

CARPAL TUNNEL SYNDROME

GENERAL INFORMATION

- *Carpal tunnel syndrome* (CTS) is the most commonly known repetitive strain injury (RSI). It is just one diagnosis under the umbrella heading of repetitive strain injuries.
- *RSIs* occur when daily microscopic damage exceeds the body's daily ability to repair tissues. The damage accumulates gradually until symptoms finally become evident.
- Excessive or repetitive work, forceful movements and awkward positioning can all contribute to an RSI developing. Anything that slows the body's ability to heal, such as stress, poor health and illness (for example, diabetes, arthritis) can contribute. A change in the volume of the *carpal tunnel* (for example, caused by a wrist fracture, obesity or a cyst) can also cause symptoms.
- About 50% of all workers are considered to be at risk of developing a repetitive strain injury such as *carpal tunnel syndrome* (CTS). 1 in 10 will develop an injury severe enough that it interferes with work, home and leisure activities.
- 9% of women between the ages of 25 and 74 may have symptoms of carpal tunnel syndrome.
- Symptoms may include hand and arm pain, numbness and tingling, weakness and clumsiness. At its worst, people who experience these injuries are unable to work, unable to pursue musical and artistic hobbies, unable to perform simple household tasks, even unable to hold and care for their babies.
- The carpal tunnel release is one of the most commonly performed surgical procedures in the United States.
- In addition to the pain and disability experienced by the individual, the cost of these injuries can be tremendous. An individual case, including medical,



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therapeutic and work-related expenses, can cost up to \$29,000. According to the U.S. Department of Labor, the direct and indirect costs of all these types of injuries can total as much as \$20 billion dollars a year.

- If we are not personally affected, why should we care? For every postage stamp we buy, for every car we purchase, for any service or acquisition, these costs are passed on to us as consumers.

WHAT IS CARPAL TUNNEL SYNDROME?

- *Carpal tunnel syndrome* is the compression of the median nerve specifically at the area of the wrist.
- The carpal tunnel's floor is made up of the 8 tiny wrist bones (the carpus) which form a semi-circle. Its roof is a thick ligament that attaches from one end of the semi-circle to the other (the transverse carpal ligament).
- 9 tendons pass through this tunnel which is about the size of your index finger. 4 of the 9 tendons bend the tips of the fingers, another 4 of the 9 tendons bend the middle joints of the finger, and the 9th tendon bends the thumb tip.
- The median nerve also passes through this tunnel. The nerve is responsible for the power in the muscles at the base of the thumb (the thenar muscles) and for the sensation of the thumb, index, middle, and part of the ring finger.
- If there is any swelling of the tendons or in the tendon sheath, or if there is thickening of the ligament, the nerve (which is the softest structure in the tunnel) gets "pinched" or compressed. With enough compression, carpal tunnel symptoms occur. If the compression is severe or occurs over a long-period of time, the nerve may actually change shape and flatten causing some permanent damage.



SYMPTOMS

- Numbness and tingling in the thumb, index finger, middle finger and ring finger

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- Waking up during the night with the hands numb; Numbness may improve by shaking the hands or hanging them down
- Pain and aching at the base of the thumb and in the wrist
- "cramping" in the thumb
- Weakness
- Feeling clumsy and frequently dropping objects
- Poor circulation or feeling that the fingers are cold
- Difficulty picking up small objects such as coins, pills, or a needle
- In advanced cases, the muscles at the base of the thumb become weaker and "waste away" (atrophy). Muscle atrophy is an advanced sign of severe nerve compression. If you notice any muscle wasting, seek medical attention immediately as the pressure on the nerve needs to be relieved as quickly as possible, usually through surgery.



OCCUPATIONAL CAUSES

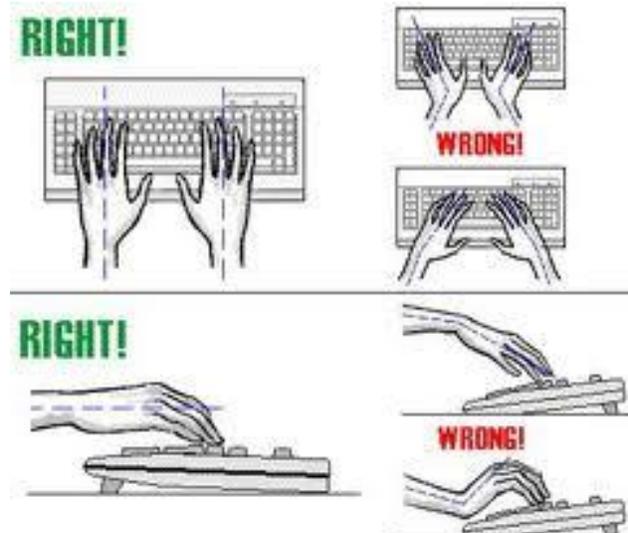
- Activities which require repetitive wrist and/or finger bending and straightening
- Forceful grasping or pinching of tools or objects, especially if the wrist is bent at an angle
- Awkward positioning of the hand and wrist during activities
- Direct pressure on the wrist (for example, leaning the heel of the hand on the wrist rest or desk)
- Use of vibrating, hand-held tools



