

Overuse Syndrome

ClarinetFest® 2001
Christine MacDonnell

Overuse syndrome is a debilitating and potentially career ending disorder for many occupations, particularly musicians. What causes overuse syndrome? Why are so many musicians afflicted with this painful disability? There are many types of overuse syndromes, such as thumb strains, trigger finger, wrist/elbow strains, bursitis, and carpal tunnel syndrome. Here I will discuss mostly carpal tunnel syndrome as a representative of this family of disorders.

Also referred to as repetitive strain injuries, overuse syndromes are painful nerve injuries due to compression of the nerve as it passes through the bones. In carpal tunnel syndrome (CTS), the nerve affected is called the median nerve. The median nerve supplies sensation to the thumb, index and the middle fingers. Compression of this nerve causes pain, numbness and weakness in these fingers. As you can imagine, inability to use these fingers will disable any musicians from playing an instrument. So why does the nerve get inflamed? To answer these questions we must understand some anatomy and the mechanics of the hand and wrist.

Pathophysiology: The hand is made of bones, pulled by tendons (which enable it to move) that are attached to the muscle. These muscles are connected at various levels of the forearm and the elbow. The tendons are covered by a fibrous material called tendon sheath, which allows the tendons to glide and slide smoothly when they move across bone. Traveling next to the tendons are various nerves and blood vessels that supply the sensation and nutrients to the hand. Many nerves and tendons go through a very small area in the wrist to give your fingers their mobility and sensory perception. To be exact, there are 9 tendons, three major nerves and two arteries that must go through that wrist. The wrist area is made up of 2 rows of bone, called the carpal bones, total of 8 pieces. These bones, when fit together, form a small arch through which all the nerves and tendons pass. The concave anterior surface of the carpal bones and the tendons form a tunnel called the carpal tunnel. In normal usage, the tendon within the sheath glides easily. However, in activities that require much repetitive movement, the tendon in the sheath causes too much friction and literally overheats within this very small space. Swelling occurs in this small space, thus compressing all the structures within it. Imagine the nerve traveling along these overheated tendons. They become pinched and pain occurs distal to the inflammation, hence the shooting pain. When this condition continues for a while, the pinched nerve becomes damaged causing weakness in the hand. In the late stages of the disorder, the musician loses all sensation to the affected areas. These are the mechanical aspects of carpal tunnel syndrome. This same principle applies to other nerves of the shoulder, neck or elbow.

Symptoms of CTS: Early signs of CTS are tingling, "pins and needles" sensation of the hands, followed by a decrease in ability to pinch or squeeze objects. During the night, the pain can become so intense that one may not be able to sleep. As the condition progresses, the tingling intensifies and numbness begins. Eventually the nerve damage causes the fingers to lose function, and sensations are dulled in the entire hand. Some people complain of a swollen sensation despite normal appearing hands. Other late findings are actual muscle loss due to lack of nerve supply to the muscle. The muscle becomes weak and has no strength near the palm. In some cases, the loss of nerve function also causes a loss of sweat function in the hand. The acute or abrupt onset of the symptoms may be irreversible and very painful, or the symptoms might be insidious and gradual, only apparent in extensive use of the hand. (Overuse.)

Social psychological impact: From my own experience, it was very frightening not to be able to practice or perform with ease and dexterity. You start to lose confidence. You are filled with anxiety. The pain reminds you of the possibility of never being able to pick up your instruments again. The prospect of surgery and extensive rehabilitation are no guarantees you will ever play again or play as well as you had. CTS has crippled so many musicians, and many have lost work and suffered lifelong pain and disability without the use of the hand to do the simplest of tasks.

This is the reason why I decided to bring awareness to you about overuse syndrome and what to do to prevent this potentially debilitating disorder. A multifaceted approach is necessary to prevent or cure this problem.

