

Computers and Your Health

I thought this first podcast should be something unique. Something that I have not heard covered by other technical podcasts-computers and your health. Why? Because it is extremely important to those of us who spend many hours in front of computers on a daily basis (I personally average between 8 and 10 hours a day on a computer for work and the rest for research for these podcasts and the www.techinstructor.info web site and of course, entertainment). These injuries, can , in rare instances, be potentially life threatening.

I am sure many of us are aware of the importance and concerns of “work place safety”. We even have a government agency dedicated to this-Occupational Safety and Health Administration-OSHA. I want to, at the very least, bring these concerns, as related to computers, to your attention and offer you some remedies you can implement, to minimize these risks. We will list these injuries and try to discuss what you can do to prevent them. We will provide some web site links you can go to for a more detailed explanation as well.

Disclaimer

First, I am not a health care professional, although I do work in the health care industry. I am providing, what I hope will be, some helpful and useful information to the users of Personal Computers, who may be at risk for some or all of these computer related injuries. I have had health professionals review this document for content. Some portions have been edited for ease of understanding. Remember, just because you have a “symptom” described below, do **NOT** assume it is related to poor ergonomics. If you think you may be suffering from an ergonomic disorder, *please consult your physician for guidance and treatment.*

Ergonomics

What is Ergonomics- a definition

The word, ergonomics, is derived from the greek words ergos meaning "work" and nomos meaning "laws"; therefore, we have the laws of work.

Ergonomics can be further defined as the design of the workplace, equipment, machine, tool, product, environment, and system, taking into consideration human's physical,

physiological, biomechanical, and psychological capabilities. It is really how you interact with your environment-whether at work or at play.

What and How can I be injured

Ok , why should I care? After all, its only a computer, right? Wrong. There are many “injuries” that can be caused or aggravated by such things as how you sit in front of the computer screen or how you use your keyboard and mouse. So what can be injured?

1. Your arms, hands or wrists
2. Your neck and shoulders
3. Your eyes-whether you wear glasses or not
4. Your back-many of us already are plagued by this one
5. Your legs-really the veins in your legs
6. And, believe it or not, OBESITY, though not classified as an injury. This one surprised me.

These injuries or conditions have been well documented in the medical literature (of course in a language that needs interpretation). I, personally, have been affected by some of these in the past. So I speak from experience.

.....

1. Repetitive Strain Injuries-RSI

**Excerpted from: [http://wiki.media-culture.org.au/index.php?title=Health_-_Health_Problems&printable=yes#Repetitive_Strain_Injury_\(RSI\)](http://wiki.media-culture.org.au/index.php?title=Health_-_Health_Problems&printable=yes#Repetitive_Strain_Injury_(RSI))

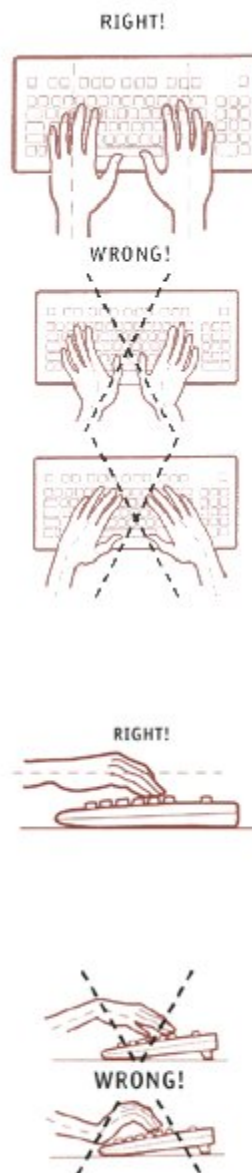
These are a response to excessive and repetitive demands placed on the body. Another name given to such problems is 'Occupational Overuse Syndrome'. The repeated movements cause damage to tendons, muscles, nerves and other bodily tissues. Ever have or know someone who has “tennis elbow”? This is an example of RSI. Those using computers, keyboards, mice and trackballs, are particularly prone to RSIs of the upper limbs. If the hands and wrists are affected, this can be very painful. This has a name, carpal tunnel syndrome and in some cases may require surgery.

