Carpal Tunnel Syndrome and Repetitive Stress: A Yogic Perspective

by Ellen Serber

Abstract: *Computers are increasingly used for both work and entertainment. Along with this increased use come new physical challenges. Repetitive stress disorders such as carpal tunnel syndrome, cubital tunnel syndrome, and thoracic outlet syndrome plague computer users. Yoga can help prevent these debilitating disorders. Yoga teachers can aid their students by incorporating into their classes information about these injuries and ways to prevent them.*

Our modern lives create new challenges for Yoga. Millions of people now use computer terminals at work, at school, and at home. Not only do people sit for long hours staring at screens doing repetitive motions with their hands, but children from a young age now use computers to search the Internet and play games.

As Yoga teachers, we encounter the results of these new lifestyles in class. Some students have carpal tunnel syndrome (CTS), while others have repetitive stress injuries (RSI), headaches, and upper back pain and shoulder pain from sitting for hours with distorted posture. Many are mentally fatigued in a new way; their eyes are tired and their brains overstimulated. In order to help these students, we need to incorporate into our Yoga repertoire knowledge about these problems and ways to alleviate them.

A study in the July 14, 1999, issue of the *Journal of the American Medical Association* (*JAMA*)[1] reports that 1 in 5 people in the general population in Sweden have symptoms that could be characterized as CTS. Work-related CTS now accounts for more than 41 percent of all repetitive motion disorders in the United States.[2] CTS is by no means a new disorder. It was first described by James Jackson Putnam in 1880. Today it is the most common peripheral compression neuropathy.[3] CTS affects as many as 15 percent of workers in high-risk industries, such as electronic parts assemblers, musicians, and dental hygienists.[4] The incidence of both CTS and RSI is increasing in all people using computers at work.

CTS is a condition that may cause pain, tingling, numbness, and weakness in the fingers and thumb. It may be felt as pain all the way from the hand up into the shoulder. There may be tingling or numbness in the hand and fingers at night, which may disturb sleep. Its onset can be slow or sudden. If the symptoms are treated at an early stage complete recovery is possible, but if the symptoms are ignored and the problem persists, permanent nerve and muscle damage can occur.

There is no consensus about the causes of CTS. The most prevalent theory is that symptoms may be due to pressure on the median nerve. This is the nerve that carries signals between the hand and the brain. The path of the median nerve extends

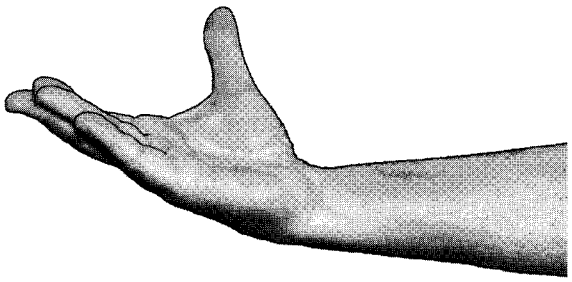

Figure 1: Observe the shape of the hands, fingers, and wrists in all standing poses and remind students to release unconscious tension (see illustration of contracted palm). Use standing poses as an opportunity to extend arms, wrists, palms, and fingers without strain.

from the forearm to the hand through a "tunnel" in the wrist. The wrist bones comprise the bottom and sides of this tunnel, and the top is a band of connective tissue (ligament). There are nine tendons running through this tunnel that connect muscles to the bones of the fingers and thumb. The tendons are surrounded by synovium, a lubricating membrane. If the synovium swells it may cause pressure on the median nerve and cause numbness, tingling, or pain in the hand.

According to online information from the American Academy of Orthopedic Surgeons,[5] the causes of swelling, thickening, or irritation of the senovial membranes in the carpal tunnel may be any of the following: repetitive and forceful grasping with the hands; repetitive bending of the wrist; broken or discarded bones in the wrist that produce swelling; arthritis, especially the rheumatoid type; thyroid gland imbalance; sugar diabetes; hormonal changes associated with menopause and pregnancy. They conclude, however, "Although any of the above may be present, most cases have no known cause."