Prevention and treatment: You can prevent overuse syndrome by changing your practice and playing habits. Rest is the best treatment, so it is important to take breaks in practice regime and performances. Drink plenty of water! Muscles are composed mostly of water, and if your body is suffering from chronic dehydration, the muscles cannot function properly. With dehydration, your muscles will fatigue faster, thus causing them to feel tired and heavy. Early use of anti-inflammatory medications such as aspirin/Motrin/Advil/Alieve can help to reduce inflammation and prevent nerve compression, but do not use these drugs to mask the inherent problem. Really become aware of your playing habits. Look in the mirror when you play and check your posture. Make sure you are not slouching in your chair, or that your head is forward of your torso and unsupported. Try to find a chair that will help your posture and that can be locked in an upright position. (A simple problem like an uncomfortable chair has been the root of many of my problems.) Check your instruments: make sure the tension on the springs is not too tight. If your thumb is hurting, experiment with moving the thumb rest up on the clarinet. Pain can be due to pressure on the tendon and nerve, from the weight of the clarinet on the thumb. Move any other keys that will allow for more ergonomic hand positioning. Use a neck strap and see if that helps. It is also important to do stretching exercises as a warm-up before playing, just as an athlete would stretch and warm-up before he plays his game. Stretching will reduce muscle fatigue, improve circulation, relax tightened restrictive muscles, improve flexibility of relaxed muscles, and relax the mind as well.

My favorite exercises: Extensor and flexor stretches: extend your hand and arm fully, then stretch the flexing tendons by resisting the wrist going into full extension while the wrist is fully flexed at 90 degrees. Hold this position for a count of five seconds. The same methods in the opposite direction are used to stretch the extensor tendons. (Fig 1) This exercise will increase mobility of the forearm, wrist, and hand. For neck/shoulder stretches, you can roll your shoulders forward for several seconds, repeat this rolling it back, and shrug it up then down. The point is to make the shoulder go through full range of movement, stretching occurs when holding each position for duration of 10 seconds. (Fig 2) Finger exercises: you can fully extend all fingers by fanning them all out, alternating this movement with tight fist clinches for five repetitions. (Fig 3) Moving joints through their full range of movement help to increase flexibility in the joint, whether it is the finger, wrist, or shoulder. To reduce tension in the thumb and maintain maximum thumb strength and flexibility I recommend this exercise: grasp the flesh between the thumb and forefinger of your right hand with the thumb and forefinger of your left hand. Gently squeeze this tissue while slowly closing your fingers and thumb, hold the position for 5 to 10 seconds, slowly open your right hand and hold for 5 seconds. Then repeat the process on the left thumb. (Fig 4) Of course, your doctor or physical therapist may prescribe other stretches and exercises to fit your diagnosis.

Usual Therapy: At the very early signs of any symptoms, you should immediately seek medical help and rest. (Just again to emphasize this is an overuse disorder, so resting will help.) A doctor will perform

simple tests to determine if there is nerve inflammation by simply tapping the trapped nerve or examine the fingers for weakness. Radiological studies might be use to find other causes of pain, such as fractures and arthritis. Early treatment and medical care will help to stop progression and further injury to the hand. Your doctor may prescribe corticosteroids, a type of steroid, injected at the site of the carpal tunnel to reduce tendon swelling and diuretics if needed. You may have to wear a splint or brace on your wrist to keep it from bending and to minimize or prevent pressure on the nerve. After the initial few weeks, the splint may only be needed at night. When medication and splinting does not improve your situation, then surgery may be required. Surgery will drain the fluids from the tendon sheaths that are compressing the nerve. This would entail either cutting the carpal ligament, the standard procedure, or stretching it. According to Dr. Richard Eaton, director of Hand Surgery Center at St. Luke's-Roosevelt Hospital in New York City, numbness will be prevalent 6 to 8 months after surgery since the nerve must regenerate from the point of compression to the end of the fingers.

Alternative therapy: Beside conventional medical treatment of exercise and anti-inflammatory pills, there are many alternative therapies for CTS. Some of these have shown to be effective, depending on who has done the study. Natural nutrients that have claims of anti-inflammatory effects are essential fatty acids (1500 to 3000 mg/day), curcumin (250-500 mg/day) bromelain (250-500 mg/day) and alpha lipoic acid (100mg/ twice a day). Some have suggested that the use of Vitamin B6 supplement (50-200-mg/day) for three months might provide relief of pain and increase function in 85% of subjects studied. B complex may be use as a substitute for B6. Vitamin B6 is needed for normal function of nerve cells and is the most frequently used and well-known nutritional treatment for CTS. It has been reported that people with CTS are frequently deficient in vitamin B6, and yet other doctors have not found a link. At very high levels vitamin B6 can damage sensory nerves, leading to numbness in the hands and feet as well as difficulty in walking. It is believed that vitamin B6 is usually safe in amounts of 200-500mg per day.

