

FACT SHEET

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CUMULATIVE TRAUMA DISORDERS

What are Cumulative Trauma Disorders?

This fact sheet describes Cumulative Trauma Disorders (CTDs), provides information about some types of CTDs and their most common symptoms, addresses who is at risk for developing them, and explains how to prevent CTDs.

Cumulative trauma disorders (CTDs) also known as repetitive strain injuries, repetitive motion disorders, overuse syndrome and work-related musculoskeletal disorders. CTDs are the largest cause of occupational disease in the United States and the most frequently reported type of occupational disease in Connecticut. CTDs are injuries of the musculoskeletal system, which includes joints, muscles, tendons, ligaments, nerves, and blood vessels. CTDs are usually caused by a combination of the following risk factors:

- **repetitive motions**
- **forceful exertions** - pulling, pushing, lifting, and gripping
- **awkward postures** - body positions that are not the natural resting position
- **static postures** - body positions held without moving
- **mechanical compression of soft tissues** in the hand against edges or ridges, such as using tools or objects which press against the palm
- **fast movement** of body parts
- **vibration**, especially in the presence of cold conditions
- **mental stress**
- **lack of sufficient recovery time** (rest breaks, days off), which will increase the risk of developing a CTD by any of the above factors.



Cumulative trauma disorders primarily affect the upper extremities and include such disorders as carpal tunnel syndrome, wrist tendonitis, ulnar nerve entrapment, epicondylitis, shoulder tendonitis, and hand-arm vibration syndrome. Common symptoms of CTDs include pain, and swelling of the body parts that are performing the work duties. Although back injuries are excluded from the definition of CTDs, it is important to note that they too, are often the result of similar risk factors. While some occupations have more risk factors than others for the possible development of CTDs, these risk factors can be reduced. It is important to note that CTDs are preventable.

WHO IS AT RISK FOR CTDs?

Any occupation involving the above risk factors can cause CTDs. Although it is difficult to list all occupations, some workers that have been known to have an increased likelihood of developing a CTD include office workers, assemblers, meat packers, sewing machine operators, buffers/ grinders, bricklayers, and housekeepers. Steps can be taken to make these and other “high risk” jobs safe.

WHAT ARE SOME TYPES OF CTDs?

Cumulative Trauma Disorders can be categorized into tendon disorders and nerve disorders.

A. Tendon Disorders

Tendons are bundles of fibrous tissue that connect the muscles to the bones. Disorders of the tendons and of their protective coverings, called synovial sheaths, are among the most common types of CTDs. Symptoms include dull aching sensations over the tendons, tenderness to the touch, discomfort with certain movements and sometimes disabling pain. **Tendonitis, tenosynovitis, stenosing tenosynovitis, De Quervain’s disease, trigger finger, ganglionic cysts, golfer’s elbow** (medial epicondylitis), **tennis elbow** (lateral epicondylitis), and **rotator cuff tendonitis** are all common types of tendon disorders.

Tendon inflammation that occurs when a muscle/tendon is repeatedly tensed or used is called **tendonitis**. With normal use, fibers that make up the tendons are exposed to “micro-traumas” or small tears that are easily repaired by the body. With continued overuse and lack of recovery time, however, the tears are unable to heal fully. Commonly affected areas are the wrists, elbows and shoulders. Occupational risk factors for tendonitis include repetition, force, awkward or static posture, over-extension (i.e., excessive stretching) of muscles, fast movements, and/or vibration. Without rest and sufficient time for the tissues to heal, permanent damage may occur.

Tenosynovitis is a general term for irritation of the tendon synovial sheath caused by awkward position, force, and the other CTD risk factors. The sheath is stimulated to produce excessive amounts of fluid, called synovial fluid, which accumulates and causes the sheath to become swollen and painful. Additional symptoms include tenderness, cracking sounds, and usually some loss of function of the affected body part. Poor work station layout, tool design, and work habits can contribute to the onset of this disorder.

Stenosing tenosynovitis, another form of tenosynovitis, is the tightening of the tendon synovial sheath caused when the tendon surface becomes irritated, rough, and inflamed. Repetitive motions which place stress on the tendons, such as hand twisting and forceful gripping, cause abnormal thickening of the sheath, and cause constriction of the tendons.