One study suggests CTS is also associated with obesity and various medical diseases.[6] Another analysis disputes those findings, however, and concludes, "The cause of CTS is multifactorial. Carpal tunnel syndrome may occur because of previous medical conditions, occupational or nonoccupational ergonomic stressors, or a combination of risk factors. The relative importance of these factors varies, but there is strong evidence that CTS occurs more often among workers who require highly repetitive and forceful hand-intensive work, especially combined with awkward postures."[7]

Diagnosis of CTS is difficult, according to Amy Schliftman, P.T., "because of overlapping symptoms that mimic CTS." She says, "CTS often confounds practitioners, who sometimes quickly assume that CTS is the problem when it may be another condition." Other conditions that also may be present are thoracic outlet syndrome (compression of nerves or blood vessels in the brachial plexus), cubital outlet syndrome (compression of the ulnar nerve in the elbow), tendinitis, and arthritis.

There are many studies concerning CTS and RSI in the workplace, but the results are often contradictory and disputed. The stakes are high: If one continues working with pain the symptoms may escalate into major disability. An employer may be quick to respond (as is the case in many high-technology companies where engineers and programmers are prized employees), or the employer may try to fire the worker or contest his or her worker's compensation claims. A survey by Office Organix, a business that sells office equipment, shows a computer workforce of 18 million people "at significant risk from repetitive stress injury including CTS and lower back injuries."[8]

There is also controversy over measurement tools to diagnose CTS. A study evaluating various clinical screening procedures, including bilateral sensory nerve conduction testing, for CTS reported, "There is relatively poor overlap between reported symptoms, the physical examination findings, and the electrodiagnostic results consistent with CTS . . . The poor overlap between various screening procedures warns against the use of electrodiagnostic findings alone without symptom presentation being considered."[9]

The range of therapies for CTS is wide. Conservative approaches include splinting the wrist; changing the configuration of the desk, chair, monitor, and keyboard; stretching and manipulation of the arms, wrists, and fingers; anti-inflammatory drugs; and cortisone injections. The more extreme therapy is surgery, which may or may not be successful.

A review of more than 200 articles concerning conservative and surgical intervention for CTS

published in the health care literature between 1963 and 1997 and listed in the Medline index of professional medical journals concludes that a majority of the articles indicate that surgery is not necessary unless there is nerve damage. "CTS, accompanied by demyelination [injury to the sheath around the nerve] but without axonal degeneration [injury to the long process, the axon, coming out of the nerve], can be treated initially with conservative medical or manual procedures."[10] Quoting an earlier study,[11] the Swedish study of carpal tunnel in the general population notes, "Despite the high incidence of surgery for CTS, no standard criteria for clinical diagnosis have been established."[12]

The first study of Yoga-based therapy for CTS was published in *the Journal of the American Medical Association* (*JAMA*) in November 1998.[13] The subjects in the study were divided into two groups. One group received two Yoga classes a week for eight weeks that focused on upper body postures: improving flexibility; correcting alignment of hands, wrists, arms, and shoulders; stretching; and increasing awareness of optimal joint position during use. Every session ended with relaxation in *shava-asana* (corpse pose).

The second group was offered a standard wrist splint with a metal insert and told to continue whatever treatment they were currently receiving. The study measured grip strength, pain intensity, sleep disturbance, Phalen sign (measures tingling and numbness with palms pressed together and fingers pointing downward), Tinel sign (tapping to induce tingling), and median nerve motor and sensory conduction time.

The results showed that the Yoga group had significant improvement in grip strength and pain reduction; the control group did not. The Yoga group also had significantly more improvement in Phalen sign than the control group. No significant differences were found in sleep disturbance, Tinel sign, and median nerve motor and sensory conduction time.

