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AUTHOR	Ubelacker, Sandra
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ABSTRACT

Musculo-skeleton injuries, which include tendinitis, carpal tunnel syndrome, chronic neck and back pain, and other Repetitive Strain Injuries (RSI), are the leading causes of disability in working-age people in North America. This paper highlights studies indicating that computer users are especially susceptible to these injuries; therefore, the keyboard techniques, computer practices, and workstation routines established in the early years are key to preventing injuries throughout life. The paper stresses the importance of the role of teachers and parents in the prevention and identification of RSI. Attention is given to carpal tunnel syndrome, eye strain, and neck and back pain. Three bad habits are identified with suggestions as to how they may be prevented. (Author/LPP)

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Teachers! Parents! Beware of RSI

Sandra Ubelacker ■

Abstract

Musculo-skeleton injuries, which include tendinitis, carpal tunnel syndrome, chronic neck and back pain, and other Repetitive Strain Injuries (RSI), are the leading causes of disability in working-age people in North America. Studies indicate that computer users are especially susceptible to these injuries; therefore, the keyboard techniques, computer practices, and workstation routines established in the early years are key to preventing injuries throughout life. This paper stresses the importance of the role of teachers and parents in the prevention and identification of RSI. Attention is given to carpal tunnel syndrome, eye strain, and neck and back pain. Three bad habits are identified with suggestions as to how they may be prevented.

■

Introduction

The practices and routines established in our early years tend to remain for a lifetime and are difficult, if not impossible, to change.

Did you know that musculo-skeletal injuries, which include tendinitis, carpal tunnel syndrome, chronic neck and back pain, and other Repetitive Strain Injuries (RSI), account for 60% of workers' compensation claims? Did you know that RSI is the leading cause of disability in working-age people in North America with 19 million people affected?

RSI has hit the largest single occupational group ever—computer users. Studies reveal that one-fifth to one-quarter of computer-keyboard users have RSI symptoms. The Bureau of Labor Statistics reports that, on average, it takes employees longer to return to work after sustaining carpal tunnel syndrome than any other disabling injury, including amputation. Our students in school today are the workers of tomorrow and are using computers from an early age.

Do parents and teachers have a role in the prevention of RSI (also known as cumulative trauma disorder or CTD)? Will today's students become tomorrow's statistics with the rampant increase in RSI in the workplace? It is very common for an 8-year-old to use a computer both at home and in school, and it is increasingly evident that students use computers from elementary school through high school. Parents and teachers must pay attention to correct computer use—RSI is preventable.

Have you heard of anyone commonly complain about tired hands, pounding pain in the wrists, no feeling in the fingers, sore shoulders, or lower back pain? If your answer is yes, this person, even the very young, may be suffering from "secretaries' hands" or what has become known as Repetitive Strain Injury (RSI) because they are using the computer the wrong way.

Carpal Tunnel Syndrome

The most serious injury is carpal tunnel syndrome. Carpal tunnel syndrome is caused when the wrists are flexed and in an awkward position, with the muscle strained (Figure 1). The blood supply to the carpal tunnel in the wrist is interrupted, pinching the nerves. The injury is very painful and can result in surgery, extensive physiotherapy, and the need to wear wrist braces when keyboarding.

Bad Habit 1

Have you every watched children play computer games? Did you notice how they rest the palms of their hand on the desk or keyboard, sometimes with their thumbs folded under the keyboard or desk? The weight of the hand is now on the palms, putting pressure on the tendons and nerves and cutting off

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the blood supply. This habit is probably the *most difficult to change* when learning to "touch type" and will eventually lead to carpal tunnel syndrome. Keyboard wrist rests are not a solution or a corrective measure. If the weight of the hand is transferred from the edge of the keyboard or table to the wrist rest, nothing has changed. The position of the hand must change without resting on any surface. Every computer user should learn to "touch type"—the younger the better. Small hands learn to play the violin. Small hands can learn to touch type.

