ENVIRONMENTAL HEALTH & SAFETY

UNIVERSITY *of* WASHINGTON

UNIVERSITY OF WASHINGTON COMPUTER WORKSTATION ADJUSTMENT GUIDELINES

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INTRODUCTION

This document provides guidance on computer workstation evaluation and adjustment for comfort. If you are comfortable using your computer workstation, no changes may be needed. However, changes may occur over time and adjustments may be helpful to address discomfort issues.

Being aware of the proper ergonomic posture and computer workstation setup and using these guidelines may help you make improvements to your existing workstation. Or, they may suggest that a change in one or more workstation components is needed.

STEPS TO ADJUST YOUR WORKSTATION

1. ADJUST YOUR POSTURE.

Review the Neutral Posture section below for good computer workstation ergonomic posture.

2. ADJUST YOUR WORKSTATION.

Refer to the **Ergonomic Adjustment Guidelines** below for each workstation component and adjust as needed to improve your comfort

- Chair
- Monitor
- Keyboard and tray
- Mouse

3. CONDUCT A SELF-EVALUATION.

a. Conduct a self-evaluation of your workstation and note areas of discomfort in your neck, shoulders, upper back, lower back, wrist, and the arm used to manipulate the mouse.

b. Make additional adjustments based on your self-evaluation of discomfort. Refer to the **Adjustments to Address Discomfort** for each workstation component.

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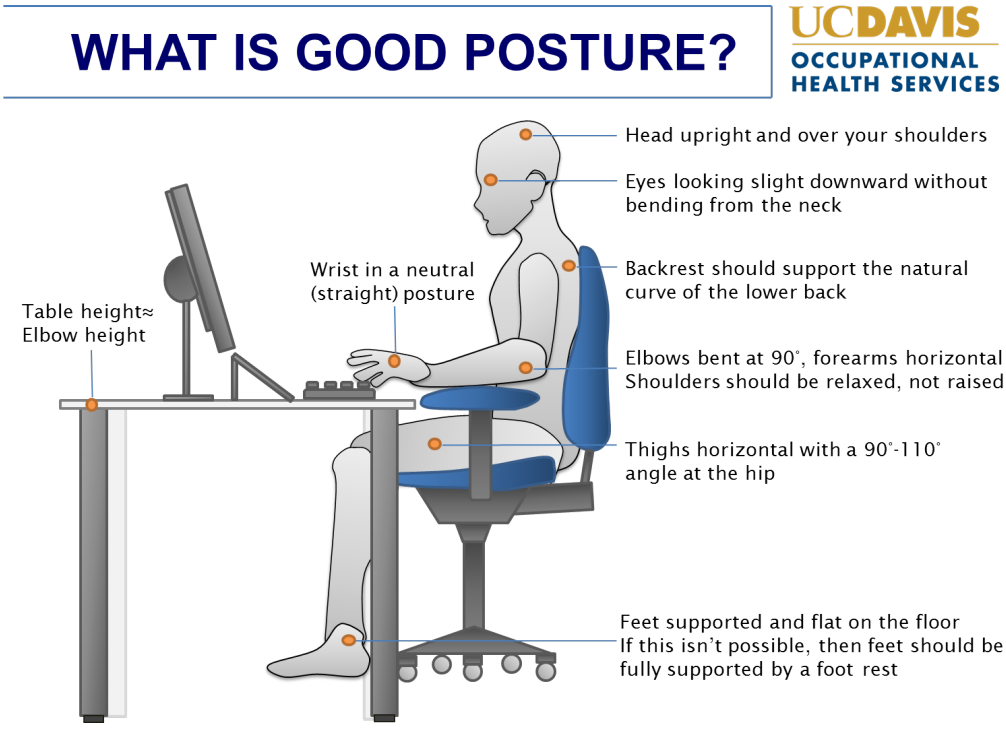
NEUTRAL POSTURE

A **neutral posture** is the ergonomic standard for sitting in a chair and using the computer. The characteristics of the neutral posture are described in the table and shown in the image below.