In the June 9, 1999, issue of *JAMA* three letters to the editor disputed the study's methodology.[14] In reply to the letters, Marian Garfinkel, the chief author of the Yoga study wrote, "We have provided some initial objective evidence that Yoga can be useful in treating CTS. Certainly we would not suggest that Yoga is or ever could be the only important aspect in preventing work-related CTS."[15]

As contentious as the debate is over causes and cures for CTS and RSI, there is one thing on which everyone seems to agree: The best medicine is prevention. A very good overall article on prevention, "Occupational Hazards," by Franklin Tessler, M.D., appeared in *MacWorld* in November 1998.[16] Along with providing many suggestions about workplace equipment and work habits, Dr. Tessler writes, "Tension is the bane of people who are trying to avoid RSI. It stiffens muscles and locks posture and makes you forget all these tips."

Yoga provides an excellent preventive strategy to address the immediate concerns of CTS and RSI as well as the long-term goals of stress reduction and increased self-awareness. One need not veer from a traditional *asana* practice to include these elements, but a new focus may be in order. Just as we attend to the feet as the base of standing poses, we must now look at the hands and wrists as essential elements in our practice and teaching. Incorporating additional finger, wrist, lower arm, and shoulder stretching into the fabric of a class can dramatically reduce the CTS symptoms of students who regularly use computers.

Furthermore, in the same manner that we focus on standing posture, we can begin to focus on sitting posture in a chair. *Asana* practice can stretch the contracted muscles that may contribute to RSI and CTS and build strength so that long hours of sitting are more tolerable. Muscular rigidity, postural imbalance and immobility, and restricted breath are familiar problems to CTS/RSI sufferers. A Yoga program that stresses breath, fluid movement, and balanced alignment can help counter these tendencies.

But *asana* practice can also aggravate CTS. Poses like *adhomukha-shvan-asana* (downward-facing dog), which places weight on the wrist, can create problems for CTS sufferers. A useful modification for this pose is to roll up a sticky mat and place it under the heel of the palm to create a less acute angle for the wrist. (See Figures 2 and 3.)

Poses such as *urdhva-mukha-shvan-asana*

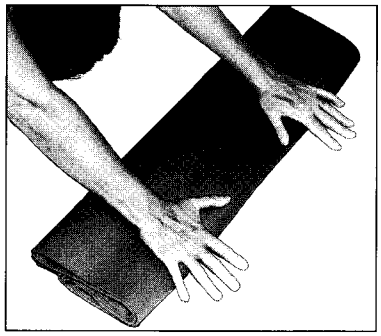

Figure 2: *Downward-facing dog is quite painful for students with CTS and RSI. Place a sticky mat on the floor and put the heel of the hand on the mat and the fingers on the floor. The elevation of the wrist will decrease pressure on the wrist.*

(upward-facing dog), *adho-mukha-vriksha-asana* (upward-facing tree or full arm balance), *baka-asana* (crane), and *urdhva-dhanur-asana* (upward bow or full back arch), which place weight with pressure on the wrist, are usually not appropriate poses for students with CTS.

Modifications of poses can help create the effect of the pose without the wrist involvement. For example, passive backbending over bolsters, blankets, a chair, or a backbender allows the student to experience the opening of the back arch without pain in the wrist and fingers. Upward-facing dog may be done with the hands on the edge of a chair seat, the upper thigh on the seat's edge, to reduce the weight on the wrist. Students who have strong symptoms would be better off not taking any weight on the wrist until the symptoms subside.

Prevention of CTS and RSI starts not only with stretching, strengthening, and improving alignment but also with self-observation. The following recommendations can be given to students who complain of symptoms of CTS and RSI.

Checklist for Prevention[17]

1. The most important thing to do is get up from your desk and move around every half hour. Take your eyes off your computer screen and gaze into the far distance. Drink a glass of water. Some computers have alarm clock functions that can be set to remind you to get up. If you don't have such a function there are shareware programs you can download from *www.shareware.com* that can be set to remind you to get up.

2. It is as important to take care of the "tool," your body, as the task. Sit up, extending the spine, while working. Keep the shoulders down and rolled back. Maintain awareness of your body as you work.

3. Do not eat your lunch at your desk. During your lunch break do an activity that involves physical exercise: walk, go to the gym, shop.