Symptoms can include hand numbness, pain in the hand, particularly in the thumb and first 3 fingers, and tingling in the hand. These symptoms can occur during the activity, but also frequently occur in the night. There may also be loss of hand strength, weakness

of the thumb, difficulty holding or pinching items, and wasting of the muscle at the base of the thumb.

Stretching is an essential part of preventing upper limb workplace injuries. Stretches should only be used as a preventative measure. If an RSI has occurred, stretches can aggravate the symptoms. The Prayer Stretch involves placing the hands together in a prayer position, and gently pushing to one side, then the other, holding the stretch on each side for about 15-30 seconds.

Correct hand position when typing is important in the prevention of CTS and other wrist generated RSIs. Wrists shouldn't be bent to the side, but instead, the fingers should be in a straight line with the forearm when viewed from above.



Possible warning signs of RSI can appear in the symptoms listed below:

- Weakness
- Fatigue Tingling, numbness or loss of sensation
- A feeling of heaviness
- Clumsiness
- Difficulty opening and closing hands
- Stiffness
- Difficulty using hands (turning pages of books or magazines, turning doorknobs or faucets, holding a coffee mug)
- Reluctance to shake hands
- Difficulty carrying things or holding bus or subway poles
- Hands fall asleep
- Waking up with wrist pain or numb hands, especially during early morning hours
- Lack of control or co-ordination
- Cold hands
- Frequent self-massage
- Difficulty buttoning clothing or putting on jewelry
- Tremors
- Avoidance of activities or sports that were once enjoyable
- Pain or soreness (RSI is not always painful, though)”

What can I do?

1. Cut down on computer use: leave voicemail instead of sending e-mail. Go for a walk or see a movie instead of playing video games. Look something up in a book instead of searching the Web. You are in the danger zone for injury if you use a computer for as little as two hours a day.
2. Adjust your workstation properly. Make sure your monitor is directly in front of you, with the top of the screen at eye level. Be sure your keyboard and mouse are low enough to allow you to relax your shoulders.
3. Sit up straight. Make sure your chair supports your spine in an erect position.
4. Practice proper technique: never rest your wrists on the desk, wrist pad or armrests while you are typing or using a mouse or trackball.
5. Pace yourself. Take a 5-to-10 minute break every 20 minutes and limit your overall time at the computer.
6. Get regular cardiovascular exercise-**this can be a challenge for many.**
7. Do appropriate upper-body strengthening and stretching exercises.
8. Stretch frequently while at the computer.
9. Do not work at the computer or other hand-intensive activities if you are

experiencing pain, fatigue or soreness.

10. Avoid using the mouse and trackball whenever possible. Use keystrokes instead.

2. Upper back and neck problems and Postural low back pain. (This one can be debilitating)

These are often caused by bad positioning of a computer screen, or bad lighting, such that the user has to strain forward to see it properly. Monitors above eye height, are a common precipitating factor. This one really gave me a problem. Jobs where the phone is jammed between ear and shoulder, to allow the hands free to perform other tasks, can also lead to similar problems, as do jobs where the neck has to be twisted and held in a twisted position to undertake a task. Badly positioned telephones and other equipment that require a lot of reaching can also contribute to the problem. Typical symptoms include neck pain, shoulder pain, weakness of the arm and hand muscles and headaches.

Prolonged sitting or standing can lead to low back pain, as can heavy lifting in the workplace. The two greatest problems seem to be sitting upright or forward, and not changing position. An upright posture with a 90-degree hip position is bad for the discs in the lower spine. It is now thought that a 'supported slouch' with your bottom a little forward in the seat is better for the discs. This can be achieved with a forward tilt chair or a chair with a level seat and a reclined backrest.

