

Computer Workstation Ergonomics

When setting up your computer workstation, there are several components that need to be considered individually. Proper design of your workstation to fit your individual needs can help reduce your risk of developing work-related postural strain, repetitive strain injuries, and a variety of upper extremity and back conditions.

In order to properly set up a computer workstation, the following components must be considered¹:

1) Monitor

Center your monitor.

For most workstations, the best position for your monitor is directly in front of you. Putting the monitor off-center (i.e., to the left or right of your body) can cause neck and shoulder pain due to twisting and awkward posture.

- **Exception:** If you only occasionally look at the screen, it's acceptable to place the monitor to the side. People who frequently interact with others across a desk - bank tellers and managers, for example - may want to keep the monitor to the side so that it doesn't interfere with their communication. A good solution for these situations is a monitor swivel arm.

Sit an arm's length away.

Your monitor should be about arm's length away when you're sitting back in your chair. (Sitting too close or too far from your screen can cause eyestrain). If you have a large monitor - 20" or larger - you should sit slightly further back.

Position the top of your screen level with your eyes.

The ideal viewing height is to have your eyes level with an imaginary line across the screen, about 2"-3" below the top of the monitor. This can be accomplished in one of two ways - either by either lowering your monitor or raising your chair. If your screen is too low, you'll find yourself tilting your head forward to view the monitor (a common cause of neck pain). If it's too high, you may have to tilt your head back, leading to neck and shoulder pain - and increasing the likelihood of glare from overhead lights (a common cause of headaches).

Tilt your monitor slightly upward.

Tilt the screen so that the base is slightly closer to you than the top. This enables you to view the entire screen and the display more clearly. Tilting the monitor downward isn't recommended unless necessary to reduce the glare of overhead lights or if your monitor is too high and can't be adjusted.

- **Beware:** Tilting the screen too far back may cause reflected glare problems from overhead lighting.

Beware of your windows.

Windows are a common source of glare on the monitor. If you work in a room with windows, be sensitive to any reflections (or glare) that may show on your monitor and cause you to squint. A great way to check for glare is to turn your monitor off and examine any reflections visible on it. Also, placing your monitor directly in front of a

¹ The information contained in this handout was adapted from: www.healthycomputing.com

window can create an uncomfortable viewing situation if the brightness of the window is greater than that of the monitor (see below).

Balance the brightness of your monitor and its surroundings.

You should adjust your monitor so that its brightness is approximately equal to the area directly behind it. The goal is to eliminate any contrast between the brightness of the screen and the area behind it. (Make sure, of course, that your workplace is adequately lit!). Uneven brightness can cause headaches and vision issues (such as fatigue and squinting). You may need to adjust your screen brightness throughout the day if your workspace is lit by natural light.

Adjust your font size and color.

The size of your text should be about two or three times the size of the smallest text that you can read. Black text on a white background is usually the easiest to discern when word-processing.

Reduce glare.

If left uncorrected, glare will cause discomfort, eyestrain, and headaches. Try to reposition your monitor so that there's no glare on the screen (but avoid putting it in a position that's uncomfortable to view!). If you can't avoid the glare by readjusting your monitor positioning, consider a high-quality glass anti-glare screen.

2) Keyboard

If you don't currently use an adjustable keyboard/mouse tray, consider attaching one to your surface.

This allows a much wider range of adjustment, and helps you maintain a proper ergonomic setup. Choose a system that is height adjustable, lets you tilt the keyboard away from you slightly for better posture (negative tilt), and allows you to use the mouse with your upper arms relaxed and as close to the body as possible.

Make sure the height of your keyboard allows you to keep an "open angle" with your arms.

In the proper position, the keyboard should be placed just above the level of your lap. This is lower than most people normally place their keyboard, but lets your arms tilt downward while using the keyboard, leaving your elbows at a comfortable "open" angle. (If you don't have an adjustable keyboard tray, you may need to accomplish this by adjusting your chair height).