Body part	Neutral posture position
Head	Head is positioned directly above the shoulders and hips.
Back	Back is straight up and down (vertical), and not leaning forward or back at the waist. Upper back and lower lumbar curve are supported by the chair back.
Neck	Neck is relaxed. Chin is at a comfortable level without excessively lifting the chin to view the monitor.
Shoulders	Shoulders are relaxed and are not lifted upward towards the neck.
Upper Arms	Upper arms are relaxed and rest beside the upper body.
Elbows	Elbows are relaxed beside upper body and are bent at a right angle, 90° to 110°. Elbows are not lifted upward and/or outward away from upper body.
Forearms	Forearms are not extended since upper arms are relaxed beside the upper body.
Wrists	Wrists are relaxed and straight/flat, or flexed slightly downward.
Knees	When sitting in the chair, knees are at the same height or slightly lower than the hips.
Feet	Feet rest comfortably on the floor, or are supported by a foot rest if the feet do not touch the floor.



SELF-ADJUSTMENT OF COMPUTER WORKSTATION

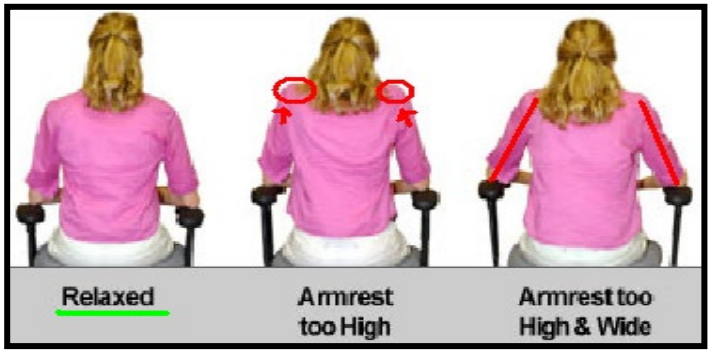
Use the information below to evaluate and adjust your computer workstation to proper ergonomic guidelines and to address discomfort in target parts of the body.

CHAIR

Ergonomic adjustment guidelines

Note: Some chairs do not have all of the adjustment features listed below.

1. **Chair height:** Feet are supported comfortably on the floor. Arms and shoulders are not forced upward toward neck and shoulders.
2. **Seat pan depth:** If too long or too short, adjust so there is a 1- to 2-finger-width distance between front edge of seat pan and back of the knees.
3. **Seat pan tilt:** Adjust so flat and comfortable or knees are slightly lower compared to the hips while sitting to reduce pressure on bottom of thighs.
4. **Chair back height:** Raise or lower back height so curve in chair back matches curve in the user's back to support lower back.
5. **Chair back tilt:** If you prefer to sit straight up and down (vertically), adjust back tilt so the user's upper back and shoulders are supported.
6. **Armrest height:** Upper arms are relaxed at sides of upper torso and elbows are bent at 90 to 110 degrees. Elbows are comfortably supported by the height of armrests. Arms and elbows and are not forcing shoulders upward toward the neck (shown at right).
7. **Armrest width:** Arms and elbows are not forced outward away from upper body (shown at right).

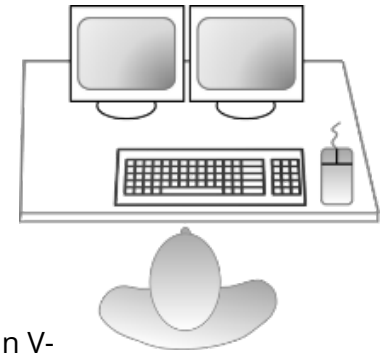


Additional adjustments to address discomfort

Area of discomfort	Chair part	Adjustment	Additional considerations
Lower back	Seat pan depth	If seat depth is too long or too short, user tends to lean forward and rest the forearms on the table during keyboard and mouse use.	
Neck, shoulders, upper back	Chair height	If chair height is too low and keyboard and mouse are used on top of the table, user tends to raise arms and elbows; Raise chair height.	May need a footrest to support the feet.
	Seat pan depth	If seat depth is too short or long, user tends to lean forward and rest forearms on table during keyboard and mouse use; Shorten or lengthen seat pan depth.	
	Armrest width	If elbows lift away from upper body to rest on armrests, adjust armrests inward to support the arms (if chair design allows).	
Wrist	Chair height	If the chair is too low, user may be resting wrists on edge of table and flexing wrists downward. If chair too high, user flexes wrist upward to use keyboard and mouse.	