Ideally, the work chair should be adjustable in height with an adjustable backrest and preferably should be depth adjustable.



http://www.ergonomics.ucla.edu/office_Chair.html

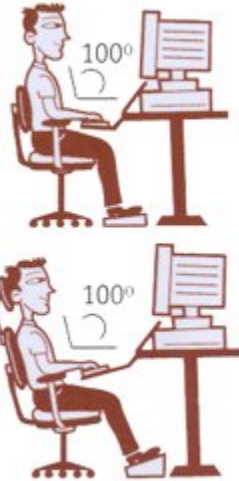
When sitting at the workstation for long periods of time, it is important to change position frequently. If it is possible to stand up and move around fairly frequently, this is even better. Changes of position relieve pressure on the discs, and allow movement of fluid in and out of the soft center of the disc. This improves disc health in the long term.

3. Visual problems. (This one can be debilitating)

Visual symptoms such as eye irritation and eye strain are among the most frequently reported complaints of computer users. Several factors may contribute to the problem,

particularly glare from the screen, poor positioning of the screen, improper workspace lighting, and poor quality copy material.

Eye position is important, with the straight-ahead position used by many computer operators contributing to eye strain and **headaches-this also got me**. The center of the screen should be 7-10 inches below the horizontal line of sight.



Graphics from: http://www.ergonomics.ucla.edu/Tips_Users.html

Ideally, workstations and lighting should be arranged to avoid direct and reflected glare from the screen or surrounding surfaces. Anti-glare screens are available for monitors, made from either mesh or glass. It is possible to reduce reflected glare off the screen by adjusting the position of the screen. While the screen is off, it should be angled so that there are no reflections of any office lights or daylight on the front surface of the screen.

Glare and reflections can be reduced in the following ways:

- Reduce light from windows. Consider full or part coverage of windows with the use of curtains, louvers, awnings, canopies and neutral-density film coverings.
- Reduce ceiling glare.
- Use ceiling fixtures that provide controlled, indirect lighting. Indirect lighting fixtures are preferred over grates and parabolic louvers that can create uneven lighting with shadows.
- Purchase low-glare bulbs or cover bright bulbs with prismatic lenses, polarizers and filters.
- Remove bulbs, install adjustable level light switches, or turn off switches. (This will reduce but not necessarily eliminate glare.)
- Use indirect lighting sources and task lights. Position task lights to avoid shadows. Aim the light at specific targets (source documents).
- Reduce other brightness sources. Avoid wearing white shirts. Do not use glossy, reflective paints on walls or select highly reflective work surfaces.

- Use barriers. Use partitions to block lights from windows and other bright sources.
- Tilt the screen. Tilt the monitor screen to avoid reflections. Positive tilts often reflect ceiling fixtures.
- Use a visor. A visor placed over the screen or on the users head will reduce glare from overhead lighting sources.
- Change workstation orientation.
- Sit at right angles to windows and at least 3 feet away from the window.
- Avoid positioning worker directly in front of or in back of overhead lights. (The operator should not have a light source or fixture within direct visual field when looking at the monitor screen.)

A visual break of 5 minutes every 20 minutes is recommended. During these breaks, it is recommended that you focus on a view at least 20 feet away to relax those muscles that are responsible for near vision focus.

4. Back

What can cause discomfort?

Many people suffer from back pain, and it can be contributed to by all of the factors below :

- Lack of support from your chair
- Sitting slumped
- Over reaching for the keyboard or mouse
- Feet not touching the ground
- Improper fit of the chair, or the improper type of chair for computer use
- Prolonged sitting without a break

How do I prevent injury?

The back muscles, ligaments and discs can be strained from slumped sitting, and by sitting unsupported for long periods. It is very important to have a chair that fits well, and that you sit properly in the chair. The chair should have a **good lumbar support**, preferably adjustable, so that you can position it to fill in the curve at your low back.

The seat of the chair should end a couple of finger widths from the back of your knees. You should be able to sit all the way back in the chair, and use the backrest. A footrest should be used to position your knees equal to, or just below, the level of the hips. The keyboard and mouse should be kept close to prevent over reaching and slumping forward to reach them.

Take a 1 - 2 minute break every 20 to 30 minutes - get up and stretch!