4. Include full body stretches in your daily activity, emphasizing the upper body. Stretch before you go to sleep at night.

5. Observe your sleeping position. Try to avoid curling up your wrists or putting your arm under your head when sleeping on your side. Make sure your pillow is the right height for sleeping. The neck should be supported, with the head resting comfortably. The neck should be in line with the rest of the spine, not propped up above it with extra pillows.

6. Check that your work station is set up correctly. The latest research suggests that the monitor screen should be between 15° and 50° below horizontal eye level. (See *http://www.ur-net.com/office-ergo/setting.htm.*) Wrists should be level when using the keyboard. New keyboards and mouse designs can help prevent hand and wrist strain. (See Tessler's article for suggestions.) Feet should be placed on the floor.

7. Develop an exercise program that includes strengthening the upper body, so that you can sit comfortably in an upright position without slouching. The program must also include exercises for flexibility to stretch out the contracted muscles of the wrist, arm, shoulder, neck, and upper back.

8. If pain persists, go to a competent health care professional who is experienced in treating carpal tunnel and repetitive stress disorders.

Here are some Yoga-based exercises that you can do in the office during the course of the day to help prevent carpal tunnel and repetitive stress

injuries. It is best to hold each position for a few breaths and let the stretch increase, but not to force it. The most important part of each exercise is to become aware of your body and your breath. Animated illustrations of this series of exercises can be found at: *http://www.will-harris.com/yoga/rsi.html.*

Figure 3: *Another variation of downward facing dog takes no weight on the wrists. Place hands on a support such as a rail or countertop and pull back, extending the upper back and arms completely. Feet should be forward of the hips and the abdominals and ribs lifted.*

1. Full body stretch at the wall: Stand up facing the wall and reach your arms and fingers up as far as you can. While you stretch up, also stretch down by placing your feet firmly onto the floor. Firm up your legs, extend the sides of the torso, and bring the shoulder blades toward the wall. Breathe fully as you stretch, walking your fingers up the wall.

2. Stretching the shoulders: Move a little away from the wall so that your torso is diagonal to your hips and press both palms into the wall equally. Press into the ground with your feet, firm up your legs, and release your tailbone away from the wall. Lift up the ribs and let your head drop slightly. You can also do this using the back of a chair. Place your hands on the chair and walk back until your torso is extended parallel with the floor. Firm up the legs, lift up the abdominal muscles, and lift the ribs while releasing the spine, with tailbone away from the chair and top of the spine toward it.

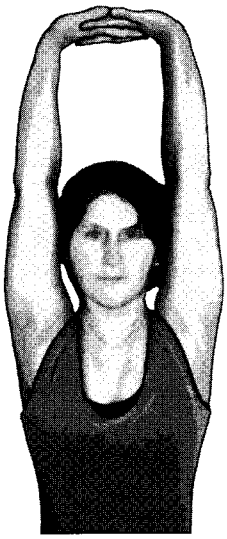

Figure 4: *Interlock fingers overhead and press the palms to the ceiling, stretching through the whole upper back, arm, wrist and palm.*

3. Forearm and wrist: Place the right palm at the wall, spreading your fingers equally. Extend your elbow and press the palm fully into the wall. Wait a few breaths and then turn your head to the left, bringing the tip of the right shoulder blade in toward the front of your body. Hold and breathe. Change sides.

4. Extended full body stretch: Take your arms out to the sides with the palms facing down. Extend your fingers and stretch through the elbows. On exhalation rotate your shoulders back and bring the palms facing up. On your next exhalation bring the arms up overhead with the palms facing each other. Again, press the feet onto the floor and firm up your legs; stretch the sides of the torso. After a few breaths, interlock your fingers and press the palms up to the ceiling, stretching the fingers and palms open. (See Figure 4.) Hold this stretch, and then on an exhalation curve to the side. Repeat on the other side. This can also be done seated at your desk. If you are seated, make sure to press the thigh bones deeply into your chair as you stretch up.