John Marion Ellis, M.D., together with well-known and respected medical researchers, was able to conclusively demonstrate that the synovium surrounding tendons underwent changes in the absence of vitamin B6, that resulted in Carpal Tunnel Syndrome, Tendonitis and Tenosynovitis, as well as many other forms of soft-tissue diseases. Two African Americans, Leo Strong and Eugene Howard, "over a period of 11 months gave 79 test tubes of blood during research that associated crippling disease with human vitamin B6 deficiency. Laboratory data on Strong was published in Proceedings of National Academy of Sciences, 1978, and clinical data in American Journal of Clinical Nutrition, 1979. "In a successful double blind study (where neither the doctor or patient know who receives the B6 and who receives the placebo), Howard, 1980, by videotape demonstrated improvement of crippling in hands and shoulders following treatment with vitamin B6. Results were conclusive."1

Dr. Ellis wrote, "I firmly believe that 90% of what is called arthritis in the United States is, in reality, a biochemical change in synovium of tendons and joints, particularly in the fingers, thumbs, elbows, shoulders, knees and hips. With these changes in synovium, a person experiences swelling, pain and stiffness of the joints, symptoms that most men and women as well as doctors call 'arthritis.' . . . as Karl Folkers [Ph.D., then Ashbel Smith Professor and director of the institute for Biomedical research, University of Texas, Austin, TX] and I have proved, these conditions respond favorably to adequate amounts of pyridoxine, given over a period of 90 days. Many of my patients experienced relief in only a matter of weeks, but in the majority of cases, it does take about six weeks for the symptoms to start disappearing, and twelve weeks for a definitive response. In cases of severe stiffness, there will be

gradual improvement up to a year."¹ Dr. Ellis recommends 25-300 mg of B6 a day depending on the person's biochemistry. The following are just two cases of Dr. Ellis with positive results:

Joseph DeChamp had severe stiffness in all fingers of both hands, with 40% loss of flexion and extension. After receiving vitamin B6, 200-500 milligrams daily for 12 weeks the severe stiffness subsided remarkably in the fingers and the Carpal Tunnel Syndrome disappeared.¹

Sarah Black had extreme swelling of hands and feet accompanying pregnancy as well as Carpal Tunnel Syndrome. Both of these conditions responded spectacularly to vitamin B6. Sarah's husband, Gerald, also sought help from Dr. Ellis for Carpal Tunnel Syndrome. After twelve weeks of treatment with 100 mg of vitamin B6 daily, all swelling, numbness, tingling, and severe stiffness of fingers subsided in both hands.¹

These are just a few cases that suggest alternative therapy is helpful, but always keep in mind that you should not delay evaluation with a physician. Alternative therapy should not be used to replace proper medical evaluation.

Modifying your diet to reduce or eliminate saturated fats and fried foods will also decrease inflammation. In several publications of The Arthritis Trust of America, it is suggested that one should avoid excess consumption of sugars, caffeine, alcohol, processed grains and corn, foods containing yellow dyes, estrogen, oral contraceptives and tobacco. Try to add more whole grains, seeds, nuts, soybeans, fresh salmon, brewer's yeast, molasses, liver, wheat bran, avocados, bananas, green leafy vegetables, prunes, raisins and blueberries to your diet.

Cautioning that supplements must be designed for individual use, and that they are not a substitute for proper nutrition, Richard P. Huemer, M.D. of Vancouver, Washington, an orthomolecular physician, recommends "500 to 2000 mg of vitamin C, a 'super' B complex that has 50 mg of the major B vitamins, and at least 100 mg more of vitamins B2, B6, and pantothenic acid. In addition, he advises, 1 to 3 grams of omega-3 fatty acids, extracted from fish oils," which will reduce inflammation.²

A combination of herbal supplements in equal parts for inflammation and pain relief is:

Cramp Bark (*Viburnum opulus*)
St. John's Wort (*Hypericum perforatum*)
Wild Yam (*Dioscorea villosa*)

You can obtain them from health food stores as dried extracts, teas or tinctures. An experienced homeopath can prescribe a regimen for treating CTS that is designed especially for you. Some of the most common remedies are listed below. These should be taken in a dose of three to five pellets of 12X to 30C every one to four hours until symptoms clear up.

Apis mellifica for joints that are red, hot, or swollen

Arnica montana, four times per day, for a bruised, beat-up feeling, soreness, achy muscle after trauma or overuse; this treatment may be especially effective if the gel or cream form is used topically

Guaiacum for CTS that is improved by the use of cold applications

Alternating hot and cold water applications (contrast hydrotherapy) may offer relief from CTS as well. This approach decreases inflammation, offers pain relief, enhances blood flow and healing. Immerse your wrists fully in hot water for three minutes followed by one minute in cold water, and repeat three times. Do this two to three times daily.

