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A User's
GUIDE
To Arranging
# Your Computer
Workstation

University
of Idaho

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Are you comfortable at your workstation?

In today's office environment *people often work on personal computers for an extended period of time. This type of work done improperly can cause a number of musculoskeletal injuries and illnesses like carpal tunnel syndrome. Employees can experience eye strain, headaches, sore muscles, tension and fatigue. A person's physical work environment can have a definite impact on employee productivity, morale, medical and training expenses.*
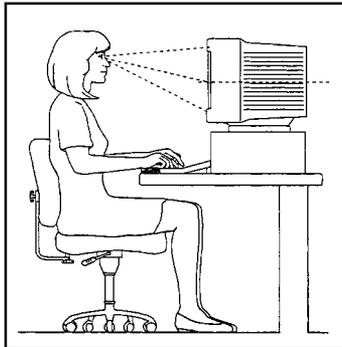
Ergonomics . . .

is the science of arranging the task or physical environment to fit the individual performing the task. The three main principles of ergonomics are:

■ **Fit the task and workplace to the individual**

■ **Design the workplace for the individual with a range of body sizes**

■ **Design the workplace for the individual at the extremes of the body size range**
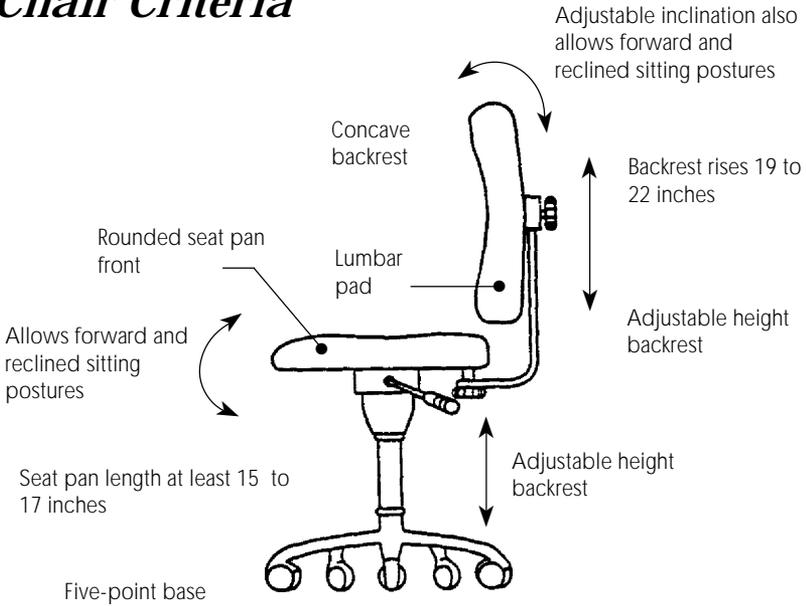
A WORKPLACE should be designed to accommodate the individual's physical needs rather than forcing the individual to fit the workplace. Ergonomic principles should be used when selecting furniture and computer equipment to create a productive and safe work area.

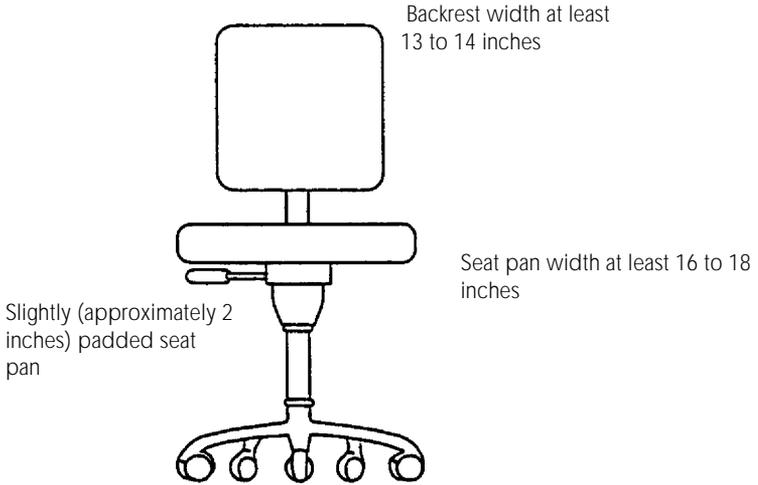## Most Common Mistakes To Avoid In a Work Area

■ **Insufficient lower back support**

■ **Improper chair and keyboard height**

■ **Improper video display terminal/VDT height**

■ **Insufficient wrist support and position**

YOUR CHAIR IS the central component of an ergonomic workstation because you spend most of your day in it. A properly adjusted chair improves circulation, and helps prevent stress and tension that can cause backaches and fatigue by reducing back pressure on your spine and supporting your lower back. The right chair also relieves cramping and stiffness in your legs.