MONITOR

Note: HP and Dell monitors have height and tilt adjustment features.



Ergonomic adjustment guidelines

User sits comfortably in the chair and looks straight ahead at the top of the monitor without raising or lowering the chin from a comfortable position. The chin and eyes then move downward to read information on the monitor.

1. Place monitor at arm's distance away from user.
2. Place the primary monitor directly in front of the user.

   If dual monitors are used equally, center the monitors directly in front of user and place in V-pattern for use.
3. Adjust the monitor height so the top is slightly above eye level.
4. Adjust the monitor tilt by pushing the top away and bottom toward the user. A tilted monitor is usually easier to view compared to a vertical straight up and down monitor.
5. If the user has difficulty reading, adjust the font size from small 100% to medium 125%.

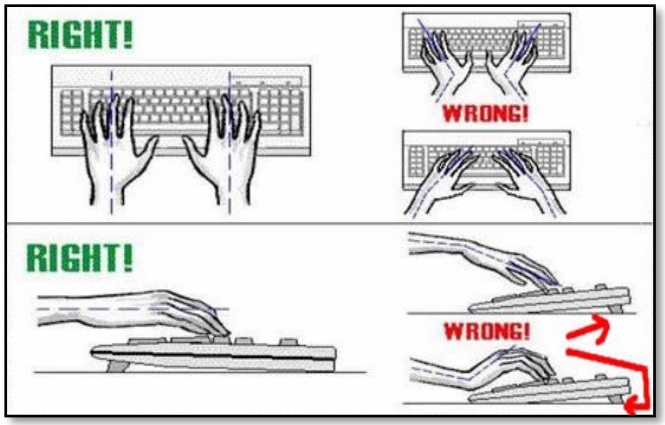
If user wears bifocal lenses, the user might be trying to view the monitor through the bottom of the lens. To improve viewing comfort, lower the monitor so the bottom edge touches the top of the table and tilt the top of the monitor away from the user.

Additional adjustments to address discomfort

Area of discomfort	Monitor position	Adjustment	Additional considerations
Lower back	Placement	If user leans forward to view monitor: ○ Move monitor closer to the user. ○ Adjust the monitor tilt.	If user wears prescription lenses, they may need to visit their healthcare provider to update their prescription.
Neck, shoulders, upper back	Height	Adjust monitor height so the top is slightly above eye level. (2" to 3" from top of large monitor).	If the user wears bifocal or progressive lenses and reads through bottom of lens: ○ Lower the monitor so the bottom edge touches the top of the table. ○ Tilt top of the monitor away from the user

KEYBOARD AND TRAY

Ergonomic adjustment guidelines



During keyboard use:

- User's upper arms are relaxed at the sides of the upper body.
- Elbows are bent at 90 to 110 degrees.
- Forearms are parallel to the floor.
- Wrists are straight or flexed slightly downward during keyboard use.

If keyboard and mouse are used *on top of the table*:

- Lower the back legs of the keyboard to flatten the keyboard.
  Exception: User is not a touch typist and relies on looking at keys for accuracy.
- Provide a wrist rest to raise the wrists so they are flat when using keyboard.
- Rest the palms on the wrist rest, not the wrists, to avoid compressing the soft tissue in the wrists during keyboarding.

