FLORIDA DEPARTMENT OF JUVENILE JUSTICE
OFFICE OF HEALTH SERVICES

EMPLOYEE HEALTH INITIATIVE:
ERGONOMICS FOR OFFICE SAFETY

Ergonomics

Millions of people work with computers every day. This photo illustrates simple, inexpensive principles that will help you create a safe and comfortable computer workstation.
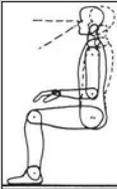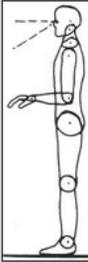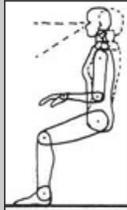
➢ There is no single "correct" posture or arrangement of components that will fit everyone. However, there are basic design goals, some of which are shown in the accompanying figure, to consider when setting up a computer workstation or performing computer-related tasks.

➢ Consider your workstation as you read through each section and see if you can identify areas for improvement in posture, component placement, or work environment.

➢ Suggestions that will help to minimize or eliminate identified problems and allow you to create your own "custom-fit" computer workstation are provided in this article.

Top of monitor at or just below eye level

Head and neck balanced and in-line with torso

Shoulders relaxed

Elbows close to body and supported

Lower back supported

Wrists and hands in-line with forearms

Adequate room for keyboard and mouse

Feet flat on the floor

Neutral Body Positioning

To understand the best way to set up a computer workstation it is helpful to understand the concept of neutral body positioning. This is a comfortable working posture in which your joints are naturally aligned. Working with the body in a neutral position reduces stress and strain on the muscles, tendons, and skeletal system and reduces your risk of developing a musculoskeletal disorder (MSD). The following are important considerations when attempting to maintain neutral body postures while working at the computer workstation. These four **reference postures** are examples of body posture changes that all provide neutral positioning for the body.

UPRIGHT SITTING POSTURE

The user's torso and neck are approximately vertical and in-line, the thighs are approximately horizontal, and the lower legs are vertical.

Figure 1.

Figure 2.

STANDING POSTURE

The user's legs, torso, neck, and head are approximately in-line and vertical. The user may also elevate one foot on a rest while in this posture.

Figure 3.

Figure 4.

DECLINED SITTING POSTURE

The user's thighs are inclined with the buttocks higher than the knee and the angle between the thighs and the torso is greater than 90 degrees. The torso is vertical or slightly reclined and the legs are vertical.

Figure 5. Declined sitting position

Figure 6.

RECLINED SITTING POSTURE

The user's torso and neck are straight and recline between 105 and 120 degrees from the thighs.

Figure 7. Reclined sitting posture

Figure 8.

1. **Hands**, **wrists**, and **forearms** are straight, in-line and roughly parallel to the floor.
2. **Head** is level, or bent slightly forward, forward facing, and balanced. Generally it is in-line with t**orso**.
3. **Shoulders** are relaxed and **upper arms** hang normally at the side of the body.
4. **Elbows** stay in close to the body and are bent between 90 and 120 degrees.
5. **Feet** are fully supported by the floor or a footrest may be used if the desk height is not adjustable.
6. **Back** is fully supported with appropriate lumbar support when sitting vertical or leaning back slightly.
7. **Thighs** and **hips** are supported by a well-padded seat and generally parallel to the floor.
8. **Knees** are about the same height as the hips with the **feet** slightly forward.

Regardless of how good your working posture is, working in the same posture or sitting still for prolonged periods is not healthy. You should change your working position frequently throughout the day in the following ways:

1. Make small adjustments to your chair or backrest.

2. Stretch your fingers, hands, arms, and torso.
   Stand up and walk around for a few minutes periodically.

Progressive Muscle Relaxation Techniques

Progressive muscle relaxation is a known relaxation technique. It was developed by American physician Edmund Jacobson around 1939. The argument is that since muscular tension accompanies anxiety, relaxing muscular tension will reduce it. While performing the exercise, don't tense the muscle too much and don't tense muscles that are not at the specific group mention at each step. The muscles should be more relaxed after releasing tension than before it was applied to that group. Sit comfortably in a chair or lie down. Do a number of slow breaths. Then move in the following progression:

1. **Hands**. The fists are tensed; relaxed. The fingers are extended; relaxed.

2. **Biceps and triceps**. The biceps are tensed (make a muscle – but shake your hands to make sure not tensing them into a fist); relaxed (drop your arm to the chair). The triceps are tensed (try to bend your arms the wrong way); relaxed (drop them).

3. **Shoulders**. Pull them back (careful with this one); relax them. Push the shoulders forward (hunch); relax.