Chair Criteria

Adjustable inclination also
allows forward and
reclined sitting postures

Concave
backrest

Backrest rises 19 to
22 inches

Rounded seat pan
front

Lumbar
pad

Allows forward and
reclined sitting
postures

Adjustable height
backrest

Seat pan length at least 15 to
17 inches

Adjustable height
backrest

Five-point base

Side View

Backrest width at least
13 to 14 inches

Seat pan width at least 16 to 18
inches

Slightly (approximately 2
inches) padded seat
pan

Front View

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Problem No. 1: Inadequate back support

Solution:

Sit in the chair at your workstation. Lean back slightly with your back firmly against the chair. The backrest should fit snugly against your lower back. If it doesn't, adjust the backrest until your lower back is fully supported.

Tip: If you can't adjust the backrest, use a small, thin, firm pillow or rolled-up towel to support you lower back.

Problem No. 2: Inadequate arm and foot position/ chair height

Solution:

To find your proper arm position place your fingers on the middle row of your keyboard, with your upper arms hanging comfortably at your sides. Your arms should be parallel to the floor. If they are not, adjust your chair height up or down until your forearms are parallel to the floor.

To find your proper foot position, move your feet forward until your knees are at a 90 to 110 degree angle. Your feet should rest firmly on the floor with 3 to 6 inches of legroom between your lap and desk or keyboard tray. If you have less than 3 inches of legroom, raise your desk or keyboard tray height, if possible.

Tip: If you can't adjust the height and your feet don't touch the floor, use a wedge-shaped footrest (like a 3-ring binder) to support your feet.

Problem No. 3: Display with the wrong height or screen distance

Solution:

With your lower back supported and feet firmly on the floor or footrest, hold your head upright and look straight at your screen. The top of your monitor should be at or just below eye level. If it isn't, raise or lower your monitor until it is at a viewing height that will allow you to maintain your head in an upright position.

Also measure the distance from your eyes to the screen. The screen should be 18 to 30 inches away from your eyes, or about an arm's length. If not, move your monitor forward or backward to achieve the proper distance.

Tip: If you can't adjust your screen height, place a stand or board beneath your monitor.

THE PROPER KEYBOARD AND MOUSE HEIGHT can help keep you from bending your wrists while typing or using the mouse. This improves the comfort of your hands, wrists, and forearms, and will help you avoid injury.

PROPERLY ADJUSTING the height and viewing distance of your display can reduce eyestrain and muscle tension in your neck, shoulders, and upper back.

Problem No. 4: Wrists bent and unsupported, and improper keyboard height

Solution:

Place your fingers on the middle row of your keyboard. Your wrists should be straight and relaxed. If they aren't, adjust you keyboard height up or down until your wrists are straight. To help keep your wrists relaxed, try a padded wrist rest. If your wrists still are not straight, readjust your chair height, making sure your feet remain on the floor or footrest.
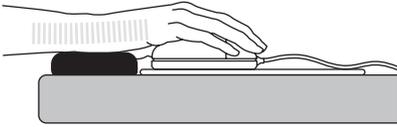
Tip: If the keyboard is too low, put a pad of paper under it.

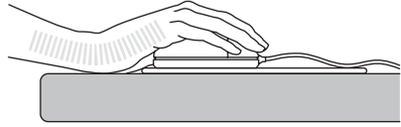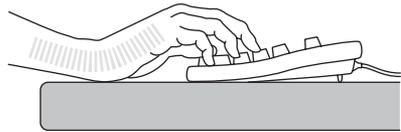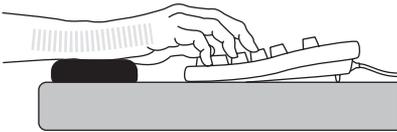A wrist rest is a device, usually made from foam rubber, that is used to

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Proper Wrist Rest Usage

Good: wrist rest helps keep wrist in neutral posture

Bad: no wrist rest and wrist deviation

keep the wrists in a neutral posture. See the illustration for good and bad examples of wrist rest usage.