If keyboard and mouse are used on an *adjustable keyboard tray*:

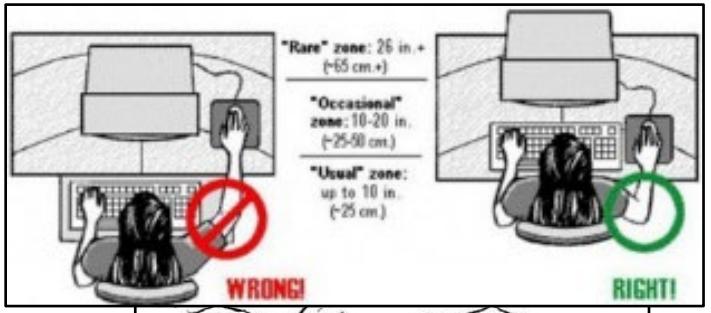
- Adjust the height of the keyboard tray.
- Adjust the tilt of the tray in a negative tilt by raising the front edge of the tray so it is slightly higher compared to the back edge next to the table and monitor.

Additional adjustments to address discomfort

Area of discomfort	Adjustments to keyboard and keyboard tray
Neck, shoulders, upper back	If keyboard and mouse are used *at the same level*: ○ Use keyboard and mouse on top of a table; **or** ○ Use an adjustable arm with a platform that can accommodate both a mouse and keyboard on the same surface.
	If keyboard and mouse are used *on top of a table*, **and** arms and elbows are *too low*: ○ Raise chair height so arm and elbow posture are in the correct position.
	If keyboard and mouse are used *on an adjustable tray*: ○ Adjust tray height so arm and elbow posture are in the correct position.
Wrists	If chair is too low, user may be resting wrists on edge of table and flexing wrists downward. ○ Raise chair height.
	If chair too high, user flexes wrist upward to use keyboard and mouse. ○ Lower chair height.
	If keyboard and mouse are used on an adjustable tray: ○ Adjust tray height so arm, elbow, and wrist posture are in the correct position.

MOUSE

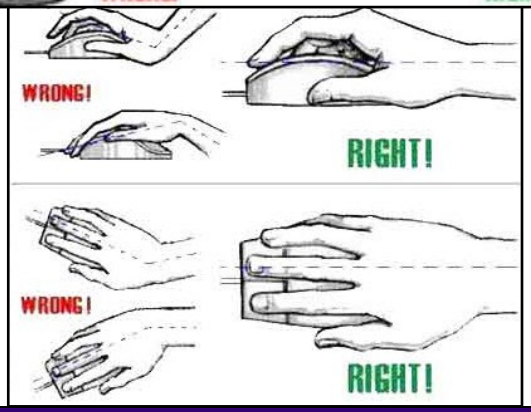
Ergonomic adjustment guidelines



User's upper arms are relaxed at the side of the upper body, elbows are bent at 90 to 110 degrees, forearms are parallel to the floor, and wrists are straight or flexed slightly downward during mouse use.

- **Placement**: Mouse is next to the edge and bottom corner of the keyboard close to user to reduce the distance reached to reduce arm extension when using the mouse.

Mouse is used at the same level as the keyboard.



- **Wrist Rest**: If mouse pad with wrist rest is used, the palm, not the wrist, rests on the wrist rest during micro-breaks.
- **Mouse Use**: To manipulate the mouse, the user moves the forearm and wrist together rather than placing the wrist on the wrist rest and "waving the hand left and right" at the wrist.

Additional adjustments to address discomfort

Area of discomfort	Adjustments to keyboard and keyboard tray
Neck, shoulders, upper back	Avoid reaching for a mouse at one height and the keyboard at a different height.
	Use the keyboard and mouse on the same surface at the same level such as an adjustable keyboard platform or on top of the table.
Wrists	Adjust chair height: ○ If the chair is too low, the user may be resting wrists on edge of table and flexing wrists downward. ○ If the chair is too high, user flexes wrist upward to use keyboard and mouse.
	If the keyboard and mouse are used on an adjustable tray: ○ Adjust tray height so wrists are flat or flexed slightly downward.
Arm, mouse-use arm	Place the mouse next to the edge of the keyboard close to the user to reduce the distance reached. Avoid extending the arm to use the mouse.
	Use the mouse at the same level as keyboard.
	If a mouse pad with wrist rest is used, rest the palm, not the wrist, on the wrist rest during micro-breaks
	When manipulating the mouse, move the forearm and wrist together rather than placing the wrist on the wrist rest and "waving the hand left and right" to manipulate the mouse.