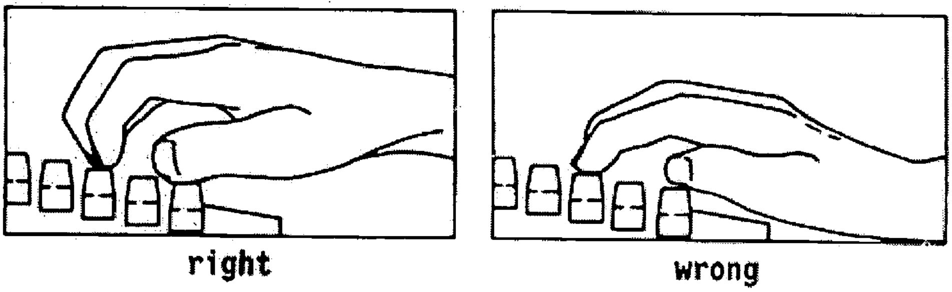


Figure 1. Hand slant.

Prevention: Hand and body aerobics. It is recommended that for every hour on the keyboard, there should be a 10-15 minute break. During this break, exercises should include shoulder, arm and hand stretches, neck stretches, and upper body stretches (Figures 2–4). These exercises include:

1. Extending the fingers in spread eagle fashion, holding them for five seconds and then relaxing.
2. Rotating the wrists clockwise and counter-clockwise followed by shaking out the hands.
3. Pressing each hand forward and backwards.
4. Looking slowly to the right and then slowly to the left or slowly tilting the head to the left and right.
5. Stretching both hands above the head, behind the back, and in front of the body to stretch the upper body.

Computer software can be purchased to guide students through these various exercises.

Keyboarding: The magic bullet. As soon as the computer is used as a "writing tool," proper keyboarding techniques should be taught. These techniques include correct posture—fingers curved, wrists low, palms above the keyboard; correct fingering; proper use of the enter key, space bar, and shift key; and control—arms motionless, elbows at side, and wrists relaxed; and good work-station habits—sitting upright with feet flat on the floor, keeping a neat work surface, and managing disks properly. *A teacher, not software, is the most important factor in the initial learning.* Software cannot determine if fingering, posture, arm and wrist position, or eyes on copy are correct. Software should be used for remedial work, not for initial learning. The habits formed in this initial learning tend to remain for a lifetime.

Eye Strain

Your eyes were not designed to stare at the same distance all day long. This practice causes eye soreness or fatigue, dry eyes, or blurred vision. There is a growing belief that shortsightedness may occur in the long run.

Bad Habit 2

Have you ever seen children, either alone or in groups, so engrossed by what is on the computer screen that they are either standing or sitting with their eyes just inches from the screen? This attention to the screen seems to go on for a long period.

Prevention: Eye exercise and lighting. Your eyes need exercise. Look away from the monitor to focus on different distances in the room. There are computer programs that give "vision aerobics." At various timed intervals, objects appear, leading the eyes around the screen.

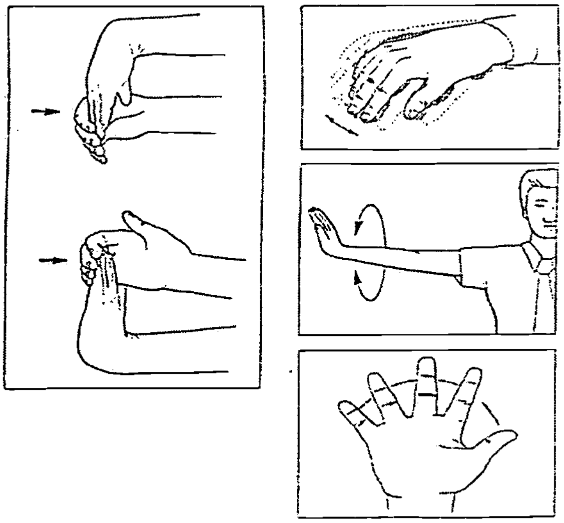


Figure 2. Shoulder, arm, and hand stretches.

Outside light competes with the monitor screen. If the monitor faces a window, shut the blinds or move the monitor away from the windows or other sources of bright light. Reflect light away from your eyes. Glare is a problem when light bouncing off the monitor strikes the eyes. If possible, tilt the monitor if it is reflecting overhead light. In schools, computer labs require less area illumination than a typical classroom.

