnel sufferer, other industries were plagued by the problem long before the advent of Bill Gates. “A classic industry for it would be meat-packing,” Dr. Wautlet says. “Others would include road construction and other heavy construction—people who use jackhammers, for example—or any job where there is a lot of repetitive grabbing and reaching.”

Recent research indicates that it’s these other industries, not computer keyboard work, that account for most work-related carpal tunnel syndromes. Heavy computer use did not equate with an increase in the incidence of carpal tunnel syndrome, scientists at the Mayo Clinic reported in the June 12, 2001, issue of the journal *Neurology*. “The findings are contrary to popular thought, but nobody has studied the problem carefully,” said lead author J. Clarke Stevens, MD, a Mayo neurologist. “Prolonged use of a computer does not seem to lead to carpal tunnel syndrome, at least not in our employees who use computers up to seven hours per day.” But with many people claiming relief of carpal tunnel syndrome from the use of ergonomic keyboards and workstations, the jury’s still out on the subject.

Diagnostic Basics

Carpal tunnel syndrome usually shows up in a fairly standard way. “People come in and say, ‘I’ve got this hand pain.’ They usually describe it as a numbness and tingling in the first 3½ digits. That’s the distribution of the median nerve,” says P. Thomas Davis, MUP, DC, associate professor of clinical research and methods at Northwestern Health Sciences University. “They add that the numbness wakes them up at night.” These symptoms indicate a compression of the median nerve where it passes through the carpal tunnel at the wrist.

Cases of the syndrome can be found in medical records from the early 20th century, when the assembly line first arrived on the American scene. But symptoms can occur any time something happens to reduce the space for the nerve within the carpal tunnel. The most common cause is swelling or thickening of the outermost layer of the tendons. Conditions that can play a role include arthritis and some hormonal disorders such as diabetes and thyroid conditions. Pregnancy-related fluid retention and the hormonal disruptions of menopause also add to the risk of carpal tunnel, which explains why women suffer from it at a rate nearly five times that of men.

In fact, carpal tunnel syndrome can represent the ghost of repetitive stresses past. “It may go back to whatever patients did as an occupation,” says Dr. Davis, who has done extensive research on the syndrome. “They may be retired now, but the present condition may come from something they did at work 20 or 30 years ago. Back then, it may not have bothered them enough to do anything about it. They didn’t know what it was. But now it’s really bothering them and they’re losing some hand control.” Carpal tunnel syndrome may also wax and wane over the course of its natural history, Dr. Davis adds. “In many cases, it involves how much people are abusing themselves. If they lighten up, it lightens up. In one study, we found a case in which a person had carpal tunnel syndrome for ten years or more, but had managed it by self-treating with Motrin and backing away from a stressful occupation.”

Don’t focus myopically on the wrist, Dr. Wautlet cautions. “If you look just to the carpal tunnel, you can be in trouble. There are three or four different areas where that nerve can be pinched, going all the way up to the neck. The next step for practitioners is to become aware of all the potential causes of carpal tunnel and not automatically assume that there’s encroachment at the wrist,” he says. “We need to be sure before making recommendations that we take a multifactorial approach, starting with a good case history and a pain diagram.”



Asking a patient to fill out a pain diagram can provide just as accurate a picture of carpal tunnel syndrome as high-tech diagnostics, Dr. Wautlet says. "The pain diagram for carpal tunnel syndrome will show marked pain over the palmar aspect of the hand, including the median part of the hand where the thumb is, the second finger, the third, the half of the ring finger that's facing the thumb, and also the tips of those fingers. That's where it's going to be. It's very straightforward," he says. Unlike Dr. Davis, Dr. Wautlet sometimes finds pain presenting in the thumb, as well.

Although this is the classic carpal tunnel syndrome presentation, sometimes symptoms can be harder to pin down. "The pain can instead shoot up the arm. It can go up into the forearm and toward the shoulder, and that's where it can get confusing," says Dr. Wautlet.

