

Loss Control Bulletin # 53

As computers have become more common in the workplace, creating a good working arrangement has become important to maintaining your comfort when working. The following guidelines were developed to help you evaluate your workstation. The information provided is a brief summary of those things most ergonomists agree are important. To help you arrange a comfortable workstation, a [checklist](#) is provided to simplify the evaluation process. Keep in mind that individuals and jobs are different, so the solutions may vary by individuals. For most persons, though, the general guidelines described are a good starting point to help you make yourself more comfortable at your workstation. If you are unable to find a comfortable arrangement or perplexed by the information provided, ask your manager for assistance.

When evaluating computer workstations, employees must be able to provide candid information. Reporting symptoms or injuries will provide the necessary information to solve the problem and will not result in reprisal or job loss.

Ergonomic Risk Factors

When evaluating a computer workstation, at work or at home, the following ergonomic risk factors should be assessed:

- **Duration:** Time spent doing a task or activity
- **Posture:** Body position
- **Repetition:** Number of times an activity takes place; primarily keystrokes or mouse use
- **Force:** Energy exerted, contact pressure
- **Environment:** Temperature, lighting, noise, efficiency of work area

These ergonomic risk factors are also present in activities other than working at your computer. Many leisure activities are also affected by ergonomic risk factors. Keeping yourself healthy may require that you evaluate both your work and lifestyle activities. Adapting to the ergonomic risk factors may require that you make some changes in how you do your work and the lifestyle choices you make. And, in some instances, you may have to try more than one change to see which works best for you.

As duration increases, repetition and force also increase; as a result, proper posture must be maintained to keep you comfortable while working. When you move or adjust your furniture and equipment, you are making adjustments to obtain proper posture. An adjustable chair and keyboard

tray allow a wider range of adjustments to establish and maintain proper posture. ([Figure 6](#))

Good posture is paramount if you use the keyboard and mouse extensively. ([Figure 1](#))

Start by adjusting your chair. Adjust the height so that your feet are flat on the floor. Adjust the lumbar support, in the seat back, so that it fills the space at your lower spine. The seatback tilt should be adjusted so you are slightly reclining from vertical. Adjusting the seat pan tilt will also help you maintain a vertical, reclining or declining position. This will put your knees slightly level, above, or below the hips. You can decide, which position is more comfortable for you. Your feet should be slightly forward and flat on the floor or a footrest. When properly adjusted, you should not have to reach for the keyboard. If your chair has a seat pan forward and rearward adjustment, it can be adjusted to help accommodate the lumbar support.

Adjusting the keyboard tray will allow you to maintain proper posture with your forearms and wrists. A good starting point is to lower the keyboard tray to a point just above your thighs. From this point, raise the keyboard tray until your forearms are parallel to the floor and your wrists are maintained in a flat posture when typing. Tighten the tray so that it does not move. Remember to float your hands when typing. Do not rest your hands on the wrist rest when typing. ([Figure 9](#)) If you prefer to set the keyboard on the desk, you will likely have to raise the height of your chair to maintain proper posture in your forearms and wrists. If your feet then do not reach the floor, you will need a footrest.

The user should be centered on the alphanumeric keyboard. If the outer edges of the keyboard are used as references for centering the keyboard and a monitor, your hands may be deviated because the alphanumeric keys will be to the left of your midline. A better reference is the space between the G and H keys. Center your body on these keys. The keyboard feet should be folded up rather than extended.

For some users, split-keyboards, left-handed keyboards or detachable number pads may be beneficial. Split keyboards with the alphanumeric keys split at an angle are one of the more popular keyboard alternatives. If you must hold your elbows outward, rather than close to the body, in order to maintain a straight wrist on the keys, a slanted keyboard may be inappropriate.

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The mouse should be adjacent to your keyboard. (Figure 10) If the mouse is positioned too far to the right (for a right-handed person), the arm and wrist may extend outward causing awkward posture. When using the mouse, keep your wrist flat, straight, and avoid moving your wrist from side-to-side.

If you do not use the number pad, a mouse bridge can help bring the mouse toward the center of your body to aid good posture. (Figure 7) Some keyboards have a mouse extension that can work in either position – adjacent to or covering the number pad.

If you use the mouse for most of your work, consider switching hands periodically or using keyboard functions (page down key, down arrow key) keys to give your dominant hand a break. A programmable mouse can make some tasks easier. For example, if you must click and drag repeatedly, the mouse can be programmed to click and hold the item until it is in place, rather than having to hold down the mouse button while dragging. This procedure helps to reduce awkward postures and force. Proper cleaning and adjustment of your mouse/ball mechanism will help to eliminate unnecessary mouse movements and minimize the force needed to generate movements. A wireless mouse may also be considered. Gripping the mouse too strongly increases force and stress on the muscles.