LAPTOP ERGONOMICS

Laptop computers are lightweight, portable and convenient, and they are widely used. However, their compact design, with attached screen and keyboard (in most designs), may put laptop users into awkward postures. When the screen is at the right height, the keyboard position is too high; and when the keyboard is at the right height, the screen is too low.

Laptops pose less risk of pain and injury when used for short periods of time (less than an hour at a time), but many people use laptops as their main computer. This may create ongoing issues including poor neck/head posture and poor hand/wrist posture that may lead to pain and potential injury. Following these guidelines may help prevent issues from developing.

The same ergonomic goals as discussed above for desktop workstations apply to laptop use:

- Neutral postures with the neck aligned with the spine (neutral -- not bent or thrust forward)
- Back relaxed but supported
- Shoulders relaxed (not hunched or rounded)
- Elbows close to the body and bent at an angle between 90 and 120 degrees
- Wrists and hands straight (not bent or turned)

Occasional laptop use

If you usually use a desktop computer, but occasionally use a laptop, review these suggestions:

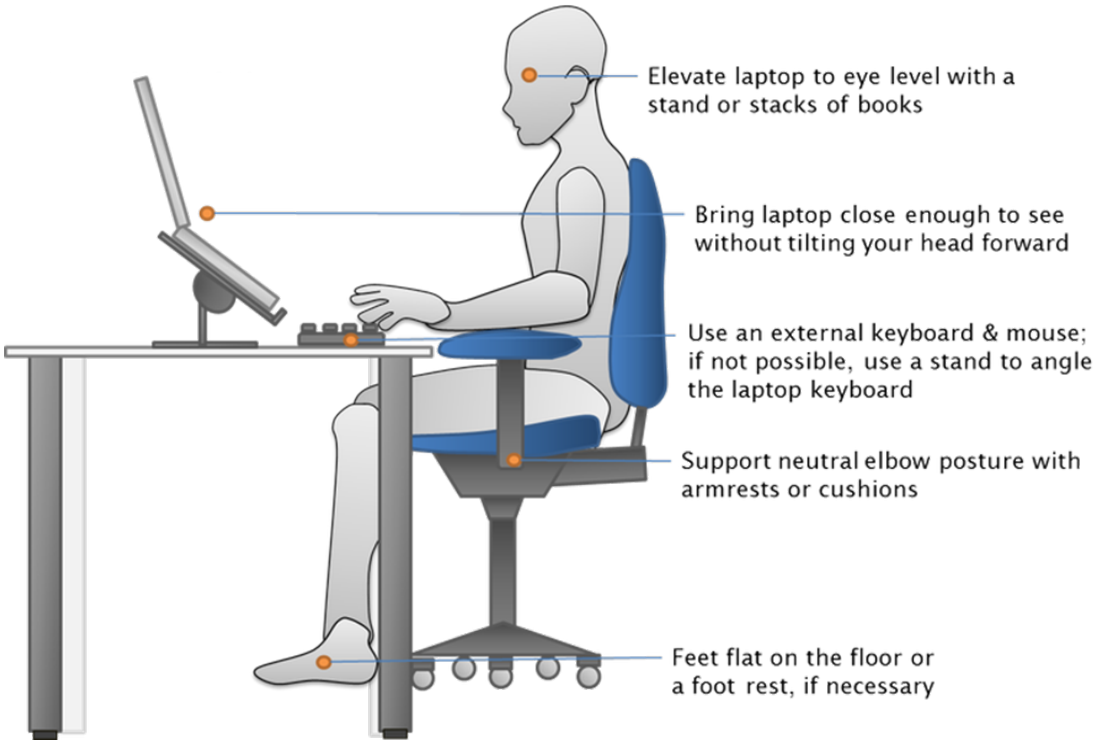
- Use a chair that supports a comfortable upright or slightly reclined posture.
- If not at a table or surface, position your laptop in your lap for the most neutral wrist posture that you can achieve. An empty 2-3 inch binder with the wider edge toward your knees will create an angle that will help keep your wrists straight and maximize the height of the screen.
- If in a reclined position, prop your feet up to maintain a neutral trunk/thigh angle.
- Be sure to maintain a neutral neck posture.
- Don’t place your laptop on top of a pillow or other soft material. The lack of circulation could shut down the fan, which can overheat the computer.
- Stand up and stretch frequently.