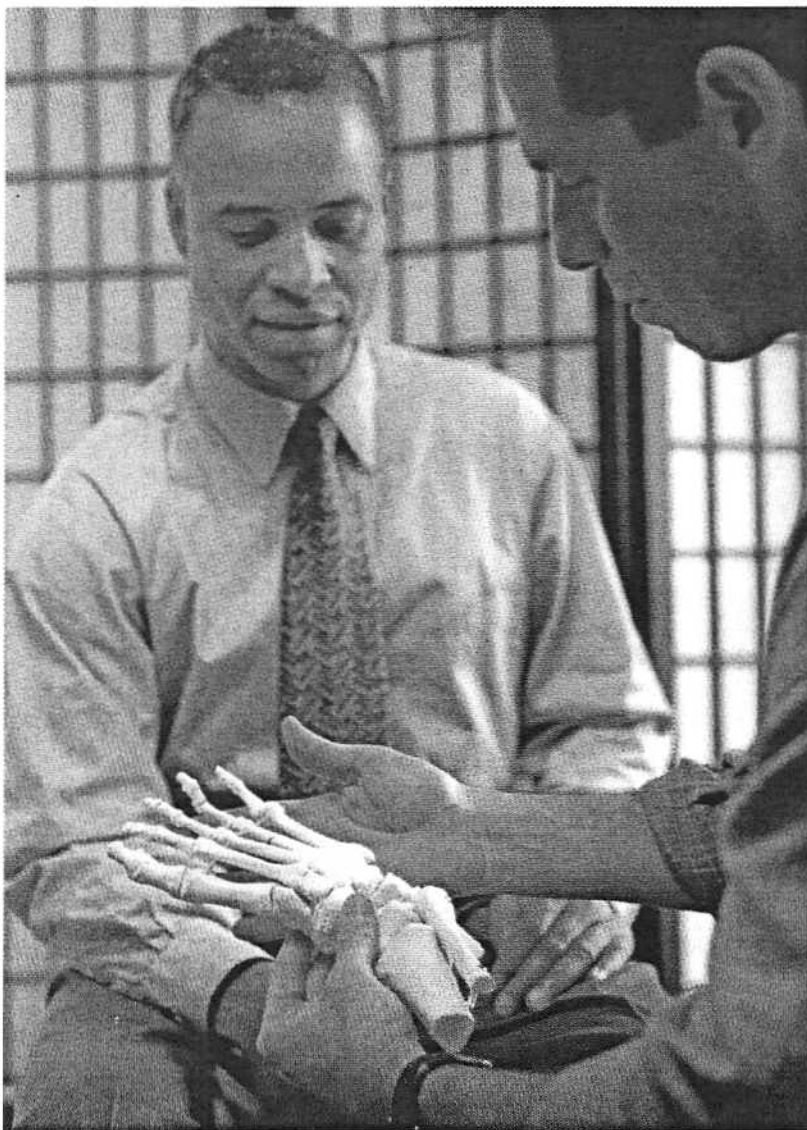
Dr. Davis agrees. "Like any other physical condition, there can be things that will lead you astray. Clinically, if you can get the characteristics of what we call the 'wake and shake' at night, that's classical carpal tunnel syndrome. But it doesn't always manifest that way," he says. "There are some non-classic presentations. What you have to do is chase it down. The tunnel is an area underneath a ligament called the flexor retinaculum, and it looks like this retinaculum may actually hypertrophy and cause pressure on the median nerve in response to repetitive stress."

Testing, Testing

Two popular functional tests for carpal tunnel—the Phalen wrist flexion test and Tinel's sign—may not be as effective as a newer functional examination, the wrist flexion nerve conduction test, says Warren I. Hammer, DC, MS, a chiropractor based in Norwalk, Connecticut, and author of *Functional Soft Tissue Examination and Treatment by Manual Methods: New Perspectives*. "The patient just flexes the wrist to about 60 degrees, and the doctor maintains digital pressure on the median nerve at the carpal tunnel for up to 30 seconds. This test has a higher sensitivity than the other two," Dr. Hammer says, pointing to a study that appeared in 1998 in the British edition of the *Journal of Bone and Joint Surgery*. "I've been using it a lot, and I've found it to be more effective. Many times you'll diagnose a problem that you might miss using Phalen's or Tinel's."

Dr. Hammer states that an important functional test often overlooked by practitioners for carpal tunnel syndrome is resistive testing of the flexor digitorum superficialis. This muscle is tested by resisting the middle phalanx of the patient's fingers, especially the middle finger. "Many times this test will aggravate a carpal tunnel since the flexor digitorum superficialis tendon, which is directly under the median nerve, will be swollen. If this test reproduces symptoms, it may indicate that this muscle needs treatment not only at the tunnel level, but also up to its origin in the forearm," he says.