4. **Neck (lateral)**. With the shoulders straight and relaxed, the head is turned slowly to the right, as far as you can; relax. Turn to the left; relax.

5. **Neck (forward)**. Dig your chin into your chest; relax. (bringing the head back is not recommended – you could break your neck).

6. **Mouth**. The mouth is opened as far as possible; relaxed. The lips are brought together or pursed as tightly as possible; relaxed.

7. **Tongue (extended and retracted)**. With mouth open, extend the tongue as far as possible; relax (let it sit in the bottom of your mouth). Bring it back in your throat as far as possible; relax.

8. **Tongue (roof and floor)**. Dig your tongue into the roof of your mouth; relax. Dig it into the bottom of your mouth; relax.

9. **Eyes**. Open them as wide as possible (furrow your brow); relax. Close your eyes tightly (squint); relax. Make sure you completely relax the eyes, forehead, and nose after each of the tensing.

10. **Breathing**. Take as deep a breath as possible – and then take a little more; let it out and breathe normally for 15 seconds. Let all the breath in your lungs out – and then a little more; inhale and breathe normally for 15 seconds.

11. **Back**. With shoulders resting on the back of the chair, push your body forward so that your back is arched; relax. Be very careful with this one, or don't do it at all.

12. **Butt**. Tense the butt tightly and raise pelvis slightly off chair; relax. Dig buttocks into chair; relax.

13. **Thighs**. Extend legs and raise them about 6in. off the floor or the foot rest but don't tense the stomach' relax. Dig your feet (heels) into the floor or foot rest; relax.

14. **Stomach**. Pull in the stomach as far as possible; relax completely. Push out the stomach or tense it as if you were preparing for a punch in the gut; relax.

15. **Calves and feet**. Point the toes (without raising the legs); relax. Point the feet up as far as possible (beware of cramps – if you get them or feel them coming on, shake them loose); relax.

16. **Toes**. With legs relaxed, dig your toes into the floor; relax. Bend the toes up as far as possible; relax.

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Evaluation Checklist
Occupational Safety & Health Administrations (OSHA);

☑Checklist

View/Print the Evaluation Checklist PDF

This checklist can help you create a safe and comfortable computer workstation. You can also use it in conjunction with the purchasing guide checklist [49 KB, 4 pages]. A "no" response indicates that a problem may exist. Refer to the appropriate section of the eTool by hitting control and click to follow the link for assistance and ideas about how to analyze and control the problem.

	Y	N
1. Head and **neck** to be upright, or in-line with the torso (not bent down/back). If "no" refer to Monitors, Chairs and Work Surfaces.		
2. Head, neck, and **trunk to** face forward (not twisted). If "no" refer to Monitors or Chairs.		
3. Trunk to be perpendicular to floor (may lean back into backrest but not forward). If "no" refer to Chairs or Monitors.		
4. Shoulders and **upper arms** to be in-line with the torso, generally about perpendicular to the floor and relaxed (not elevated or stretched forward). If "no" refer to Chairs.		
5. Upper arms and **elbows** to be close to the body (not extended outward). If "no" refer to Chairs, Work Surfaces, Keyboards, and Pointers.		
6. Forearms, wrists, and **hands** to be straight and in-line (forearm at about 90 degrees to the upper arm). If "no" refer to Chairs, Keyboards, Pointers.		
7. Wrists and **hands** to be straight (not bent up/down or sideways toward the little finger). If "no" refer to Keyboards, or Pointers.		
8. Thighs to be parallel to the floor and the **lower legs** to be perpendicular to floor (thighs may be slightly elevated above knees). If "no" refer to Chairs or Work Surfaces.		
9. Feet rest flat on the floor or are supported by a stable footrest. If "no" refer to Chairs, Work Surfaces.		
	Y	N
10. Backrest provides support for your lower back (lumbar area).		
11. Seat width and **depth** accommodate the specific user (seat pan not too big/small).		
12. Seat front does not press against the back of your knees and lower legs (seat pan not too long).		
13. Seat has cushioning and is rounded with a "waterfall" front (no sharp edge).		
14. Armrests, if used, support both forearms while you perform computer tasks and they do not interfere with movement.		
"No" answers to any of these questions should prompt a review of Chairs.		
	Y	N
15. Keyboard/input device platform(s) is stable and large enough to hold a keyboard and an input device.		
16. Input device (mouse or trackball) is located right next to your keyboard so it can be operated without reaching.		
17. Input device is easy to activate and the shape/size fits your hand (not too big/small).		
18. Wrists and **hands** do not rest on sharp or hard edges.		
"No" answers to any of these questions should prompt a review of Keyboards, Pointers, or Wrist Rests.		
	Y	N
19. Top of the screen is at or below eye level so you can read it without bending your head or neck down/back.		
20. User with bifocals/trifocals can read the screen without bending the head or neck backward.		
21. Monitor distance allows you to read the screen without leaning your head, neck or trunk forward/backward.		
22. Monitor position is directly in front of you so you don't have to twist your head or neck.		
23. Glare (for example, from windows, lights) is not reflected on your screen which can cause you to assume an awkward posture to clearly see information on your screen.		
"No" answers to any of these questions should prompt a review of Monitors or Lighting/Glare.		
	Y	N
24. Thighs have sufficient clearance space between the top of the thighs and your computer table/keyboard platform (thighs are not trapped).		
25. Legs and **feet** have sufficient clearance space under the work surface so you are able to get close enough to the keyboard/input device.		