5. Sitting posture: Practice sitting with an upright torso, the sides of the torso extending and the head resting comfortably on the neck. Bring your hands down to the seat of the chair and roll the shoulders back, bringing the shoulder blades into the back.

Some of the following poses can be done either standing or sitting. If you are seated, move forward on your chair and place your feet firmly on the ground; press your thigh bones into the chair and extend your torso upward with your shoulders dropping down. If you are standing, remember to keep your feet planted firmly on the ground and your legs strong.

6. Opening the chest: Interlock your fingers behind your back with the palms facing the torso. Roll the shoulders back, but keep the ribs from poking forward. Stretch your elbows and arms on

an exhalation and hold this posture for a few breaths. On an exhalation, bend your elbows and bring your wrists to the right side waist, gently pressing the right elbow toward the left. Then bring the wrists to the other side. Repeat this sequence with the fingers interlocked with the opposite thumb on top.

7. Opening the mid-back: Hug your body, placing the right hand around your left shoulder and left hand around your right shoulder, one elbow over the other. Breathe into the area between your shoulder blades. On the exhalation, bring the lower arms perpendicular to the floor, the palms facing each other; stretch the fingers up. On the next exhalation, raise the elbows up to shoulder height. Hold for a few breaths and then repeat, reversing which elbow is on top.

8. Releasing the neck: Shrug the shoulders high up to the ears, hold for a beat, and then release and drop. Repeat at least 3 times.

9. Releasing the side of the neck: Sit forward on the seat of your chair with your feet planted firmly on the floor. With your right hand reach back to the seat back or the rear of the seat itself. Extend the torso and drop the chin into the chest. Pull diagonally to the left and lift your left hand up and reach over your head toward your right ear, gently pulling the head diagonally away from the right shoulder. Hold and breathe, stretching from the base of the skull to the shoulder. Repeat on the other side.

10. Twisting the torso: With the feet planted firmly on the ground, and the thigh bones pressing into your chair, exhale and lift and turn the belly to the right. Do not twist the neck; keep the head in line with the torso. Let your hands help you turn by pressing into the seat or the back of the chair. Gradually increase the twist and now let your eye gaze turn to the right around your shoulder. Repeat to the other side. Remember to keep breathing slowly and deeply as you twist.

11. Stretching forearms: Bring your palms together in front of your chest in a prayer position, stretching all the fingers fully. Relax your shoulders. Slowly stretch the heel of your palms down until they are at the level of your wrists. If you can do this stretch without discomfort you can increase the stretch by moving the hands over to the right and holding for a few breaths. Repeat to the left. Stretch slowly and carefully, observing the sensations of your forearm and wrist. (See Figures 5 and 6.)

12. Stretching the wrists: Make fists of your hands and place them, thumbs up, on the desktop, supporting your lower arm on the desk. Slowly stretch the fists to the right, without moving your lower arm, and then to the left. Lift your arms off the desktop and make slow circles with your wrists, keeping your hands in closed fists. Circle both directions. Release your fingers and place them, tips up, on the edge of your desk. Press into the desk with the fingers. Try this first with the fingers together and then spread apart.

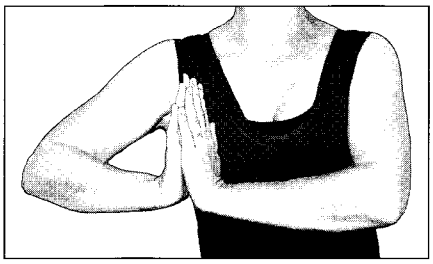

Figure 5: *Place the palms together in front of the chest at a comfortable height. Slowly bring the heels of the hand down to the level of the forearm and press them together.*

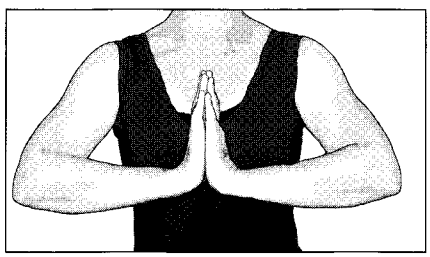

Figure 6: *Shift the palms over to the side, stretching through the forearm and wrists.*

13. Stretching the fingers: Place the index finger on the edge of your desk, keeping your wrists straight. Gently push into the desk and hold for a few breaths. Repeat with all the fingers except the thumb.