If your keyboard is lower than the desk surface, tilt the back edge of the keyboard slightly down (known as "negative keyboard tilt").

Using a slightly negative keyboard tilt will help you keep your wrists in the proper (neutral) position. Try to avoid positive keyboard tilt (i.e., where the top row of keys is noticeably higher than the bottom row of keys). Also, make sure that if there are "legs" attached to the bottom front of your keyboard, they are left un-extended.

If you use a keyboard tray, make sure there's enough room for your mouse.

Your mouse should be close to your keyboard so that you don't have to reach far to grasp it.

If you have a broad chest, consider a "split" keyboard.

Split keyboards divide the keyboard into two halves, each of which points slightly outwards. The outward angle lets your wrists and forearms point inward without requiring your elbows to come in as far, better conforming to the contours of your body. Conversely, thinner people may find a traditional "straight" keyboard more comfortable.

3) Mouse

Place your mouse close to your keyboard and within easy reach.

Placing your mouse too far away can cause your shoulder muscles to tire from constantly supporting your outstretched arm, leading to neck and shoulder pain. Keeping it close to your keyboard means you won't have to overstretch when reaching for the mouse.

Keep your mouse close to your keyboard.

Placing your mouse on a desk if your keyboard is on a tray can cause you to overreach, and result in shoulder or neck pain. You should be able to use your mouse comfortably with your arms close to your side, and your elbows at a slightly "open" angle.

Consider a mouse tray to help keep your mouse near your keyboard.

Your mouse should be close to your keyboard, and both should be comfortably placed. If you are using a keyboard tray, the best position for your mouse is on an adjustable tray that slides over the numeric keypad of your keyboard, putting your mouse about 2 inches above your keyboard (known as a mouse bridge). If your keyboard tray has a tiltable mouse tray to the side, then try angling it down slightly to improve your wrist posture. Try to avoid using a mouse to the side of the keyboard on a flat, lowered tray, because this puts your hand in greater wrist extension.

Adjust your mouse/trackball's software controls.

Many people don't realize that the way their mouse functions can be controlled through software. You can adjust the speed at which your mouse moves, the time required between double-clicks, and the size of the cursor. If you're constantly having to backtrack because you shot past the "close window" button, try slowing your mouse down.

Consider using a different input device to reduce repetitive arm motions.

Trackballs decrease the distance your shoulder has to travel, which may help reduce movement-related pain. (However, they can also put more strain on the fingers and hands.) Some mouse designs work like a joystick and may help. You can also use a touch pad, a pen and tablet, or a foot-operated mouse. Try a variety of devices, and use the one that feels most comfortable.

Make sure you're using the right sized pointing device.

People often don't realize that mice may come in different sizes. Make sure that the mouse fits comfortably in your hand; if it's too large, you may want to find a smaller mouse. There are even adjustable-size mice.

4) Chair

The Basics

You should be able to sit comfortably in the chair, using as much of the chair back as possible for support. The lumbar support should fit comfortably into the curve of your lower back, and your feet should be flat on the ground (use a footrest if necessary). The seat pan (i.e. the part on which you sit) should be an appropriate size that allows at least one inch between your legs and either side of the chair, and supports your legs without applying pressure to the back of your knees.

Adjustable Chair

Adjust the Chair Height

Start with your seat at the highest setting and then adjust downward until your legs and feet feel comfortable, and the back of your knees is at an open angle (90° or slightly greater, and not compressed). Or, stand facing the chair and adjust the height so that the top of the seat pan is just below your kneecaps.

Sit Back in the Chair

Adjust the height and/or depth of the lumbar support to provide comfortable lower back support.

Adjust the Recline

If the chair has a recline lock, set this at a comfortable position. Remember to unlock this periodically; this will allow the backrest to move with your back as you change posture. It's generally better to be slightly reclined, as this helps relieve tension from your lower back. If the chair allows you to, adjust the recline tension as you move back and forth so that the chair provides consistent support.

