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BUSINESS MATTERS 2

## Arranging a Computer Workstation: Recommendations[[1]](#footnote-1)

The following is a brief summary of ergonomist-approved recommendations for creating an ergonomic working arrangement—an important part of protecting your health.

#### A Length of Use

If the computer will only be used by one person, then the arrangement can be optimized for that person's size, shape, and features such as adjustable height may be unnecessary. If it's going to be used by several people, you will need to create an arrangement that most closely satisfies the needs of the extremes—the smallest and tallest, thinnest and broadest persons—as well as those in between.

Consider how long people will be using the computer each day. If it's only a few minutes, ergonomic issues may not be a high priority. If it's more than one hour, you may want to consider an ergonomic arrangement. If it's more than four hours, then you should implement an ergonomic arrangement.

#### B Type of Computer

Most ergonomic guidelines for computer workstation arrangements assume that you will be using a desktop system, where the computer screen is separate from the keyboard.

Laptop computers are growing in popularity and are great for short periods of computer work. Guidelines for laptop use are more difficult because laptop design is inherently problematic: When the screen is at a comfortable height and distance the keyboard isn't, and vice versa. For sustained use, consider purchasing either an external monitor, an external keyboard (preferably with a negative-tilt keyboard tray), or both; or a docking station. Then, rearrange your workspace to create a good workstation layout.

#### C Desk

Make sure that the computer monitor, CPU system unit, keyboard, and mouse are placed on a stable working surface (nothing that wobbles) with adequate room for proper arrangement. If this work surface is going to be used for writing on paper as well as computer, use a flat surface that is between 28 and 30 inches above the floor (suitable for most adults).

Consider attaching a keyboard/mouse tray system to your work surface. Choose a system that is height adjustable, that allows you to tilt the keyboard down away from you slightly for better wrist posture (negative tilt), and that allows you to use the mouse with your upper arms relaxed and as close to the body as possible and with your wrist in a comfortable and neutral position.

#### D Chair

Choose a comfortable chair. If only one person is using the chair, it can even be at a fixed height provided that it is comfortable and has a good backrest that provides lumbar support. If more than one person will be using the computer, consider buying and a chair with several ergonomic features.

Studies show that the best seated posture is a reclined posture of 100 to 110 degrees—not the upright 90 degree posture that is often portrayed. In the recommended posture, the chair starts to work for the body, and there are significant decreases in postural muscle activity and in intervertebral-disc pressure in the lumbar spine. Erect sitting is not relaxed, sustainable sitting; reclined sitting is.

#### E Types of Work

Determine the type of software that will be used most often and adjust your workstation accordingly. For word processing, arranging the best keyboard/mouse position is a high priority. For Internet use and graphic design, arranging the best mouse position is a high priority. For data entry, arranging the best numeric keypad/keyboard is a high priority. For games, arranging the best keyboard/mouse/game pad is a high priority.

#### F Monitor Positioning

Make sure that any paper documents that you are reading are placed as close to the computer monitor as possible and that these are at a similar angle. Use a document holder where possible.

* Angle: Place the monitor directly in front of you and facing you, not angled to the left or right. This helps to eliminate too much neck twisting. Also, whatever the user is working with, encourage him/her to use the screen scroll bars to ensure that what is being viewed most is in the center of the monitor rather than at the top or bottom of the screen.
* Centering: Center the monitor on the user so that the body and/or neck isn't twisted when looking at the screen. However, if you are working with a large monitor and spend most of your time working with software like Microsoft Word (which defaults to creating left-aligned new pages), and you don't want to have to drag these to more central locations, try aligning yourself to a point about one third of the distance across the monitor from the left side.
* Height: Put the monitor at a comfortable height that doesn't make the user tilt their head up to see it or bend the neck down to see it. When you are seated comfortably, a user's eyes should be in line with a point on the screen about two to three inches below the top of the monitor casing. We actually see more visual field below the horizon than above this (look down a corridor and you'll see more of the floor than the ceiling), so at this position the user should comfortably be able to see more of the screen. If the monitor is too low, the user will crane their neck forwards, if it's too high, they'll tilt their head backwards and end up with neck/shoulder pain.
* Bifocals and progressive lens: Even if you wear bifocals or progressive lens, if you sit back in your chair in a reclined posture (with you back at around 110 degrees) that is recommended for good low back health, rather than sitting erect at 90 degrees. If you slightly tilt the monitor backwards and place this at a comfortable height you should be able to see the screen without tilting your head back or craning your neck forwards. Postural problems with bifocals can occur if you sits erect or even hunched forwards. Low monitors cause neck flexion and suffer more from glare. Recent studies have shown that the best position for a computer monitor is for the center of the screen to be at around 17.5 degrees below eye level. Try to align your eyes with the top of the viewing area of the screen, and this should put the center about right geometrically.
* Viewing distance: The monitor should be at a comfortable horizontal distance for viewing, which usually is around an arm's length (sit back in your chair and raise your arm, and your fingers should touch the screen). At this distance you should be able to see the viewing area of the monitor without making head movements. If text looks too small, then either use a larger font or magnify the screen image in the software rather than sitting closer to the monitor.
* Screen quality: Use a good-quality computer screen. Make sure that the text characters on your screen look sharp, and that they are a comfortable size (you can change the screen resolution to find a comfortable and clear character size). If you can see the screen flickering out of the corner of your eye you should try increasing the refresh rate of your monitor (with a PC you can change monitor resolution and refresh rates using the Monitor control panel in your Settings folder; with a Mac you can use the Monitor control panel). You can also consider using a good-quality glass anti-glare filter or an LCD display (like a laptop screen).
* Eye health: There are natural changes in vision that occur in most people during their early 40s. It's a good idea to periodically have your eyes checked by a qualified professional. If any screen adjustments feel uncomfortable, change them until the arrangement feels more comfortable or seek further professional help.