De Quervain's disease, caused by excessive friction between the two thumb tendons and the sheath which they share, is the most recognized form of stenosing tenosynovitis. The swollen tendons restrict the motions of the thumb. Occupations known to have higher incidence of De Quervain's disease include buffers/grinders, sewers and cutters, packers, and housekeepers.

Trigger finger occurs when the tendon sheath of a finger is so swollen that the tendon becomes locked in the sheath. This is often associated with using tools that have handles with hard edges or ridges, and/or repetitive bending of the fingers with continued forceful gripping of equipment. Although severe pain is uncommon, attempting to move the finger will cause snapping and jerking movements.

Ganglionic cysts are another kind of tendon sheath disorder. A bump on the wrist forms under the skin due to the sheath swelling up with synovial fluid from repetitive motion, such as prolonged typing or keyboard use, and other risk factors.

Golfer's elbow (Medial Epicondylitis) is associated with tasks that require repeated or forceful rotation of the forearm and bending of the wrist at the same time. This CTD is quite common in construction and assembly work. It is an irritation of the tendons attached to the finger's flexor (bending) muscles which are located on the inside of the elbow.

Tennis elbow (Lateral Epicondylitis) is inflammation of the extensor tendons that attach to the outside of the elbow. It tends to be caused by rapid over arm motions like throwing. Despite the names implying that athletes are most affected by the two different types of epicondylitis, the majority of cases result from occupation related cumulative trauma.

Rotator cuff tendonitis, the most common shoulder tendon disorder, is often associated with work that requires the elbow to be in an elevated position for long periods of time, such as when performing overhead tasks. These tasks put stress on the shoulder tendons and causes tearing and swelling of the rotator cuff tendons. Repeated overhead motions cause thickening of both the tendons and the tissues of the arm sockets. This can give rise to “frozen shoulder” syndrome, which may include severe pain and the loss of shoulder function.

Bursitis, is inflammation of the bursae, small flat sacs filled with synovial fluid which assist the movement of tendons and muscles over bony areas such as shoulders, elbows, and knees. A tendon that becomes roughened from overuse will irritate the bursa next to it causing the bursa to become swollen or inflamed. Shoulder bursitis may make shoulder movement difficult and limited.

B. Nerve Disorders

Pressure on the nerves from hard edges or ridges of some work surfaces, tools, or nearby bones during repeated work activities can result in nerve cumulative trauma disorders. The most common type of nerve disorders is **carpal tunnel syndrome, thoracic outlet syndrome, Raynaud’s syndrome, and other nerve entrapment syndromes.**

Carpal Tunnel Syndrome (CTS) an increasingly common CTDs and the most frequently reported CTDs in Connecticut. **CTS** refers to compression of the median nerve as it passes the carpal tunnel in the wrist. Any condition that increases the contents of or decreases the size of the carpal tunnel can cause compression of the median nerve. Jobs that combine high force, high repetition, awkward hand posture and little rest, like typing, assembly work, packing, bricklaying, sewing, and cutting are at high risk for **CTS**. Commonly reported symptoms of **CTS** include numbness, burning, and tingling in the first 3 ½ digits. If left untreated, symptoms can become much worse and may result in loss of grip strength, clumsiness, increased pain at night, and possibly permanent loss of hand function.

Thoracic outlet syndrome involves the compression of nerves from the spine and blood vessels from the heart that go to the muscles in the arm. Performing overhead tasks for extended periods of time can cause this condition. Like CTS, symptoms of thoracic outlet syndrome include numbness in the fingers along with weakened wrist pulse and sensation of one’s arm “falling asleep.” Because the nerve does not “know” where it is being injured, thoracic outlet syndrome is often mistaken for being CTS.

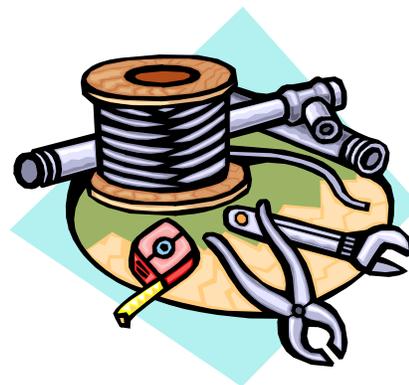
Raynaud’s syndrome, also referred to as “vibration white finger” or “hand-arm vibration syndrome,” (HAVS) is a condition caused by forceful gripping and/or prolonged use of vibrating tools such as hand-held power drills, power saws, needle guns, chipping hammers, and rotary hammer drills. The risk of Raynaud’s syndrome is even higher when vibrating tools are used in cold temperatures. Symptoms include numbness and tingling in the fingers, skin that turns pale and cold, and ultimately loss of sensation and muscle control in the fingers and hands.