A common carpal tunnel test many doctors of chiropractic may have learned in school isn't as sensitive as was once thought, says Dr. Hammer. "You'd have the



patient put the tips of the fifth finger and thumb together while the examiner resisted. If there was weakness, that was a hint of carpal tunnel. The problem with that test is a muscle called the flexor pollicis longus. It's under the control of the anterior interosseous branch of the median nerve, which does not go through the carpal tunnel. This particular muscle takes over during this test, so the test really isn't a good one." A much better muscle test for motor weakness, he says, is a test of the abductor pollicis brevis. "That's much more specific for median nerve involvement at the level of the carpal tunnel."

Although pain diagrams and function tests can often pinpoint carpal tunnel syndrome for the doctor of chiropractic, sometimes a referral to a neurologist for nerve conduction studies may be necessary. Even if you *know* it's carpal tunnel syndrome, someone else may require further proof. "Part of it depends on who you're proving it to," says Dr. Davis. "If it's a workers' comp case, you'll probably want to refer for testing. If there's no compensation due or no insurance company involved, you may just treat it on a trial basis to see how the patient responds."

Dr. Hammer also urges the DC to look at carpal tunnel syndrome more broadly. "One of the reasons I feel a lot of people don't get an adequate result with carpal tunnel syndrome is that they localize all the treatment in the area around the transverse carpal ligament. Of course, that's a major area. As a matter of fact, that's where the doctor of chiropractic will often see prior medical failures. The operation was performed, but the patient still has symptoms—because the median nerve was affected more proximally. You always look at the gestalt. From the standpoint of reducing the tension of the whole forearm, you should go not only to the flexor side, but also evaluate the dorsal side of the forearm," Dr. Hammer explains. "That can also be responsible for causing a restriction in the volar side, affecting the wrist. It's all interrelated." In fact, he suggests, carpal tunnel syndrome should be considered whenever a patient complains of an unexplainable upper-extremity pain. "I recall having a patient whose only complaint was cervical pain. She did not respond to treatment, and I was very frustrated. Even though there were no symptoms in the hand or the forearm, she was later found to have carpal tunnel syndrome."

And sometimes, it may look like carpal tunnel when it's not. "When you evaluate potential carpal tunnel syndrome, you always test distally to see if that's the cause. Test the flexor superficialis, and do resistive testing of the pronator teres against pressure," says Dr. Hammer. "While the patient is doing resistive testing of the pronator teres, the doctor compresses the median nerve in the belly of the pronator teres. If that causes pain in the forearm and the palm of the hand but not in the

fingers, you direct the treatment more distally because that's where the problem is. That's not carpal tunnel syndrome," he says. "Some people have been operated on for carpal tunnel syndrome when the cause was more proximal."

Treatment Options

In his research, Dr. Davis says, he's found a number of patients with carpal tunnel who are outside the health insurance system. "If they don't have insurance, they don't get outside help unless they have to," he says. "Testing, treatment, maybe surgery — those are very expensive options. It's not brain surgery or a heart transplant, but it's not cheap. They tend to avoid it if they can."

Left untreated, carpal tunnel syndrome can cause severe and irreversible damage. Weakness — not