	Y	N
26. Document holder, if provided, is stable and large enough to hold documents.		
27. Document holder, if provided, is placed at about the same height and distance as the monitor screen so there is little head movement, or need to re-focus, when you look from the document to the screen.		
28. Wrist/palm rest, if provided, is padded and free of sharp or square edges that push on your wrists.		
29. Wrist/palm rest, if provided, allows you to keep your forearms, wrists, and hands straight and in-line when using the keyboard/input device.		
30. Telephone can be used with your head upright (not bent) and your shoulders relaxed (not elevated) if you do computer tasks at the same time.		
"No" answers to any of these questions should prompt a review of Work Surfaces, Document Holders, Wrist Rests or Telephones.		

	Y	N
31. Workstation and equipment have sufficient adjustability so you are in a safe working posture and can make occasional changes in posture while performing computer tasks.		
32. Computer workstation, components and accessories are maintained in serviceable condition and function properly.		
33. Computer tasks are organized in a way that allows you to vary tasks with other work activities, or to take micro-breaks or recovery pauses while at the computer workstation.		
"No" answers to any of these questions should prompt a review of Chairs, Work Surfaces, or Work Processes.		

	✓
1. Make sure the screen is large enough for adequate visibility. Usually a 15 to 20-inch monitor is sufficient. Smaller units will make it difficult to read characters and larger units may require excessive space.	
2. The angle and tilt should be easily adjustable.	
3. Flat panel displays take less room on the desk and may be more suitable for locations with limited space.	

	✓
1. Split keyboard designs will allow you to maintain neutral wrist postures.	
2. Keyboards with adjustable feet will accommodate a wider range of keyboard positions and angles. Adjustable feet on the front as well as the back will further aid adjustments. Increased adjustability will facilitate neutral wrist postures.	
3. The cord that plugs into the CPU should be long enough to allow the user to place the keyboard and the CPU in a variety of positions. At least six feet of cord length is desirable.	
4. Consider a keyboard without a 10-key keypad if the task does not require one. If the task does require one occasionally, a keyboard with a separate 10-key keypad may be appropriate. Keyboards without keypads allow the user to place the mouse closer to the keyboard.	
5. Consider the shape and size of the keyboard if a keyboard tray is used. The keyboard should fit comfortably on the tray.	
6. Consider keyboards without built-in wrist rest, because separate wrist rests are usually better.	
7. Keyboards should be detached from the display screen if they are used for a long duration keying task. Laptop keyboards are generally not suitable for prolonged typing tasks.	

	✓
1. Keyboard trays should be wide enough and deep enough to accommodate the keyboard and any peripheral devices, such as a mouse.	
2. If a keyboard tray is used, the minimum vertical adjustment range (for a sitting position) should be 22 inches to 28 inches from the floor.	
3. Keyboard trays should have adjustment mechanisms that lock into position without turning knobs. These are frequently over tightened, which can lead to stripped threads, or they may be difficult for some users to loosen.	

	✓
1. The desk area should be deep enough to accommodate a monitor placed at least 20 inches away from your eyes.	
2. Ideally, your desk should have a work surface large enough to accommodate a monitor and a keyboard. Usually about 30 inches is deep enough to accommodate these items.	
3. Desk height should be adjustable between 20 inches and 28 inches for seated tasks. The desk surface should be at about elbow height when the user is seated with feet flat on the floor. Adjustability between seated and standing heights is desirable.	
4. You should have sufficient space to place the items you use most often, such as keyboard, mouse, and monitor directly in front of you.	
5. There should be sufficient space underneath for your legs while sitting in a variety of positions. The minimum under-desk clearance depth should be 15 inches for your knees and 24 inches for your feet. Clearance width should be at least 20 inches.	
6. Purchasing a fixed-height desk may require the use of a keyboard tray to provide adequate height adjustment to fit a variety of users.	