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ERGONOMICS

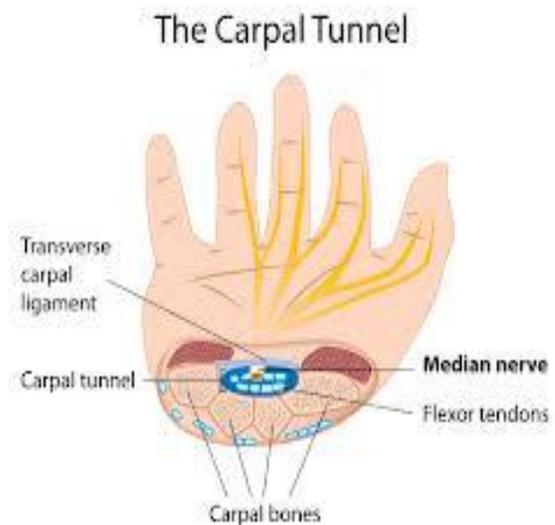
- Maintain a neutral wrist position during activities; Avoid bending, extending or twisting the wrist during activities
- Avoid positioning the wrist in a bent position (towards the palm of the hand) for any length of time (for example, when sleeping)
- Work from the shoulder and don't isolate finger or wrist movement
- Avoid using a sustained pinch or grip, especially if the wrist is not in a neutral position
- Minimize repetition; Periodically rest the hands briefly during repetitive or stressful activities; Stretch often during repetitive activity
- Alternate hands during the activity if possible to share the workload
- Slow down the activity
- Use the lightest grip possible (on tools, pens, the mouse, the steering wheel, etc.) that still allows you to maintain good control
- Use the least amount of force necessary during the activity
- Use the appropriate tool for the job
- Use ergonomically designed tools if available (modified or padded handles, larger grips with good traction, handles with modified designs) that help you maintain the neutral wrist position.
- Make sure that tools are in good condition and that cutting edges are sharp (reduces the force needed to use the tool)
- Use of gloves that dampen vibration if you are exposed to high frequency vibration
- Alternate work activities so the hands are not performing any one task repetitively for any length of time
- Use good *ergonomic* practices at work; Apply these *tendon and nerve protection* principles to daily and leisure activities as well.
- Practice good *health* habits.



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EARLY TREATMENT

- Splinting the wrist in a neutral position (custom fit by a therapist or pre-fabricated wrist brace)
- Avoiding the activities which cause pain if possible; Modify those activities which cannot be avoided
- An ergonomic consultation to modify work environment stressors
- Use of ergonomic equipment such as wrist rests, split keyboards, seating system and modified work-stations
- Education in *tendon and nerve protection* techniques including modification of sleep and work habits
- *Hand therapy* techniques to improve circulation, decrease swelling and reduce pain
- A supervised *exercise* program to stretch tight muscles, strengthen weak muscles, promote postural balance; the program should include tendon and nerve gliding exercises
- The M.D. may prescribe anti-inflammatory medications such as naprosyn or ibuprofen; If these medications cause stomach irritation, the M.D. may also prescribe a stomach calmer such as zantac
- The M.D. may recommend a cortisone injection into the carpal tunnel
- A Vitamin B6 supplement may help improve nerve function (the studies are controversial); 100 milligrams is the daily recommended dosage; too much B6 can actually cause nerve damage. You may want to consult with your M.D. prior to taking.



SURGICAL PROCEDURE

The decision to have a carpal tunnel release surgery is usually made if conservative therapy treatment does not relieve symptoms, if muscle weakness is present, if loss of sensation is constant, when pain is frequent enough and severe enough to interfere with the ability to perform daily, leisure and work activities.

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- A minor operative procedure
- Can be either endoscopic (small portal holes are made at each end of the transverse carpal ligament) or open (a small incision is made in the palm, usually in the crease)
- The roof (transverse carpal ligament) of the carpal tunnel is cut open
- The area of the carpal tunnel is expanded by 20-40% relieving the pressure on the nerve

WHAT SHOULD I DO AFTER SURGERY?