GLARE IS THE REFLECTION on your screen that makes it hard to see the screen clearly. Glare can be caused by sunlight or inside lighting. Lighting adjustments can sometimes minimize glare and reduce the strain on your eyes.
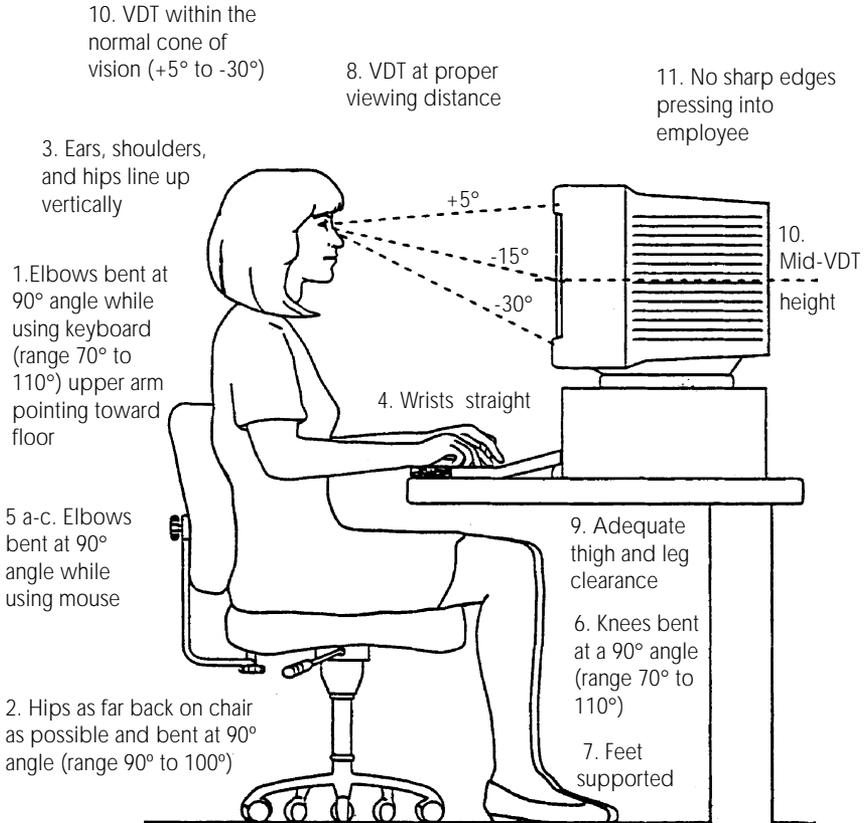
Problem No. 5: Inappropriate lighting
Solution:

Adjust your screen's contrast and brightness to help improve viewing comfort.

Your workstation should be free from the glare of any lighting source. If it isn't, reduce lighting, tilt or swivel your screen, or get antiglare filters to put over your screen.

The figure on the following page shows the fundamentals of good posture when sitting at a VDT workstation. The number of the steps in the following checklist, correspond to the numbers of the descriptions in the figure.

Fundamentals of Good Posture at a Sitting Workstation with a Video Data Terminal

10. VDT within the normal cone of vision (+5° to -30°)

8. VDT at proper viewing distance

11. No sharp edges pressing into employee

3. Ears, shoulders, and hips line up vertically

+5°

-15°

-30°

10. Mid-VDT height

1.Elbows bent at 90° angle while using keyboard (range 70° to 110°) upper arm pointing toward floor

4. Wrists straight

5 a-c. Elbows bent at 90° angle while using mouse

9. Adequate thigh and leg clearance

6. Knees bent at a 90° angle (range 70° to 110°)

2. Hips as far back on chair as possible and bent at 90° angle (range 90° to 100°)

7. Feet supported

Source: Adapted form Grandjen, 1987; American National Standards Institute/Human Factors Society; 1988; and Putz-Anderson, 1988

Checklist
for Assessing a Sitting Workstation with VDT

Checklist Steps	Yes	No	Instructions
1. Is the elbow joint bent at approximately a 90° angle while the employee is using the keyboard (the angle can range from 70° to 110°)? If no, adjust the chair height and/or keyboard height. If they can not be adjusted, try a different chair and/or desk. Most companies have a storage area that is a good source of old furniture. Consider buying a different chair or desk if there is no other way to achieve the correct elbow angle.	❏	❏	*Eyeball the employee's elbow joint to determine if it is bent at about a 90° angle. You can hold the corner of a square piece of cardboard up to the joint to compare the 90° angle of the corner to the angle of the elbow.*
2. Is the hip joint bent at approximately a 90° angle (the angle can range from 90° to 100°)? If no, adjust the chair height or try a different chair.	❏	❏	*Eyeball the hip joint to determine if it is bent at a 90° angle.*
3. Are the ears, shoulders, and hips lined up vertically (the head can be tipped slightly forward at a comfortable angle of 5° to 10°)? If no, adjust the chair height, the angle of the backrest, the viewing distance to the VDT, or the keyboard height.	❏	❏	*Step back from the employee and look at their seated posture. You should be able to draw a straight line pointed down from their ears through their shoulders and hips.*
4. Are the wrists straight? If no, adjust the chair height or the keyboard height. Try a different chair and/ or desk if the workstation cannot be properly adjusted. Also, consider using a wrist rest.	❏	❏	*Look at the wrists to determine if they are straight or deviated. Compare the wrist posture to the figures on page 7.*
5. Is a mouse used at the workstation? If yes, perform steps 5a, 5b, and 5c.	❏	❏	
5a. Is the elbow bent at a 90° angle while the employee is using the mouse (the angle can range from 70° to 110°)? If no, move the mouse closer to the person. An arm support can also be used.	❏	❏	*Eyeball the elbow to determine if it appears to be bent at approximately a 90° angle (see step 1 for an additional method of determining the angle).*
5b. Is the upper arm close to the body? If no, move the mouse closer to the person.	❏	❏	*Look to see that the upper arm is close to the body and not abducted (pulled away).*
5c. Is the wrist deviated? If yes, adjust the height of the mouse and/ or use a wrist rest.	❏	❏	*Look at the wrist to determine whether it is deviated either to the left or right, up or down.*

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Checklist Cont.