#### G Posture

Good posture is the basis of good workstation ergonomics. It is the best way to avoid a computer-related injury. To ensure good user posture:

* Make sure that the user can reach the keyboard keys with their wrists as flat as possible (not bent up or down) and straight (not bent left or right).
* To avoid nerve compression at the elbow, make sure that the user's elbow angle (the angle between the inner surface of the upper arm and the forearm) is at or greater than 90 degrees.
* Make sure that the upper arm and elbow are as close to the body and as relaxed as possible for mouse use. Avoid overreaching. Also make sure that the wrist is as straight as possible when the mouse is being used.
* Make sure the user sits back in the chair and has good back support. Also, check that the feet can be placed flat on the floor or on a footrest.
* Make sure the head and neck are as straight as possible.
* Make sure the posture feels relaxed for the user.
* Keep it close!
* Make sure that those things the user uses most frequently are placed closest to the user so that they can be conveniently and comfortably reached.
* Make sure that the user is centred on the alphanumeric keyboard. Most modern keyboards are asymmetrical in design (the alphanumeric keyboard is to the left and a numeric keypad to the right). If the outer edges of the keyboard are used as landmarks for centring the keyboard and monitor, the user’s hands will be deviated because the alphanumeric keys will be to the left of the user's midline. Move the keyboard so that the centre of the alphanumeric keys (the B key, is centred on the mid-line of the user).
* Make sure that the phone is also close to you if you frequently use it.
* A good workstation ergonomic arrangement will allow any computer user to work in a neutral, relaxed, posture that will minimize the risk of developing any injury. An ideal keyboard arrangement is to place this on a height-adjustable negative-tilt tray. An ideal mouse surface is one to two inches above the keyboard and moveable over the numeric keypad. If you want a surface at the level of the keyboard base, then make sure that this can also be angled downwards slightly to help to keep your hands and wrist neutral while you are moussing, and keep your elbow is as close to the body as possible while you work. Computer Location

Think about the following environmental conditions where the computer will be used:

* Lighting: Make sure that the lighting isn't too bright. You shouldn't see any bright light glare on the computer screen. If you do, move the screen, lower the light level, and/or use a good-quality, glass anti-glare screen. Also make sure that the computer monitor screen isn't backed to a bright window or facing a bright window so that there's the screen looks washed out (use a shade or drapes to control window brightness).
* Ventilation: Make sure that you use your computer somewhere that has adequate fresh-air ventilation and that has adequate heating or cooling so that you feel comfortable when you're working.
* Noise: Noise can cause stress, which tenses your muscles, which can increase injury risks. Try to choose a quiet place for your workstation, and use low-volume music—preferably light classical—to mask the hum of any fans or other sound sources.

#### H Breaks

All Ergonomists agree that it's a good idea to take frequent, brief rest breaks. Practice the following:

* Eye breaks: Looking at a computer screen for a while causes some changes in how the eyes work, causes you to blink less often, and exposes more of the eye surface to the air. Every 15 minutes you should briefly look away from the screen for a minute or two to a more distant scene, preferably something more than 20 feet away. This lets the muscles inside the eye relax. Also, blink your eyes rapidly for a few seconds. This refreshes the tear film and clears dust from the eye surface.
* Micro breaks: Most typing is done in bursts rather than continuously. Between these bursts of activity you should rest your hands in a relaxed, flat, straight posture. During a micro break (two minutes or less) you can briefly stretch, stand up, move around, or do a different work task (e.g., make a phone call). A micro break isn't necessarily a break from work, but it's a break from the use of a particular set of muscles that's doing most of the work (e.g. the finger flexors if you're doing a lot of typing).
* Ergonomic software: Working at a computer can be hypnotic, and often you don't realize how long you've been working and how much you've been typing and moussing. Ergonomic software monitors how much you've been using the computer, prompt you to take a rest break at appropriate intervals, and suggest simple exercises.
* Rest breaks: Every 30 to 60 minutes, take a brief rest break. During this break, stand up, move around and do something else. Get a drink of water, soda, tea, or coffee, etc. This allows you to rest and exercise different muscles, and you'll feel less tired.
* Exercise breaks: There are many exercises that you can do to help relieve muscle fatigue. You should do these every 1-2 hours.

This article has been adapted from: Arranging a Computer Workstation: Recommendations. In: *ehs.pitt.edu*. [online]. [cit. 19.09.2018]. Dostupné z: <https://www.ehs.pitt.edu/workplace/10steps.html>

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