

# RTC SAFETY BULLETIN



APR

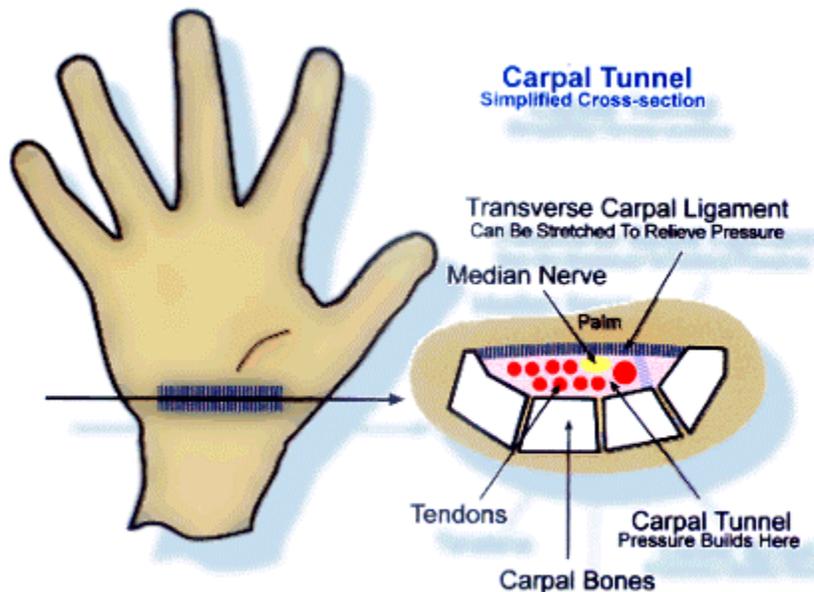
2004

## CUMULATIVE TRAUMA DISORDER (CTD)

**Burning, Cold, Cramping, Fatigue, and Loss of Dexterity, Numbness, Pain, Stiffness, Tingling, Weakness of Grip.** They may often occur during or after periods of rest or sleep. In advanced cases, you may feel cramping or pain around the base of the thumb or your thumb may become nonfunctional.

These symptoms often characterize *Carpal Tunnel Syndrome*. By the time you feel any of them in your hand, wrist or arm, cell degeneration is in process.

As shown, the Carpal Tunnel is made up of several Carpal bones connected by ligaments. The largest of which is the Transverse Carpal Ligament. These structures form the perimeter of a passage through its center called the carpal tunnel. Through this tunnel run nerves, tendons, blood and other soft tissues. For a variety of reasons some of these soft tissues swell, especially the tendons and the protective sheaths that cover them. Overuse, injuries such as sprains, friction between the tendons and their protective sheaths, fractures; fluid retention, forceful movements and infection are a few of the more common causes. However, unlike most of your body where swelling simply protrudes, this swelling has no place to expand since bones and ligaments encircle it. Consequently, because the swelling is contained, pressure builds in the tunnel. This pressure then crushes the main nerve to your hand called the Median Nerve, causing it not



to function properly. The pressure also obstructs blood flow, which retards healing and causes further cell degeneration until the cycle spirals out of control.

Many different symptoms can arise from the accumulation of small injuries or stresses to the body. CTD is not so much a disease as it is a response to excessive demands that we place on our bodies - without giving them adequate time to recover between. What follows is an attempt to explain some of the concepts of CTD, its possible causes, and how CTD can cause symptoms.

**Cumulative:** It just keeps adding up.

**Trauma:** Injury to the body that happens secondary to some physical cause.

**Disorder:** A dysfunction of the normal body processes. A group of symptoms - for example pain, tingling or weakness: that describes the manifestations of a certain disorders are usually referred to as a syndrome.

**CAUSES:** It's easy to say that overuse can cause problems, but at the tissue level:

Incorrect/Static Posture + Muscle Tension + Over Use + Repetitive Motion = CTD

**Incorrect/Static Posture:** An incorrect posture places stress on the body causing pain and stiffness. The body and its joints are made for movement, and even correct posture held for a long time becomes tiring.