- Keep the incision clean and dry
- Change the bandages as needed, especially if saturated with blood
- Keep the fingers moving - make a gentle fist and hook fist, spread the fingers apart
- Do not bend the wrist forward (toward the palm) aggressively for 4 weeks after surgery
- Begin stretching the wrist back once the M.D. approves movement
- Use your hand for light activity, as normally as possible, but respect pain
- Once the stitches are removed, begin gently massaging the scar
- Use a silicone based scar bandage if the scar is thick, stuck, red or painful
- Gradually increase strength activities at 4 weeks post-surgery



Carpal Tunnel Syndrome Treatment



POST-SURGICAL THERAPY

- Protective splinting with the wrist neutral for a short period of time immediately post-surgery if necessary
- Cleaning and dressing of the incision until healed
- Scar management including massage, the use of scar molds or silicone gel sheeting, ultrasound, hot packs

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- Desensitization techniques for a sensitive scar
- Swelling reduction techniques including instruction in elevation of the arm, compression wraps, retrograde massage, cold packs
- Active motion including tendon and nerve gliding exercises
- Strengthening and work conditioning activities beginning at 4 weeks after surgery to tolerance.

FAQs

I'm afraid to have the surgery. I've heard that it doesn't help. Why?

- Most people who have the carpal tunnel release surgery notice an improvement in symptoms. However, symptoms may not resolve entirely if the compression on the nerve has caused any permanent damage. If this is the case, the surgery may prevent the condition from getting worse but a good result may not be reported.
- The person with a "poor" surgical result may be experiencing a "double-crush" injury. The nerves are long, starting up in the neck and branching into the three main nerves into the hand. If the nerve is compromised at one position (for example, the carpal tunnel), the function of the nerve may be compromised at other locations along its length. Your M.D. may want to pursue further diagnostic testing if symptoms continue.
- The M.D. will usually try to make the smallest incision possible to promote a speedier recovery and cause less scarring. In the rare cases that a surgery is not initially a success, a larger incision will allow the M.D. to visualize a greater portion of the tunnel and achieve a more in-depth cleaning around the nerve. This may be especially important in cases where arthritic swelling (synovium) may need to be cleaned out.

What can I expect after surgery?

- Most often, a large portion of the numbness and tingling that you may have experienced prior to the surgery is relieved almost immediately post-surgery. Occasionally, some degree of numbness may remain for 3-4 months.
- The pain that travels or radiates up the arm into the shoulder and neck is often relieved almost immediately as well. Pain becomes more centered around the surgical site while the hand is healing.

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- There will likely be tenderness at the base of the hand for 3-4 months after surgery.
- There will be some amount of swelling over the carpal tunnel for months as well.
- You may feel pressure against the carpal tunnel when you grip and squeeze objects, and especially when pushing with the palm (for example, when pushing yourself up from a chair or off the floor) for close to a year.

Can I get carpal tunnel syndrome again?

- The carpal tunnel release opens the carpal tunnel by 20-40% which relieves pressure on the nerve. If swelling caused by either work demands or disease process exceeds this amount, symptoms can continue or re-occur.

I was doing okay for a few weeks after surgery, but now my hand is hurting more. Why?

- The nerve may be "waking up". When it has been squeezed for awhile, the nerve impulses have not been moving normally. Now that there is less pressure on the nerve, it is sending out signals to try and re-establish normal nerve function. You may feel sharp, shooting pains, or burning, or "zingers". These are all good signs, even if they are uncomfortable or painful. They will normalize with time. Let the M.D. or therapist know about these sensations during your appointments.
- Occasionally, when the ligament over the carpal tunnel is released, the carpal bones "settle back" a bit. You may experience some pain and swelling over the small finger side of the wrist while this happens. This usually occurs at about week 2-3 post-surgery and may continue for 2-3 weeks before fading away.

I had the carpal tunnel release surgery several years ago and my hand felt great. Now the symptoms are back when I put pressure on the wrist in Yoga class. What is happening?

- Initially, carpal tunnel syndrome symptoms may be caused by swelling and compression on the nerve. After the surgery, the compression is relieved, but as the incision heals, the nerve may be caught up in scar tissue which does not

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allow it to stretch and glide normally as we move. With extreme wrist positions, the nerve may now overstretch at the site that it is caught in the scar and cause similar symptoms.

- The best way to prevent this future possibility is to perform tendon and nerve gliding exercises for 3 months after surgery and to use scar management techniques such as massage and silicone gel bandages.