Other Nerve Entrapment Syndromes

Repetitive motion of the upper extremities can also result in entrapment of the median, ulnar, and radial nerves in other locations. **Pronator teres syndrome** involves entrapment of median nerve in the forearm. **Radial tunnel syndrome** refers to entrapment of the radial nerve by repetitive motion of the extensor muscles of the forearm. **Cubital tunnel syndrome** involves entrapment of ulnar nerve from external pressure over the cubital tunnel at the elbow.

WHAT IS ERGONOMICS?

It is important that the job and the workplace fit the worker, both physically and mentally, rather than forcing the worker to fit the job. The study of fitting the job to the worker and improving the workplace is called **ergonomics**. An **ergonomist** is a trained professional who is qualified to evaluate jobs/work sites and recommend changes in the layout of work stations, equipment, tool design, work habits, and work organization. Because CTDs have become a widespread problem in so many industries, prevention measures should be regarded as both effective and cost-effective.



WHAT CAN YOU DO TO PREVENT CTDs?

- Learn about CTDs and their risk factors.
- Think about your job and evaluate your work station, tools, equipment, and work habits.
- Write down your concerns regarding possible or existing cumulative trauma problems.
- Take regular breaks from repetitive work and rotate tasks.
- Stretch and exercise the affected body part(s).
- Involve your health and safety committee in ergonomics or set up an ergonomic committee to identify commonly experienced cumulative trauma problems and discuss possible solutions with your employer.
- Lastly, if you suspect that you might have a work-related cumulative trauma disorder, seek medical treatment as soon as possible to prevent further and permanent damage.

WHAT CAN YOUR EMPLOYER DO TO PROTECT YOU FROM CTDs?

Ergonomic prevention efforts are much more likely to succeed if they include management commitment. Employers can utilize outside experts such as private consultants, insurance companies, as well as health and safety committees. Workers at every level should be included in the effort to improve the conditions in the workplace because they know the work process and are able to identify parts of a job that are stressful and that cause health problems which might not be clear to a supervisor or an outside “expert.” For the same reason, workers can be helpful in evaluating whether solutions will work in a particular job. **By preventing CTDs, both the employers and employees will benefit.** Prevention saves money, decreases employee illness, decreases lost work days, and increases job satisfaction.

Some information contained within this fact sheet was extracted in part from the National Institute for Occupational Safety and Health (NIOSH) and The United States Department of Labor, Occupational Safety and Health Administration.

WHERE CAN I GET MORE INFORMATION?

For more information about Cumulative Trauma Disorders contact

- Your doctor or an occupational medicine clinic
- Connecticut Department of Public Health, Environmental and Occupational Health Assessment Program
(860)509-7740
www.ct.gov/dph/occupationalhealth
 - Connecticut Department of Labor
CONN-OSHA Consulting Services
860-263-6900 (Employer Referral Only)
<http://www.ctdol.state.ct.us/osha/consulti.htm#Consulting%20Services>
- Ergonomic Technology Center of Connecticut UCONN Health Center
(860)679-2893
<http://www.oehc.uhc.edu/ergo.asp>
- National Institute for Occupational Safety and Health - Ergonomic Guidelines for Manual Material Handling
<http://www.cdc.gov/niosh/docs/2007-131/>
- National Institute for Occupational Safety and Health - A Guide to Selecting Non-Powered Hand Tools
<http://www.cdc.gov/niosh/docs/2004-164/default.html>
- U.S. Department of Labor, Occupational Health & Safety Administration
Safety & Health Topics: Ergonomics
<http://www.osha.gov/SLTC/ergonomics/index.html>

Originally prepared for the Connecticut Department of Public Health, Division of Environmental Epidemiology and Occupational Health and the Ergonomic Technology Center, Inc. by Colleen Mullins, University of Connecticut, Graduate Program in Public Health

May 1996

[Revised November 2008]