Checklist Steps	Yes	No	Instructions
6. Are the knees bent at a 90° angle (the angle can range from 70° to 110°)? If no, adjust the chair height or try a different chair.	❏	❏	*Again, just eyeball the knee joint and determine if it is bent at a 90° angle.*
7. Are the feet supported? If no, give the employee a footrest because at this point the workstation has been adjusted for the employee's elbows, hips, wrists, and knees.	❏	❏	*This is an easy one. Look to see if the feet are flat on the floor.*
8. Is the VDT at the proper viewing distance (approximately the employee's arm length)? If no, adjust the distance of the monitor from the employee's eyes, moving the monitor forward or back until it is positioned correctly. A monitor arm can help you achieve the correct position.	❏	❏	*Ask the employee to sit in their optimal posture and reach for the screen. The employee should be able to reach the screen without bending forward. At the same time, ask the employee if he or she has any difficulty seeing the screen. Ensure that the lighting levels are correct.*
9. Is there adequate thigh and leg clearance? If no, try a desk with a thinner desktop to provide more leg clearance. Remove items stored underneath the desk.	❏	❏	*The employee needs to be as close to the work as possible. A desktop that is too thick or items stored under the desk can prevent the employee from getting close to the desk. Ask the employee to sit at the workstation. Look to see that there are no obstacles to a good posture.*
10. Is the part of the screen the employee uses most within the normal cone of vision, which is +5° (above the horizontal axis) to -30° (below the horizontal axis)? If no, adjust the height of the VDT by removing the monitor base if the monitor is too high or adding a monitor base if the monitor is too low. A monitor arm can also be used to raise or lower the VDT.	❏	❏	*The mid-VDT height should be about 8 inches below the employee's eye height. You can measure this by holding a yardstick horizontally at the employee's eye level. At the point where the yardstick bisects the monitor, use a shorter ruler to measure 8 inches down.*
11. Are any sharp edges pressing into the employee? If yes, pad the items that are causing problems with light foam rubber or remove them.	❏	❏	*Look at the employee sitting at the workstation to determine if the edge of the desk, the keyboard, or other items at the workstation are pressing into the employee's flesh. Such pressure can restrict blood flow. Also, ask the employee if any items are pressing into his or her flesh.*
12. Return to step 1 and repeat steps 1 through 11 to ensure that the body alignment is still correct in every aspect.	❏	❏	*Perform this step to ensure the relationship between the individual and the workstation have not changed due to subsequent adjustments.*

Take a Microbreak

Take a 30-second microbreak at your workstation throughout the day. The brief breaks and exercise can energize your body and relieve muscle tension. Here are some examples of exercises you can do at your workstation:

❏ Palm your eyes

- Lean your elbows on your desk. Cup your hands and place them lightly over your closed eyes.

- Hold for a minute, while breathing deeply in and out. Slowly uncover your eyes.

❏ Squeeze your shoulders

- Put your hands up, with forearms raised.

- Push your arms back, squeezing your shoulder blades. Hold for a few seconds.

- Relax and repeat 3 times.

❏ Stretch your back

- Sit up straight and imagine you have a cable attached to the top of your head.

- Feel the cable slowly pull you up higher and higher. Hold for a few seconds.

- Relax and repeat 3 times.

❏ Shake your arms

- Drop your arms and hands to your sides.

- Shake them out gently for a few seconds.

- Relax and repeat 3 times.

Employees are encouraged to attend one of the workshops on Computer Ergonomics and Office Safety presented by Environmental Health and Safety for additional information on selecting office furniture and equipment. Employees can also contact the Furniture Buyer in Purchasing at 885-3660 or via email to *purchase@uidaho.edu*.

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References:

"Arranging Your Workstation to Fit You", Krames Communication, 1100 Grundy Lane, San Bruno, CA, 94066-3030, (800) 333-3032, 1993.

Ostrom, Lee T., "Creating the Ergonomically Sound Workplace", 1st ed., Jossey-Bass Inc., 350 Sansone St., San Francisco, CA, 94104, (415) 433-1767, 1994. (used with permission)