14. Stretching the thumbs: Place your right palm on the desktop with your wrist straight. Relax all your fingers, and with your left hand slowly stretch the right thumb away from the forefinger. Hold for a few breaths and then release. Now do the same with the other hand.

15. Shaking out tension: Shake out your wrists and arms, letting them dangle from your shoulders. Rotate your shoulders forward and back. Turn your head right and left, looking into the far distance. Close your eyes and take some deep, slow breaths keeping your belly soft.

Notes

1. Atroshi, I. Prevalence of carpal tunnel syndrome in the general population. *Journal of the American Medical Association* (1999) 282:153–158.

2. Atcheson, S. G. Concurrent medical disease in work-related carpal tunnel syndrome. *Archives of Internal Medicine* (1998) 158:1506–1512.

3. Sternbach. G. The carpal tunnel syndrome. *Journal of Emergency Medicine* (May–June 1999) 17(3):519–523.

4. Roach, K. Carpal tunnel syndrome, *http://uhs.bsd.uchicago.edu/~roach/carpal-tunnel.html.*

5. American Academy of Orthopaedic Surgeons Public Information, *http://www.aaos.org/wordhtml/pat_educ/carpaltu.html.*

6. Atcheson, S. G. op. cit.

7. Burt, S. Work-related carpal tunnel syndrome. *Archives of Internal Medicine* (1999) 159:1371–1372.

8. Study pinpoints dangers to workers. Business Wire, cited in Excite.com News, January 8, 1999.

9. Homan, M. M., et al. Agreement between symptom surveys, physical examination procedures and electrodiagnostic findings for the carpal tunnel syndrome. *Scandinavian Journal of Environmental Health* (April 1999) 25(2):115–124.

10. Davis, P. T., and J. R. Hulbert. Carpal tunnel syndrome: Conservative and nonconservative treatment: A chiropractic physician's perspective. *Journal of Manipulative Physiological Therapy* (June 1998) 21(5):356–362.

11. Dawson, D. M. Entrapment neuropathies of the upper extremities. *New England Journal of Medicine* (1993) 329:2013–2018.

12. Atroshi, I. op. cit.

13. Garfinkel, M., et al. Yoga-based intervention for carpal tunnel syndrome, a randomized trial. *Journal of the American Medical Association* (November 11, 1998) 280(18):1601–1603.

14. Multiple authors. Yoga for carpal tunnel. *Journal of the American Medical Association,* (June 9, 1999) 281(22):2087–2089.

15. Ibid.

16. Tessler, F. Occupational hazards, *http://macworld.zdnet.com/pages/November.98/Feature.4544.html.*

17. Prevention checklist developed with the help of Amy Schliftman, P.T., West Marin Physical Therapy, March 1999.

Resources

A valuable source of information for CTS and RSI sufferers is "Sorehand," a free online discussion group. See the Sorehand website at: *http://www.ucsf.edu/sorehand.* To subscribe to the ongoing exchange of information, send e-mail to *listserv@itssrv1.ucsf.edu* with "*subscribe sorehand* <your email address>" in the body of the message.

Tessler, Franklin. Occupational hazards. *MacWorld Magazine* (November 1998), *http://macworld.zdnet.com/1998/11/features/4544.html.*

Butler, Sharon J. *Conquering Carpal Tunnel Syndrome.* Oakland, Calif.: New Harbinger Publications, 1996.

Pascarellii, Emile, M.D., and Deborah Quilter. *Repetitive Strain Injury: A Complete Computer User's Guide.* New York: John Wiley & Sons, 1994.

Pettie, Sandra. *Repetitive Strain Injury Sourcebook.* Los Angeles: Lowell House, 1997.

Montgomery, Kate. *End Your Carpal Tunnel Pain Without Surgery.* Nashville, Tenn.: Rutledge Hill Press, 1998.