The mouse comes in various sizes and shapes – trackball, joystick, touchpad, vertical, to name a few. Regardless of which type you choose, it should fit your hand to allow for proper posture. The wrist should be kept as flat as possible and should not move from side-to-side when moving the mouse.

The monitor and keyboard should be in line with your body. (Figure 1) The height and distance will vary by user, but a good starting point is to have your eyes in line with a point about 2-3 inches below the monitor casing (not the screen) and about an arm's length away from you. Your head should be held in a natural, upright position looking straight ahead at the screen and you should be sitting back in your chair against the seatback. You should not be looking down or up to see the screen. The center of the screen should be 15-17 degrees below horizontal eye level.

The height of the monitor may change if you wear glasses. For example, if you wear bifocals, the screen may be positioned lower than normal. The distance will vary depending

on the font size, color and type of work. If you cannot read the print, it's better to use a larger font or magnify the screen image rather than move the monitor too close to you, which may cause your eyes to have difficulty focusing (convergence problems). Text characters should look sharp and screen should not flicker. Dark text on a light background works best for typing. If you are having vision problems, an eye examination is recommended.

After you have adjusted your chair, keyboard tray, and monitor, you should be able to reach the keyboard keys with your wrists as flat as possible (not bent up or down) and straight (not bent left or right). The forearms should be approximately parallel to the floor. The elbows should be at 90° or more and hanging naturally in close to the body. Your wrists should float when striking the keys. You should not be reaching for the keyboard and should be sitting back in your chair with your feet flat on the floor or on a footrest. Your head and neck should be looking naturally straight ahead at the monitor.

A proper workstation arrangement will allow you to use your computer in a neutral, relaxed position. Alternative workstations include sit-stand workstations and height adjustable, split work surfaces. Regardless of the type chosen, adjustable equipment is the key factor to maintaining good posture and a comfortable workspace.

Environmental conditions such as lighting, ventilation, and noise should also be considered. Anti-glare screens can be used to reduce glare on monitor screens. It is better not to have a screen back to a bright window or facing a bright window. In most office environments, noise and lighting are not high risk factors.

Frequently used accessories such as calculators, manuals, staplers, etc. should be maintained within the **primary work zone**, so they can be reached comfortably. (Figure 3) If you are on the phone for prolonged periods, a headset should be used. (Figure 5) If you enter information from hard copies, a **document holder** may be beneficial. (Figure 4) The document holder should be located adjacent to and at the same height as the monitor.

If you use a **laptop** for prolonged periods of time, a docking station with keyboard tray and monitor are recommended. (Figure 8) At a minimum, a keyboard tray should be used to help you maintain proper wrist posture when typing.

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Wrist rests, if used, are for “resting” when you are not typing. When resting, your heel or palm should contact the pad not your wrist. When typing, your hands should move freely and be elevated above the wrist rest. If your hands are touching the pad while typing, you may be inhibiting free movement.

Breaks should be taken to control the duration of the tasks you are completing. Micro-breaks (less than two minutes) can be taken just by changing the work task and the muscles that are being used. For example, making a telephone call or walking to the printer is a micro break. Generally, you should take a brief rest break every 30 to 60 minutes. Move around, stretch, or do some other task. (Figure 2) This is particularly important if you have been sitting for two hours or more without a break.

Give your eyes a break by looking up from the computer screen every 15 minutes or so. Look at something at least 20 feet away and remember to blink. Most people blink less when looking at a computer screen and the eye becomes dry. Blinking refreshes the tear film and wets the eye surface.

Consider installing ergonomic software that reminds you to take a break and demonstrates stretching exercises. This

software can be purchased or you may be able to find some free downloads on the internet.

The guidelines provided here are a brief summary of steps you can take to make yourself more comfortable at your workstation. While not exhaustive, they are a good starting point. Remember to make the proper adjustments to attain good posture, vary your tasks and take breaks.