Acupuncture releases the body's endorphins and enkephalines, our natural pain-killing chemicals, and can help a high percentage of people with pain. The National Institute of health (NIH) recently covered a panel of experts to review the state of scientific research in regard to acupuncture and concluded that it could be an acceptable alternate or adjunct treatment of pain associated with CTS. For those of you who hate needles, the cold laser treatment may be used as a substitute for acupuncture. Cells are not damaged in this process. During the treatment, the cold laser penetrates the cells of the skin, entering the tendons and scar tissue. The laser deposits photons into the cells and nerve stimulation is immediate. Circulation is improved as well as oxygen and endorphins are released to block pain. Enzymes that accompany pain are blocked, and the ability of lymphocytes to react to antigens is reduced, thereby acting as an anti-inflammatory. Swelling can be reduced in hours, but in chronic situations, 2 to 3 treatments per week may be necessary.²

Massage and pressure point therapy may also help prevent or relieve symptoms, especially when rosemary and/or St. John's Wort oil are used. Carol A Cooper, RN, D.C. of Keizer, Oregon, has prepared a videotape on CTS that, as well as proper supplements, explains to patients how to provide themselves with limited testing and treatment of their condition. One suggestion of hers is to massage the palm side of the wrist, even if it hurts, to break down the scar tissue and increase circulation. Include the palm muscles and forearm as well.³ Dr. Cooper also advises finding tender spots on the body and massaging them. If atrophy of the muscle is present, she suggests squeezing a tennis ball, as those contractions will help build up muscles again. This should not be done until pain is relieved however.

In conclusion, overuse syndrome is a preventable disorder. Good practice habits and early treatments is the key to preventing permanent damage to the hands. Various treatments are helpful to relieve inflammation and pain, but no treatment will be necessary if proper precautions are taken along with good warm up exercises prior to performing to prevent injury. I hope that my research into this topic has provided you with enough basic information to understand and recognize overuse syndrome. If there are any questions, you may email me at winds4you@aol.com.

Footnotes

¹. John Marion Ellis, M.D., Free of Pain, National Headquarters, Natural Food Associates, 1988.

². Maxine Karpen, R.N., "Treating Carpal Tunnel Syndrome," Alternative & Complementary Therapies, September/October 1995, p. 284.

³. Carol A Cooper, D.C. Heliotropes Lecture Series, Carpal Tunnel Syndrome

References:

1. Fuhr JF, Farrow A, Nelson HS. Vitamin B6 levels in patients with carpal tunnel syndrome. Arch Surg 1989; 124:1329-30.
2. Keniston RC, Nathan PA, Leklem JE, Lockwood RS. Vitamin B6, vitamin C, and carpal tunnel syndrome. J Occup Environ Med. 1997;39:949-59.

3. Franzblau A, Rock CL, Werner RA, et al. The relationship of vitamin B6 status to median nerve function and carpal tunnel syndrome among active industrial workers. *J Occup Environ Med.* 1996;38:485-91.
4. Smith GP, Rudge PJ, Peters TJ. Biochemical studies of pyridoxal and pyridoxal phosphate status and therapeutic trial of pyridoxine in patients with carpal tunnel syndrome. *Ann Neurol* 1984;15:104-7.
5. Ellis JM, Azuma J, Watanbe T, Folkers K. Survey and new data on treatment with pyridoxine of patients having a clinical syndrome including the carpal tunnel and other defects. *Res Comm Chem Path Pharm* 1977;17(1):165-77.
6. Ellis JM. Vitamin B6 deficiency in patients with a clinical syndrome including the carpal tunnel defect. Biochemical and clinical response to therapy with pyridoxine. *Res Comm Chem Path Pharm* 1976;13(4):743-57.
7. D'Souza M. Carpal tunnels syndrome: clinical or neurophysiological diagnosis. *Lancet* 1985;i:1104-5.
8. Driskell JA, Wesley RL, Hess IE. Effectiveness of pyridoxine hydrochloride treatment on carpal tunnel syndrome patients. *Nutr Rep Internat* 1986;34(4):1031-9.
9. Ellis JM. Treatment of carpal tunnel syndrome with vitamin B6. *Southern Med. J* 1987;80(7):882-4.
10. Browning DM. Carpal tunnels syndrome: clinical or neurophysiological diagnosis? *Lancet* 1985;i:1104-5 [letter].
11. Smith GP et al. Biochemical studies of pyridoxal and pyridoxal phosphate status and therapeutic trial of pyridoxine in patients with carpal tunnel syndrome. *Ann Neurol* 1984;15:104-7.
12. Amadio PC. Pyridoxine as an adjunct in the treatment of carpal tunnel syndrome. *J Hand Surg* 1985;10A(2):237-41.
13. Stransky M et al. Treatment of carpal tunnel syndrome with vitamin B6: a double-blind study. *Southern Med. J* 1989;82(7):841-2.
14. Bernstein AL, Dinesen JS. Brief communication: effect of pharmacological doses of vitamin B6 on carpal tunnel syndrome, electron-encephalographic results, and pain. *J Am Coll Nutri* 1993;12:73-6.
15. Gaby AR. Literature review & commentary. *Townsend Letter for Doctors and Patients.* 1990;Jun:338-9.
16. Parry G, Bredesen DE. Sensory neuropath with low-dose pyridoxine. *Neurology* 1985;35:1466-8.
17. Schaumburg H, Kaplan J, Windebank A, et al. Sensory neuropathy from pyridoxine abuse. *N Engl J Med.* 1983;309(8):445-8.