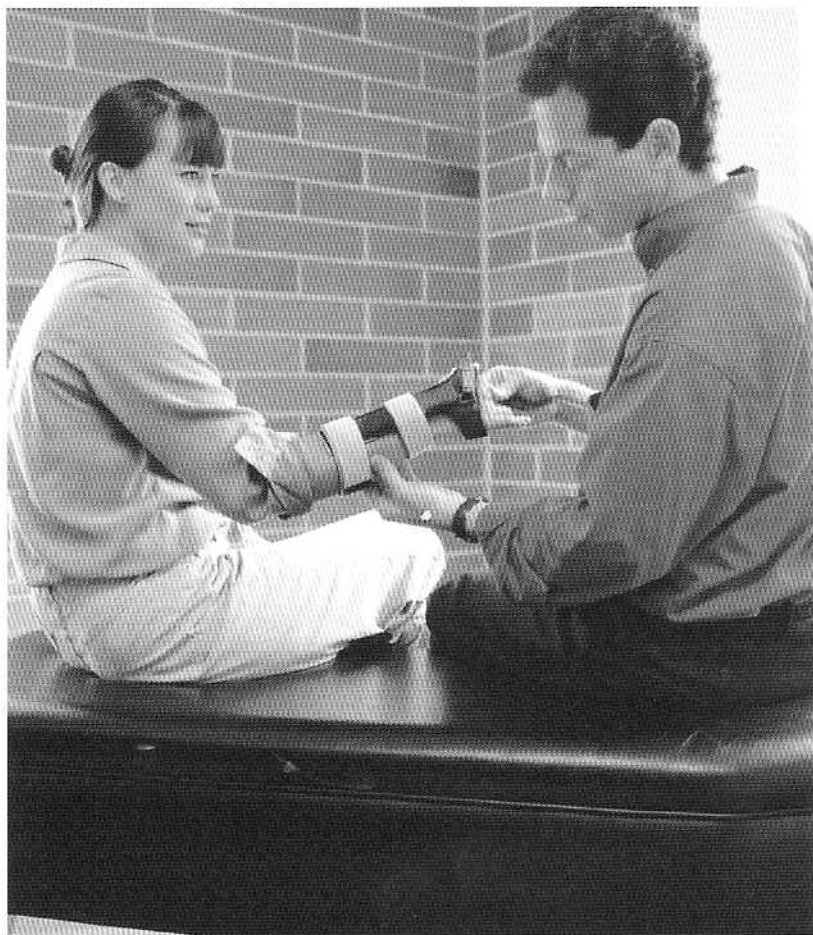
just periodic numbness and pain — is the first sign that serious nerve damage may have been done. "If they have a real severe problem, you'll start to see wasting of the meaty part or thenar eminence of the hand, where it's just caved in. If you see that, the syndrome is pretty far progressed, and those patients are in trouble," Dr. Wautlet says.

In addition to the uninsured, patients who let carpal tunnel syndrome progress too far are often those whose family doctors don't recognize its severity. "One lady was in her 70s and her doctor had just told her, 'Well, you know, you're getting older. You have to expect this as you age.'" Of course, no one "has to" expect carpal tunnel syndrome at any age, or accept it. Standard conservative medical treatments have included splinting, especially to relieve nighttime symp-

toms; anti-inflammatory medication for pain; and "lifestyle prescriptions" to allow more frequent rest for the hands. Steroidal medications have been found to provide some relief for carpal tunnel syndrome caused by temporary conditions like pregnancy-related swelling. But as the statistics mentioned earlier show, a lot of carpal tunnel syndrome patients don't find sufficient relief through these treatments, and over a quarter of a million of them each year have carpal tunnel release surgery.

A May 2001 study, published in *Arthritis and Rheumatism*, found that two-thirds of carpal tunnel release patients were satisfied with the procedure's result up to nearly three years later. Particularly when a patient has reached the point of muscle wasting, there may be no





other option. "We're not doing the patient a favor by prolonging the inevitable," Dr. Wautlet says. "You can do posture education so you don't have reoccurrence. But with significant damage already occurring, the patient needs to be sent out right away for nerve conduction studies and a surgeon's opinion."

Carpal tunnel release surgery, which involves cutting the transverse carpal ligament, can be performed using the traditional open incision, or endoscopically. With its smaller incision and more rapid recovery time, endoscopic release is becoming more popular, though it remains technically demanding. "I think endoscopic is better since it's less invasive and allows a quicker return to work," says

Dr. Wautlet. He urges each DC to check around the community to develop a referral relationship with a neurosurgeon or orthopedic surgeon who performs carpal tunnel release endoscopically.

Sometimes surgery may be pursued too soon. "Surgery is the ultimate solution from a medical standpoint, but there are many potential complications and it doesn't always solve the problem," says Dr. Davis. Unfortunately, many patients still don't realize that conservative chiropractic treatment represents another option. "If more people knew that doctors of chiropractic treat carpal tunnel syndrome successfully, more would come in to see us for it," Dr. Davis notes.

Chiropractic treatment—including mobilization of the wrist, elbow, and upper spine, ultrasound therapy, joint mobilization, and wrist support—can be just as effective in relieving carpal tunnel syndrome as standard conservative medical management, research shows.^{2,5}

The Graston Technique, which Dr. Hammer mentioned as improving results in treatment of tendinitis in the March 2002 *JACA* Focus article, is "the most effective hands-on method I have found for carpal tunnel problems. It saves my hands, and I'm actually able to penetrate deeper. It magnifies what I can palpate. I never believed that my palpation would be improved over my actual fingers as it is with stainless-steel instruments, but it's true," he says. The Graston Technique involves six stainless-steel specially shaped instruments designed to enable the doctor to do more powerful and more sensitive deep-friction massage.