Adjust the Seat Pan

When sitting back, make any adjustments to the seat pan (e.g. seat pan tilt) to reach a comfortable position. The seat pan should extend about an inch on both sides of your legs, and should not apply pressure to the back of your knees.

Adjust the Armrest

If possible, adjust the height, width, and position of your armrests to one most comfortable for how you work. Keep in mind that armrests will be used only *between* typing sessions, not while typing or using your mouse. Consider lowering or swinging the armrests out of the way when not in use so as to not inhibit your movement.

Clear Obstacles

Make sure that the chair's casters (wheels) move smoothly, and that nothing obstructs your ability to position the chair in front of your desk and computer.

5) Desk

Using a fixed height desk?

If you have a desk with limited clearance or a center drawer that stops you from installing a keyboard/mouse tray system, then you may need to raise the height of your chair to use the keyboard and mouse on the desktop. This arrangement is not ideal, and you should think about replacing the desk with a work surface/keyboard tray arrangement as soon as possible. If you have to do this, remember to use a good footrest to support your legs while you are working.

Using a fixed height work surface?

If you have a fixed height work surface, it's probably between 28"-30" above the floor. While this is a comfortable height for writing on paper, it's too high for computer keyboard and mouse work. The best arrangement is for you to install a height adjustable keyboard/mouse tray system beneath the work surface. Another option is to place the keyboard and mouse on top of the desk and adjust your chair upward, using a foot rest to maintain proper seating posture.

Using an adjustable height work surface?

If you have an adjustable height work surface, set it to a comfortable height for writing and then attach a separate height adjustable keyboard/mouse tray system to correctly adjust these components.

6) Documents

Don't put the documents flat on your desk or work surface while working with them.

You'll likely have to twist and tilt your neck to read the documents, then move your head to see the computer screen. This repeated neck twisting and head movement can cause neck discomfort.

Use a copyholder, or place the documents as close as possible to the computer screen - at about the same distance and level as your monitor.

Keeping documents at the same distance as your screen minimizes the refocusing your eyes do when switching between the two. Positioning the documents (and the monitor) directly in front of you minimizes the number of times you need to turn or swivel your head. Lastly, placing documents at roughly the same level as your monitor means you don't have to tilt your head as much to view them. All of these can be helped by a copyholder. There are three major types:

- **Screen-mounted document holders.** These attach to the side of your computer monitor and suspend the paper document in the same vertical plane. This kind of holder is good for single sheets of paper or lightweight documents.
- **Freestanding document holders.** Although a number of different designs are available, most of these have a sloping surface that angles the document in the same plane as your computer screen. You can adjust the angle and/or height on certain models. Some are designed for lightweight documents (a single sheet of paper), while others can support large books. Whatever the design, this kind of holder should be placed close to the side of the computer monitor at the same distance as the screen. Because the visual field curves to either side, you can also rotate the document holder slightly at an angle to the screen to follow this curve.

- **In-line document holders.** This kind of document holder places documents between the keyboard and computer screen at an angle that follows your field of vision, which naturally curves down. In-line document holders eliminate side-to-side head movements and let you look from the screen to document and vice versa. These document holders are very useful if you work with oversized documents, such as wide-legal paper or wide-format computer printouts.

GENERAL CONSIDERATIONS:

- ❑ take frequent breaks → stand up or stretch while on the phone, go and get a glass of water, or find some other excuse to walk around for a few minutes
- ❑ the ideal posture is a variable posture – change positions frequently
- ❑ employ the **20/20/20 rule** ⇒ every 20 minutes, focus your eyes on something 20 feet away for 20 seconds – this will help avoid and reduce eye strain that can occur with long periods of computer work
- ❑ an egg timer is a cheap and effective way to remind you to stretch or move around – set it to go off every 10-15 minutes