Frequent laptop use

Review the image below for good ergonomic setup and posture when using a laptop frequently and follow these guidelines.

- Maintain a neutral neck posture by placing the top of the screen near eye level or slightly lower if using bifocal glasses.
- Use a laptop stand or place your laptop on a stable support surface, such as a monitor riser, or other support so that the screen height can be adjusted.
- Attach a regular size, external keyboard and mouse to the laptop, and place them on an adjustable keyboard tray or desk. The keyboard and mouse should be positioned at or slightly below elbow height.

- Use a docking station whenever possible to more closely resemble a standard desktop workstation where input devices can be attached.
- Take frequent stretch breaks.



Source: UC Davis Occupational Health Services

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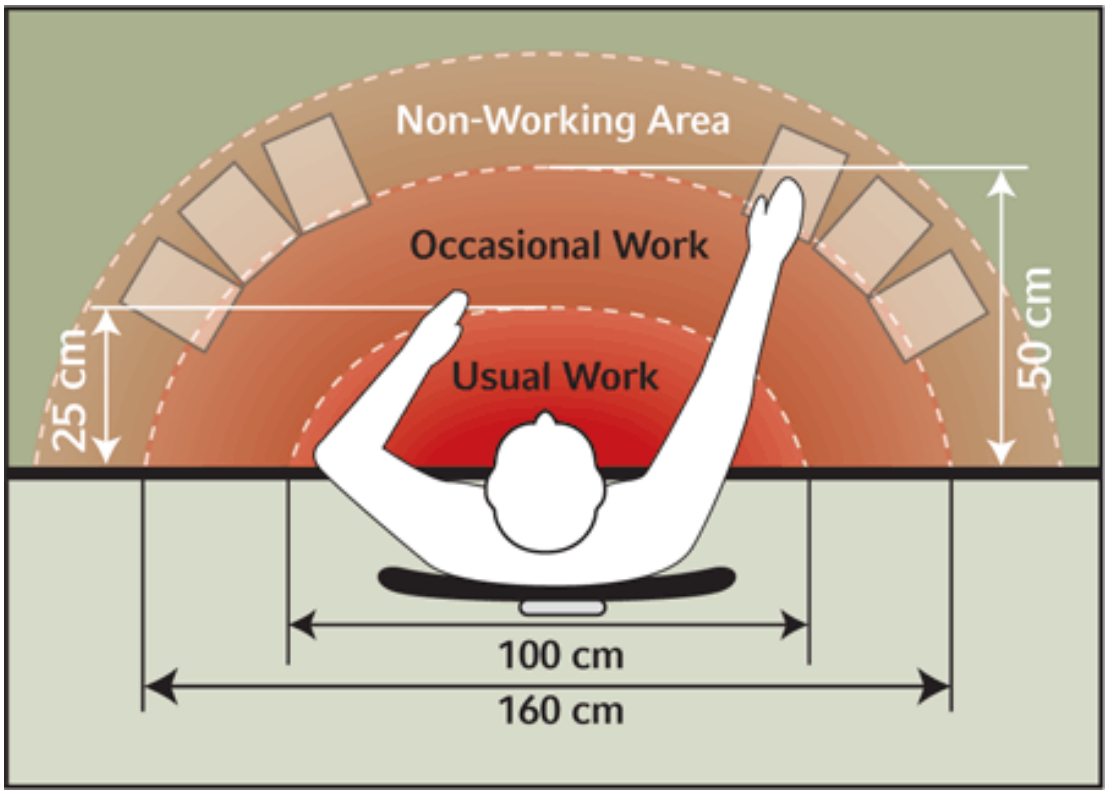
WORKSTATION ORGANIZATION

Organize your work surface so there is little clutter. Place and use the phone, documents, document holder, etc. in the preferred locations where they are easy to reach. Place items used more frequently closer to the user.