**Muscle Tension:** To function properly, the body and each of its structures need a steady supply of blood, rich in oxygen and nutrients. Cutting off or slowing the blood supply harms the tissues of the body. Tense muscles squeeze off their own flow of energy and fuel. Muscles can get energy without oxygen; however, the process produces lactic acid, a potent pain-causing chemical. As pain develops, muscles tighten further to "guard" the surrounding area - blood flow is slowed even more. Nerves deprived of blood and squeezed by muscles begin to tingle or go numb.

**Over Use:** Using muscles and joints after they have become fatigued increases the likelihood of injury. Overloaded or without proper rest they have no chance to recover fully.

**Repetitive Motion:** Movement applied to muscles and joints the same way all the time may contribute to early wear and tear.

## **TREATMENT OPTIONS**

Once a syndrome is diagnosed, physicians/therapists use many conservative (non-surgical) treatment approaches to reduce the discomfort. Splints may be suggested initially to protect sore areas. Anti-inflammatory drugs may be used together with physical therapies like ultrasound, cold packs, or electrical

stimulation. A series of exercises may be suggested to help tissues move safely while healing. Remember that as tension restricts blood flow, muscles and nerves are deprived of oxygen and nutrients, aggravating the symptoms of CTD. Rest and Relaxation (R & R) can be used to relieve tension and allow recovery.

The R & R concept can be used when working OR playing:

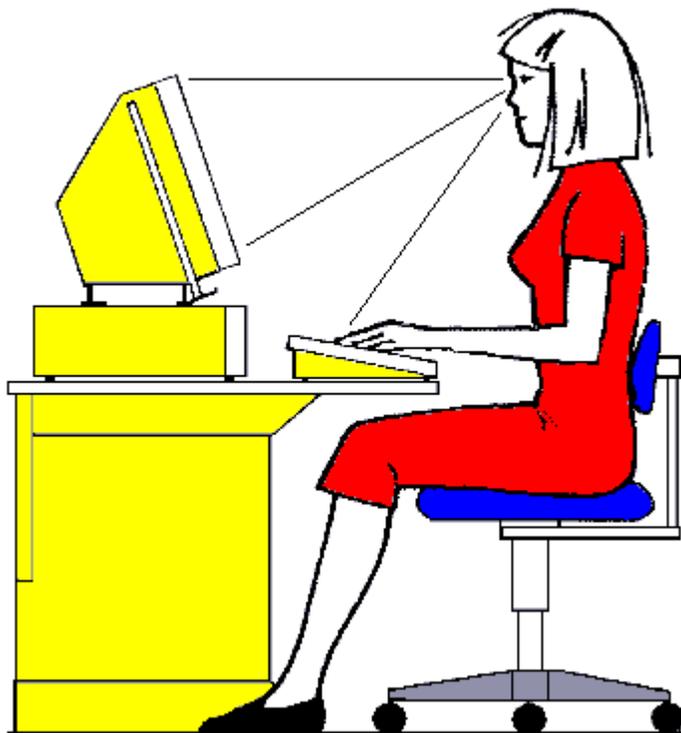
- Be relaxed and pace yourself
- Don't be a statue!
- See if you can modify the work/play site

### **Basic Anatomy and Physiology of the Spine and Neck**

Posture plays a significant role in CTD. Slouching with the spine or leaning with the head puts the body out of balance and causes the limbs to be stretched or bent awkwardly. The neutral spine position starts with the three natural curves of the spine - the inward curve of the neck (cervical) region, the outward curve of the mid back (thoracic) region, and the inward curve of the lower back (lumbar) region. Too much bending (flexion) or straightening (extension) in either the cervical or lumbar region takes the spine out of its neutral position and increases the risk of injury.

Instead of leaning with the head, rotate the upper body forward at the hips.

Instead of slouching, rotate the upper body forward at the hips. Instead of bending or lifting with a flexed lumbar spine, rotate the upper body forward at the hips.