Related websites

<http://ergo.human.cornell.edu/ergoguide.html>

<http://www.hfes.org/web/Default.aspx>

<http://www.osha.gov/SLTC/etools/computerworkstations/index.html>

http://www.dir.ca.gov/dosh/dosh_publications/ComputerErgo.pdf

<http://www.ccohs.ca/oshanswers/ergonomics/office/stretching.html>

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COMPUTER WORKSTATION EVALUATION CHECKLIST

Employee Name _____

Department _____

Chair

Yes No

- Is it in front of the monitor and keyboard?
- Can the chair height be easily adjusted from a seated position?
- Is the seat pan 25% wider than the occupant?
- Is the backrest height and angle adjusted for mid and lower back support?
- Are the armrests adjustable (height and width) or removable?
- Is the seat pan angle and tilt adjustable?
- Is the seat pan padded with a gently sloped front edge?
- Does the seat pan front edge end 2 to 3 inches behind the knee?
- Is the seat pan upholstery porous, breathable and of non-slip material?
- Is the base stable (five-leg pedestal on casters)?

Keyboard Tray

- Is a keyboard tray/holder provided?
- Is the height adjustable?
- Is the tray tilt adjustable?
- Is it positioned directly in front of the monitor and operator?
- Is it wide enough to accommodate a mouse?
- Are the keyboard legs flat?
- Is a wrist rest provided?

Monitor

- Is it located directly in front of the keyboard and operator?
- Are the height, tilt, and rotation adjustable?
- Is the top of the screen level with or slightly lower than eye level?
- Are the text or graphics on the screen easy to read?
- Is the screen free of visible flickering?
- Is it positioned away from direct or reflected glare?
- Is a glare screen needed?

Mouse

Yes No

- Is a mouse provided?
- Is the mouse level with and adjacent to the keyboard?
- Does the mouse fit comfortably under the palm?
- Does the cursor respond smoothly to movement and clicks?

Posture

- Is the head maintained in a near upright position?
- Is the individual seated back against the backrest?
- Are wrists maintained in a neutral position?
- Are wrists floating when typing?
- Are elbows close to the body?
- Is a lumbar support provided that maintains the natural S curve of the back?
- Are shoulders down and relaxed?
- Are thighs comfortably under the keyboard?
- Are knees maintained at a 90-110° angle?
- Are feet resting flat on the floor or on a footrest?

Document Holder

- Is a document holder provided?
- Is it positioned at screen level and next to the monitor?
- Is there adequate lighting on the document?

Footrest

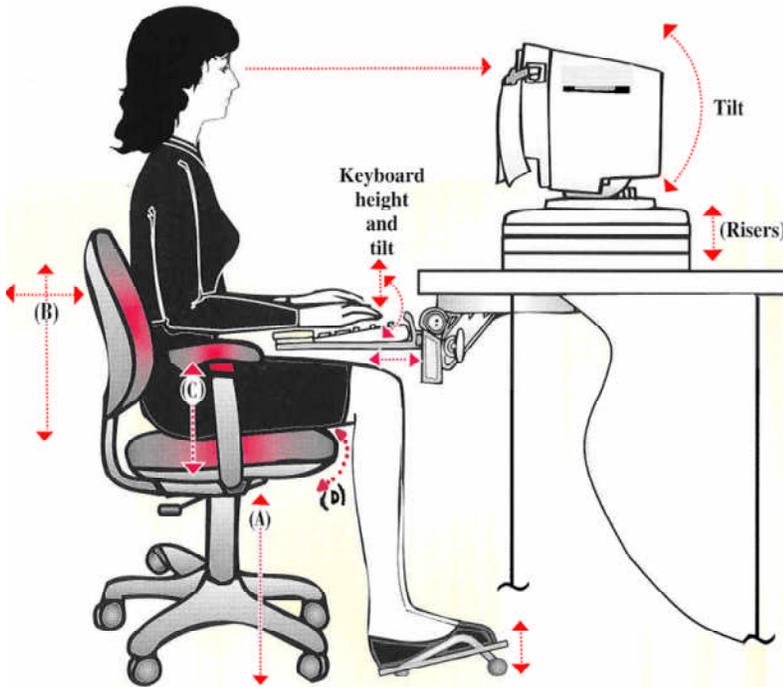
- Is a footrest provided?
- Is the height and angle adjustable?

Miscellaneous

- Are frequently used items within arm's length and easy reach?
- Are headsets provided if regular phone work is required?
- Is there sufficient lighting?
- Are frequent breaks taken?

Evaluator _____ Date _____

Figure 1



Posture

- Back supported
- Elbows in
- Wrists and forearms parallel to the floor
- Knees bent at 90°
- Feet on the floor or footrest

Adjustable Features

- Chair height (A)
- Back rest (B)
- Arm Rest Angle (C)
- Seat Pan Angle (D)
- Keyboard position
- Monitor height, distance, tilt



Stretching

Before, during, and after working

Figure 2



Figure 3



Figure 4



Figure 5



Figure 6



Figure 7



Figure 8.



Figure 9.

Figure 10