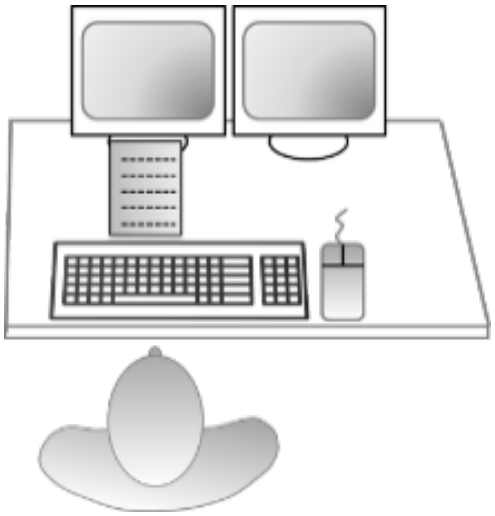


Work zones

Place frequently used items within easy reach while sitting. Place less frequently used items farther away to reduce the need to extend the arms to reach items.

- **Primary Zone** ("Usual Work"): Area in front of the individual; intended for frequently used items, such as the phone, or a calculator; area is 100cm wide and 25 cm deep.
- **Secondary Zone** ("Occasional Work"): Area between 25cm and 50 cm away from the individual and 160cm wide; intended for occasionally used items, such as pens, paper, and files.
- **Tertiary Zone** ("Non-Working Area"): Area beyond 50 cm away from the individual and wider than 160cm; intended for infrequently used items, such as manuals, binders, and pictures.

Document holder



- Use a document holder to place documents at a height so that the computer user does not excessively bend or twist the neck.
- It is preferred to place the holder directly in-line above the keyboard and at the bottom of the monitor

Phone

- Avoid extensive cradling of the phone between the neck and shoulder, as it can cause neck and shoulder discomfort. Use a headset, preferably wireless style.
- Minimize reaching - Move the phone close to the user.
    - If left handed, place the phone on the left side of the workstation.
    - If right handed, place it on the right side.
- Provide a headset if high volume phone usage.

Cord management

- Bundle cords to manage and organize tangled cords.
- Arrange cords so they do not restrict placement of monitor(s) and mouse.
- Arrange cords so not to create a trip and fall hazard.

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BREAKS AND MOVEMENT

Integrate breaks and movement into your work routine.

- Take short breaks away from the computer and rotate job tasks throughout the day to reduce fatigue.
- **Take time to relax your eyes. Follow the 20/20/20 rule -- Every 20 minutes, take a 20-second break and focus your eyes on something at least 20 feet away.**
- Change positions periodically to help maintain circulation and prevent putting pressure on any one area of the body for an extended period.
- Take time to stretch the neck, shoulders, and legs. Refer to the information below.

Note: If you are under medical treatment, please consult with your healthcare provider to identify a stretching program that will benefit you, enhance your recovery, and identify any stretches that should be avoided.

TITLE	SOURCE	LINK AND DESCRIPTION
The Solution – Fitness Breaks	Mayo Clinic	Videos on specific desk stretches to understand proper form and technique • Video: Neck stretches for the workplace • Video: Forearm stretches for the workplace • Video: Upper body stretches for the workplace • Video: Seated stretches for the workplace • Video: Standing stretches for the workplace
Stretching at the Workstation	Canadian Centre for Occupational Health and Safety	Illustrations and descriptions of stretches for computer users • What are some stretches for the hands and forearms that can be done at the workstation? • What are some stretches for the neck and shoulders? • What are some stretches for the back, side and legs?

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RESOURCES

Visit the Ergonomics page on the Environmental Health and Safety (EH&S) website for additional resources.

Assistance

If you need additional assistance in identifying ergonomic issues with your workstation, or in selecting ergonomic equipment, contact the UW Environmental Health & Safety Ergonomics Program at ehsergo@uw.edu or 206.543.7388.

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