7. Desktops should have a matte finish to minimize glare. Avoid glass tops.	
8. Avoid sharp leading edges where your arms come in contact with work surfaces. Rounded or sloping surfaces are preferable.	
9. The leading edge of the work surface should be wide enough to accommodate the arms of your chair, usually about 24 inches to 27 inches. Spaces narrower than this will interfere with armrests and restrict your movement. This is especially important in four-corner work units.	
	☑
1. The chair should be easily adjustable.	
2. The chair should have a sturdy five-legged base with good chair casters that roll easily over the floor or carpet.	
3. The chair should swivel 360 degrees so it is easier to access items around your workstation without twisting.	
4. Minimum range for seat height should be about 16 inches.	
5. Seat pan length should be 15 inches to 17 inches.	
6. Seat pan width should be at least as wide as the user's thighs. A minimum width of about 18 inches is recommended.	
7. Chair edges should be padded and contoured for support.	
8. Seat pan tilt should have a minimum adjustable range of about 5 degrees forward and backward.	
9. Avoid severely contoured seats as these limit seated postures and are uncomfortable for many users.	
10. Front edge of the seat pan should be rounded in a waterfall fashion.	
11. Material for the seat pan and back should be firm, breathable, and resilient.	
12. The seat pan depth should be adjustable. Some chairs have seat pans that slide forward and backward and have a fixed back. On others the seat pan position is fixed and the backrest moves horizontally forward and backward so the effective depth of the seat pan can be adjusted. **Beware** of chairs where the back only tilts forward and backward. These do not provide adequate adjustment for a wide range of users.	
13. The backrest should be at least 15 inches high and 12 inches wide and should provide lumbar support that matches the curve of your lower back.	
14. The backrest should widen at its base and curve in from the sides to conform to your body and minimize interference with your arms.	
15. The backrest should allow you to recline at least 15 degrees and should lock into place for firm support.	
16. The backrest should extend high enough to support your upper trunk and neck/shoulder area. If the backrest reclines more than about 30 degrees from vertical, a headrest should be provided.	
17. Armrests should be removable and the distance between them should be adjustable. They should be at least 16 inches apart.	
18. Armrest height should be adjustable between 7 inches and 10.5 inches from the seat pan. Fixed height armrests are not desirable, especially for chairs that have more than one user.	
19. Armrests should be large enough (in length and width) to support your forearm without interfering with the work surface.	
20. Armrests should be padded and soft.	
21. Most chairs are designed for weights under 275 pounds. If the user weighs more than 275 pounds, the chair must be designed to support the extra weight.	
	☑
1. The document holder needs to be stable but easy to adjust for height, position, distance, and viewing angle.	
2. If the monitor screen is your primary focus, purchase a document holder that will sit next to the monitor at the same height and distance.	
3. If the task requires frequent access to the document (such as writing on the document) a holder that sits between the keyboard and monitor may be more appropriate.	
	☑
1. Wrist rest should match the front edge of the keyboard in width, height, slope, and contour.	
2. Pad should be soft but firm. Gel type materials are recommended.	
3. Wrist rest should be at least 1.5 inches deep (depth away from the keyboard) to minimize contact pressure on the wrists and forearm.	
	☑
1. Choose a mouse/pointer based on the requirements of your task and your physical limitations. There really is no difference, other than preference, among a mouse, trackball, or other device.	
2. A mouse should match the contour of your hand and have sufficient cord length to allow its placement next to the keyboard.	
3. If you choose a trackball, avoid ones that require the thumb to roll the ball--thay may cause discomfort and possible injury to the area around your thumb.	
4. A smaller mouse may be more appropriate especially if you have small hands. Caution should be taken if a mouse is used by more than	

one person.	
5. A mouse that has sensitivity adjustments and can be used with either hand is desirable.	
	☑
1. If task requirements mandate extended periods of use or other manual tasks such as typing while using the phone, use a telephone with a "hands-free" headset.	
2. The telephone should have a speaker feature for "hands-free" usage.	
3. "Hands-free" headsets should have volume adjustments and volume limits.	
	☑
1. Good desk lighting depends on the task you're performing. Use bright lights with a large lighted area when working with printed materials. Limit and focus light for computer tasks.	
2. The location and angle of the light sources, as well as their intensity levels, should be fully adjustable.	
3. The light should have a hood or filter to direct or diffuse the light.	
4. The base should be large enough to allow a range of positions or extensions.	

References & Resources for More Information:

Occupational Safety & Health Administrations (OSHA);