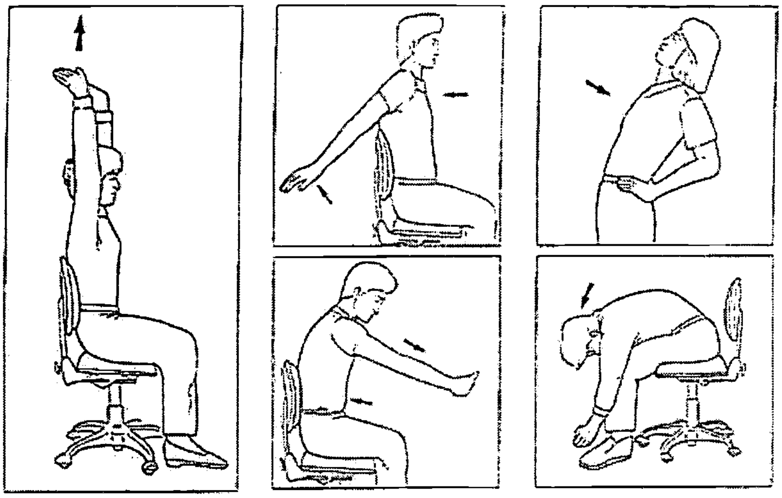


Figure 3. Upper body exercises.

Neck and Back Pain

Neck and back pain are common complaints. The cause is usually poor posture, which decreases blood flow to certain muscles. These muscles stiffen up and hurt.

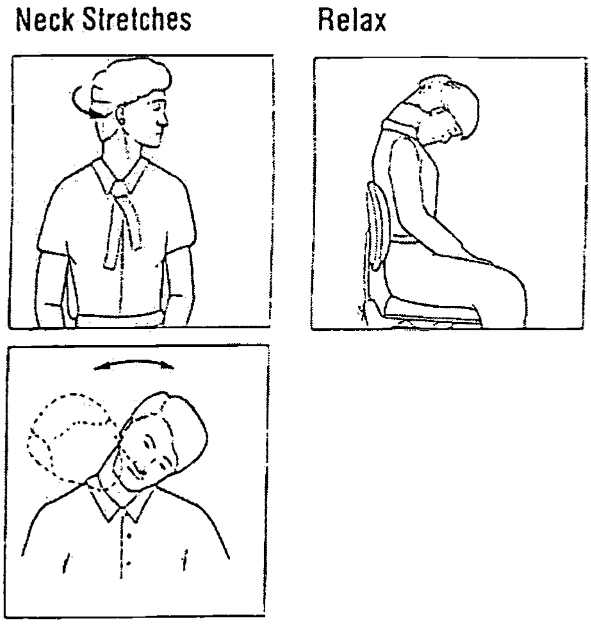
Bad habit 3

Have you ever noticed how children sit at their computer? Are their legs in one of these positions: wrapped around the legs of the chair, wrapped around each other, one leg resting on the other knee; or one leg tucked under their body?

Prevention: Good posture and workstation design. Ten basic principles of good posture in an appropriate workstation are (Figure 5):

1. The eyes are level with the middle of the screen.

2. The chin is tucked in.
3. The elbows are at 90 degrees.
4. The wrists are neutral, not raised up.
5. The shoulders are relaxed.
6. The knees and hips are level or the knees are slightly lower.
7. The back of the chair supports the small of the back.
8. The height of the chair touches the tip of the shoulder blades.
9. The feet rest on a foot rest if the legs are short or the chair is too high.
10. If a ruler is placed from the ear to the hip, it would be in a straight line parallel with the spine in good posture.



Neck Stretches

Relax

Figure 4. Neck exercises.

The height of the keyboard affects posture. The keyboard should be at about seated elbow height to encourage keying with straight wrists and relaxed shoulders. If a mouse is used, position it at the same height and as close as possible to the keyboard. A copy holder can prevent neck strain and reduce eye fatigue if it is placed at eye level and at the same distance from your eyes as the monitor and fairly close to it. Wrist rests, when used properly, can reduce pressure and improve wrist posture and comfort. The wrists must remain straight to avoid stress or pressure on tendons and nerves.