5. Deep vein thrombosis (Your Legs)-**this can potentially be serious**

What is it? A thrombosis is a blood clot. The clot may block a blood vessel, causing potentially serious health effects. A deep vein thrombosis (DVT), is a blood clot that forms in the deep veins of the leg. A deep vein thrombosis in the thigh carries a risk of pulmonary embolism. This occurs when the clot, or thrombus, loses its attachment to the inside of the vein, leaves the leg and lodges in the pulmonary artery, the main blood vessel to the lungs. If the clot is large enough, it can completely block that artery and be life threatening.

Sitting still for long periods of time allows blood to pool in the veins. There is debate over whether or not the confinement of long distance international flights may contribute to the risk of DVT. This condition is known as '**economy class syndrome**'. Because of this possibility, computer users should be aware of this potential condition. Those of us over the age of forty who sit for long periods of time at a computer can be susceptible to this risk.

Ergonomics, again, plays a roll here.



Use a foot rest. Try to have the bottom of your thigh slightly above the edge of you chair to relieve the pressure.

Here are some other suggestions:(made for air travelers but can apply here)

- Wear loose clothes
- Avoid cigarettes and alcohol
- Drink plenty of fluids
- Move about whenever possible
- Don't sit with the legs crossed
- Perform leg and foot stretches and exercises while seated

6. Obesity-I did not think of this as related to Computers and Health

While not a true injury, this can cause other health related issues. This one really applies to me as well. Most of us lead a pretty sedentary life style-read that as low physical exercise and eating high calorie foods. Couple that with sitting for long periods of time, well, you get the idea.

Summary

Repetitive and prolonged use of a computer keyboard and/or mouse can lead to muscle aches and discomfort. Posture and positioning are important. Try to incorporate the following tips into your work style to avoid problems.

Maintain good posture when working. Sit all the way back in the chair against the backrest. Keep your knees equal to, or lower, than your hips with your feet supported.

Keep your elbows in a slightly open angle (100° to 110°) with your wrists in a straight position. The keyboard tilt can help you attain the correct arm position. A negative tilt (front of keyboard higher than back) helps when working in upright sitting positions. If you recline, a positive tilt (front of the keyboard lower than the back) might be necessary.

Avoid overreaching. Keep the mouse and keyboard within close reach. Center the most frequently used section of the keyboard directly in front of you.

Center the monitor in front of you at arm's length distance and position the top of the monitor 2" to 3" above seated eye level. You should be able to view the screen without turning or tilting your head up or down.

Place source documents on a document folder positioned between your monitor and keyboard. If there is not enough space, place documents on an elevated surface close to your screen.

Use good typing technique. Float your arms above the keyboard and keep your wrist straight when keying. If you use a wrist-rest, use it to support your palms when pausing, not while keying.

Hit the keyboard keys with light force. The average user keys four times harder than necessary.

Keep your wrists straight and hands relaxed . Don't hold the mouse with a tight grip or extend fingers above the activation buttons.

Limit repetitive motions. Reduce keystrokes with macros and software programs such as voice recognition. Reduce mouse pointing device movement with scroll locks and keystroke combinations.

Customize your computer settings. The screen font, contrast, pointer size, speed, and color can be adjusted to maximize comfort and efficiency.

Reduce glare. Place your monitor away from bright lights and windows. Use an optical glass glare filter when necessary.

Take eye breaks and intermittently refocus on distant objects. Try palming your eyes in your hands to reduce eye fatigue.

Work at a reasonable pace and take frequent stretch breaks. Take 1 or 2 minute breaks every 20-30 minutes, and 5 minute breaks every hour. Every few hours, try to get up and move around.

Use of non-prescribed medications, or wrist splints, can often be more harmful than helpful. If you begin to develop symptoms, seek help. Early intervention can prevent future problems.

Your life style and physical fitness affect how you feel at the computer. Stay in shape by stretching and exercising regularly. Stretches and exercises can be found on our website.

.....

And remember, when in doubt about your health, seek advise and treatment from your doctor.