Links and Sources

Sharon J Butler, *Conquering Carpal Tunnel Syndrome*, Advanced Press, 1708 Lancaster Ave #321 Pauli, PA 19301

Carol A Cooper, D.C. *Heliotropes Lecture Series, Carpal Tunnel Syndrome*, Heliotrope Natural Foods 2060 Market Street, Salem, OR 97303

On the Internet:

<http://home.mdconsult.com>

<http://www.illness.com/library.htm> Provides informational sites and publications

<http://altmedicine.com> provides numerous medical sites

<http://www.wellweb.com>

<http://www.altmedicine.org>

<http://www.naturalhealthlink.com>

<http://www.garynull.com>

<http://www.arthritistrust.org>

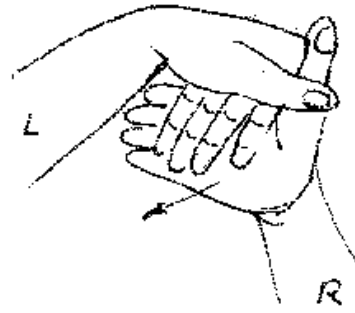
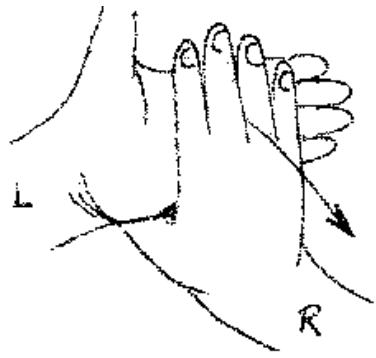


figure 1



figure 2



figure 3

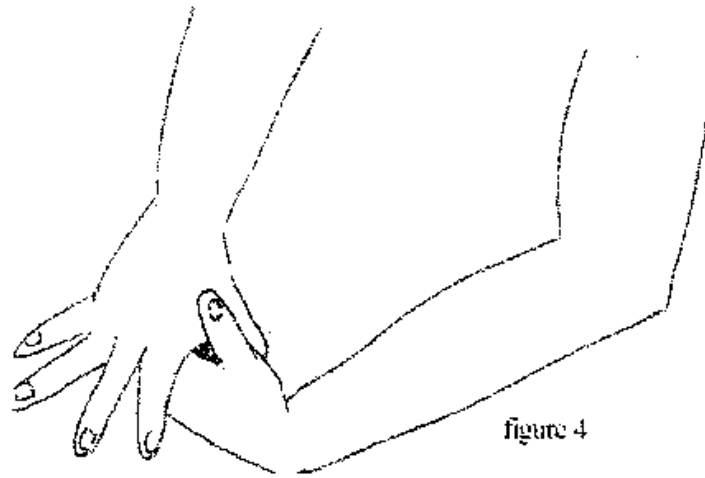
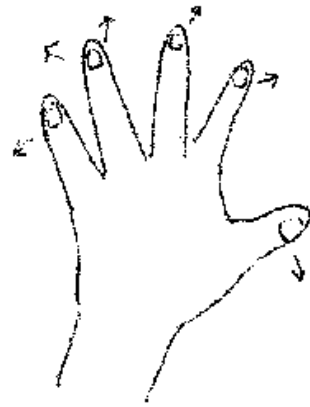


figure 4