Business education teachers have been attentive to good posture and workstation design when teaching keyboarding, word processing, and information processing courses. Is this as true when teaching spreadsheets, databases, and other programs such as drawing, painting, and accounting programs? Computers (formerly typewriters) are no longer the domain of the business education program. Computers are used across the curriculum—especially with the new interest in multimedia, the Internet, e-mail, and using the computer as a writing tool. As people become as expert in computer use as in pen and pencil use, the "whole child" sometimes is forgotten. The focus is on the computer and what it can do. What about the child using the computer? As the computer keyboard becomes an extension of the hands, equal attention should be given to the whole body. "The sum of the parts is greater than the whole."

Six Easy Steps to Prevent RSI

1. Learn to "touch type"—the skill will last a lifetime.
2. Take a break.
3. Stretch your hands and upper body.
4. Look away from the screen occasionally.
5. Reflect light and glare away from your eyes.
6. Sit properly at an appropriate computer workstation.

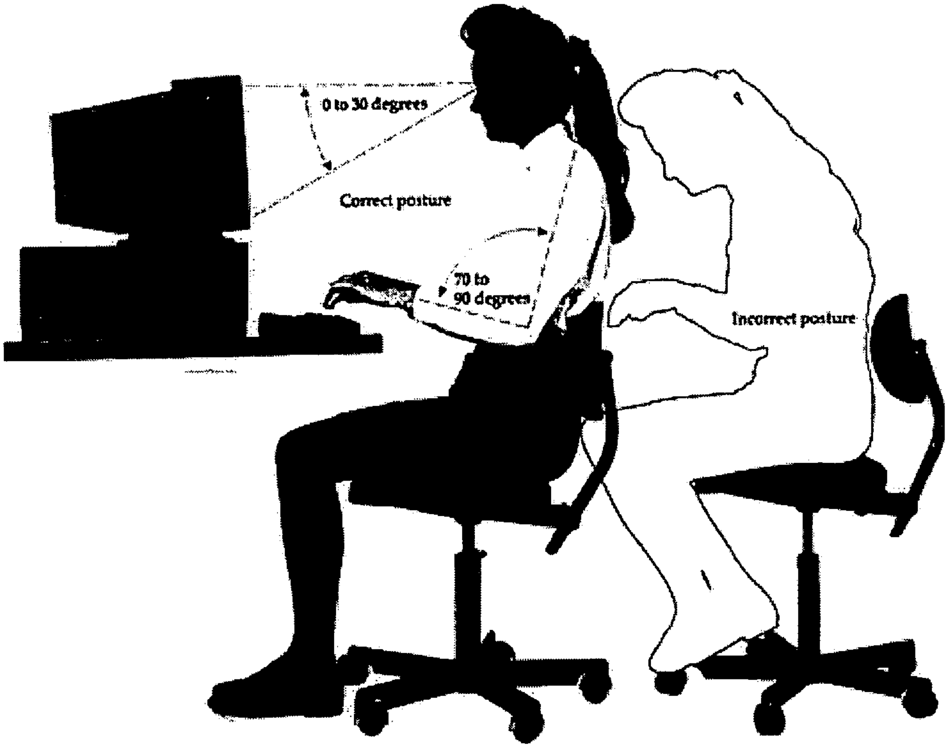


Figure 5. Correct posture.

The practices and routines established in our early years tend to remain for a lifetime and are difficult, if not impossible, to change. It is more important than ever that attention be given to the prevention of RSI. These injuries once acquired are debilitating and last for life. What have we, as parents and teachers, done to impress the importance of RSI prevention on our children or students and on our colleagues in the elementary and junior and senior high schools teaching in areas where computers are used? What is our responsibility as parents and teachers? Would you have a 16-year-old take driving lessons from someone who does not know how to drive?

The following resources provide more information on safe computer use.

1. Scott, Jennifer. (1994, January 26). Computer ills. In Randy Werle (Producer), *The Health Show.* Toronto: CBC Television.
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