### **Basic Sitting Guideline (Back injury prevention)**

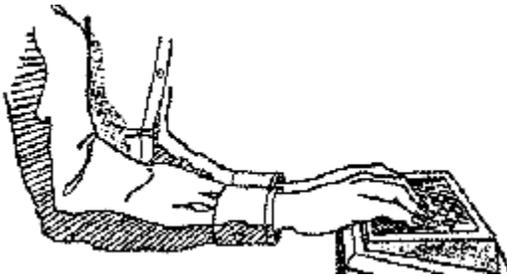
Sit with a neutral alignment of the spine, using a comfortable chair designed to support correct posture. Avoid slouching by sitting against the back of the chair. Bending the head forward strains the neck and affects nerves and arteries leading to the arms. Shoulders are relaxed and the elbows, hips and knees are bent at a right angle. Avoid pressure to the back of the knees. Feet should be flat on the floor or supported by a footrest. Don't sit still! Staying in one position causes fatigue and tension. Take frequent breaks - get up and move around.

## How Do I Prevent It?

Correct typing technique and posture, the right equipment setup, and good work habits are much more important for prevention than ergonomic gadgets like split keyboards or palm rests. The figure shows proper posture at a computer. Note that the chair and keyboard are set so that the thighs and forearms are level (or sloping slightly down away from the body), and that **the wrists are straight and level - not bent far down or way back**. Also note that the typist is sitting straight, not slouching, and does not have to stretch forward to reach the keys or read the screen. Anything that creates awkward reaches or angles in the body will create problems. Please note that even a "perfect" posture may result in problems if it is held rigidly for long periods of time: relax, **MOVE** and shift positions frequently. This isn't just about your hands and arms, either: the use or misuse of your shoulders, back and neck may be even more important than what's happening down at your wrists.

This is not the "last word" on "correct" posture at the desk:

While you are actually typing your wrists **should not rest on anything**, and should not be bent up, down, or to the side. Your arms should move your hands around instead of resting your wrists and stretching to hit keys with the fingers. (Palm rests give you a place to rest your hands *only when pausing from typing*, **NOT while you are typing**.) When you stop typing for a while, rest your hands in your lap and/or on their sides instead of leaving them on the keyboard.



- Wrists also should **not be bent to the side**, . . .

**Wrong** . . . . . **Correct**



. . . but instead your fingers should be **in a straight line with your forearm** as viewed from above.

- **INCREASE YOUR FONT SIZES.** Even with ever-larger monitors, many people use tiny little fonts in their desktops and applications. This encourages one to hunch forward into the monitor to read things, putting pressure on nerves and blood vessels in the neck and shoulders.

Microsoft Windows desktops and applications can easily be configured to use larger, easier-to-read fonts. Do it!

- **DON'T POUND on the keys:** use a light touch.
- Use two hands to perform double-key operations like **Ctrl-C** or **Alt-F**, instead of twisting one hand to do it. Move your whole hand to hit function keys with your strong fingers instead of stretching to reach them.
- **TAKE LOTS OF BREAKS TO STRETCH and RELAX.** This means both momentary breaks every few minutes and longer breaks every hour or so. Pace and plan your computer work.
- **Hold the mouse *lightly*,** don't grip it hard or squeeze it. Place the pointing device where you don't have to reach up or over very far to use it; close to the keyboard is best. **Better yet:** learn and use keyboard equivalent commands whenever possible. Learn Control-C and Control-V and maybe Control-D for Windows/Excel users (and there are many others).
- ***Eliminate unnecessary computer usage.*** Can some of your electronic mail messages be replaced by telephone calls or conversations in person? **And lose the computer/video games . . .** that often involve long, unbroken sessions of *very* tense keyboard or controller use. If nothing else, **PAUSE** the game every 3 - 4 minutes. Don't sacrifice your hands to a game!
- **DON'T TUCK THE TELEPHONE BETWEEN YOUR SHOULDER AND EAR** so that you can type and talk on the phone at the same time. This common procedure is very aggravating for your neck, shoulders, and arms.
- **TAKE CARE OF YOUR EYES.** Eyestrain is also a related, widespread problem that should be addressed at the same time you are setting up your computer for healthier use.
- **PAY ATTENTION TO YOUR BODY.** Pain is your body yelling that it's in big trouble, but learning what is comfortable or awkward for your body *before* you're in pain may prevent injury.

Finally, inform your supervisor of cumulative trauma issues. There may be available resources to correct the problem.

#### SAFETY QUICK NOTES:

1. Eye wash stations: have you done your weekly check and recorded this?
2. Wooden ladders: don't paint them, inspect before use, don't use the top step!