"What's extremely important after releasing the restrictive tissue is stretching—especially immediately after treatment. It helps in realignment of the collagen. As soon as you've freed up the tissue, if only for a minute, you need to do some stretching." For example, he suggests, you can grab both sides of the carpal tunnel and separate the transverse carpal ligament. "It's very important to attempt to achieve a plastic deformation of the tissue. Grasp the area, open it up, and hold it open."

"I usually tell my patients that within six to eight visits, they should start showing some improvement," says Dr. Wautlet. "I'll see patients with these problems two or three times a week, and we find out quickly if we can

help them. With three visits a week, we know where they're at in three weeks. If the situation is chronic, it's more difficult, or if there are lots of different cofactors, then it may take up to 12 visits, but I won't go past 12. If you don't see some change in that time frame, you need to take the patient to the next therapeutic level." At that point, he recommends nerve conduction tests to further assess the severity of the condition and the possible need for surgery.

One self-management tool for carpal tunnel syndrome patients is a set of home stretches. "Have the patient lean on a table with the hand open, press down, and feel the area open," advises Dr. Hammer. "That stretch should be held for five minutes, not forcing it, but allowing it to gradually open. That type of tissue cannot be forced open; you're really trying to free up what they call the gel. That's a good stretch for

the patient to do at home, as well as in the office after treatment." The patient is also instructed in wrist flexion and extension movements that allow gliding of the median nerve from the hand through the tunnel to the forearm.

Although computer use may not play as strong a role in carpal tunnel as was previously thought, office ergonomics can still help with ongoing relief, and the DC should discuss appropriate changes with patients. "Let's say the carpal tunnel syndrome is a work-related injury. The doctor should develop on-the-job modifications. Perhaps the patient would only be allowed to do the repetitive motion half the time, alternating with doing something else," says Dr. Wautlet. "Have the patient take 'micro breaks' every 15 minutes. Teach him how to use that time to stretch the pronator teres, how to stretch the forearm muscles, and how to do some self-

mobilization of the carpal bones if they're limited in motion."

The doctor of chiropractic can manipulate the carpal bones, mobilizing them, and doing myofascial work. "This is the passive approach, and it's important, but we also want to teach the patient—and hopefully the employer, as well," Dr. Wautlet says. "At a meat-packing plant, talk to the employer. Ask if the employees' schedules can be rotated so the same person doesn't always have to do the boning with the knife. Persuade the employer that this will save money in workers' compensation. It's a challenge to the 21st-century doctor of chiropractic."

Like Dr. Wautlet, Dr. Davis stresses that carpal tunnel syndrome "has to be managed in totality. It's a problem that needs to be treated involving the whole arm and the upper back and neck because there can be other complicating factors."

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In addition to soft-tissue manipulation, ultrasound, and prescribed self-care and ergonomics, he suggests that DCs explore supplemental treatments such as microcurrent and icing. "Some people are also using B-6. The jury's out on that. Some people swear by it, and others swear at it." ▼

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Double-Crush Syndrome: Myth or Reality?

What about the "double crush" hypothesis—the cumulative effect of small injuries at multiple injury sites, rather than one major area of repetitive strain—as the cause of carpal tunnel syndrome? While all those interviewed for this article agreed that doctors of chiropractic should consider other sources of injury, such as the neck and forearm, in cases of carpal tunnel syndrome, they saw "double crush" as a less likely possibility.

"There is a very good paper by Swenson.⁴ He did a review of clinical studies that documented double-crush syndrome and found these studies of questionable value," Dr. Hammer notes. "The data did not support the hypothesis that two clinically insignificant lesions along the course of a nerve can significantly impair the function of the nerve."

"It's an old chiropractic fallback—something going on at the top end and at the bottom end of the same neurological track," Dr. Davis says. "There are people who say it doesn't exist, and those who swear that it does. I think it's quite possible, but new evidence in the literature throws it into question.⁵ We've fallen back on that diagnosis a little too hard and we need to lighten up; it's not the end-all and be-all we thought it was."

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