OFFICE WORK STATION ERGONOMICS

Health Effects
In the wake of the expanding use of computer workstations, concerns have been expressed about their potential health effects. Complaints include excessive fatigue, eyestrain and irritation, blurred vision, headaches, stress, and neck, back, arm, and muscle pain. Research has shown that these symptoms can result from problems with the equipment, workstations, office environment or job design, or from a combination of these factors.

Visual Problems
Visual problems such as eyestrain and irritation are among the most frequently reported complaints by computer operators. These visual symptoms can result from:
- Improper lighting,
- Glare from the screen,
- Poor positioning of the screen itself.

These problems usually can be corrected by adjusting the physical and environmental setting to the computer operator.

Lighting
Light should be directed so that it does not shine into the operator's eyes when the operator is looking at the display screen. Further, lighting should be adequate for the operator to see the text and the screen, but not so bright as to cause glare or discomfort (see Figure 1).
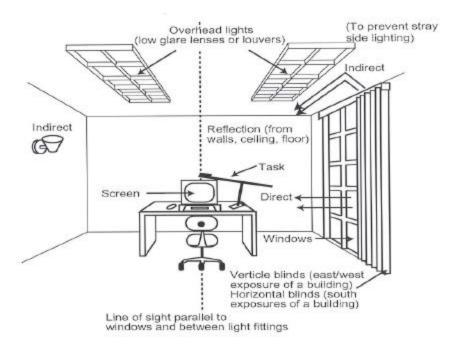

Figure 1.
Position of light source relative to the workstation.
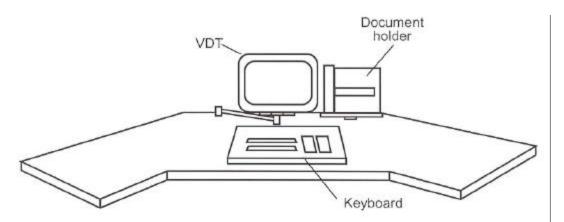
Workstation Design
Proper workstation design will reduce visual and musculoskeletal discomfort associated with computer use when the following work practices are observed:

- Ensure that the operator has a comfortable sitting position sufficiently flexible to reach, use, and observe the display screen, keyboard, and document.
- Provide posture support for the back, arms, legs, and feet as well as adjustable display screens and keyboards.
- Ensure that workstation tables or desks are vertically adjustable to allow for operator adjustment of the screen and keyboard.
- Ensure proper chair height and support to the lower region of the back.
- Ensure that document holders are used to allow the operator to position and view material without straining the eyes or neck, shoulder, and back muscles.

The type of task performed at the workstation may also influence the development of fatigue. In designing a workstation, the type of tasks involved should be considered when determining the placement of the display screen and keyboard. For example, if the job requires the operator to look more at the source document than at the display screen, the source document should be in front of the operator and the screen may be to the side. (See Figure 2.)

The employee must have adequate workspace to perform each of the tasks required by the job. Individual body size must be considered and will influence the design of the workstation and access to various accessories.

In general, computer workstations should provide as many adjustable features as possible. Also, adequate legroom should be provided for the employee to stretch out and relieve some of the static load that results from sitting with the legs in a fixed position for long periods.

Figure 2.
Workstation arrangement (depending on job task).

In the office environment, the workstation consists primarily of a work surface, a chair, computer equipment, and other related accessories (see Figure 3).
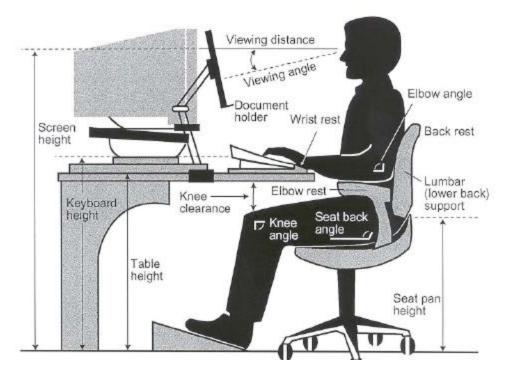

Figure 3.
Proper user position and support

Chair. A properly designed and adjustable chair for comfort, efficiency, and for the task being performed is critical. Specific chair criteria are as follows:
- All adjustments should easily be made from the seated position,
- The chair should have 5 casters for stability,
- The chair height is correct when the entire sole of the foot can rest on the floor or footrest and the back of the knee is slightly higher than the seat of the chair. This allows the blood to circulate freely in the legs and feet,
- The seat pan should be slightly concave with a softly padded, rounded, or "waterfall" edge,
- Adjustable armrests should be low and short enough to fit under work surfaces to allow users to get close enough to the work surface,
- The chair back should provide firm lower and mid-back support,
- The seat and backrest of the chair should support a comfortable posture that permits frequent variations in the sitting position.

Display Screen. Monitors should have *s*creens that:
- Have user controls for character brightness,
- Swivel horizontally and tilt or elevate vertically to enable the operator to select the optimum viewing angle.
- The topmost line of the screen should not be higher than the user's eyes,
- The screen and document holder should be the same distance from the eye (to avoid constant changes in focus) and close enough together so the operator can look from one to the other without excessive movement of the neck or back,
- People who wear bifocals often have to tilt their head back to read through the bottom portion of their lenses. They should avoid tilting their head back by lowering the display or using single-lens glasses while using the screen,
- Viewing distance should be about an arms length distance to the screen.

Keyboard. A lower-than-normal work surface may be required to keep the operator's arms in a comfortable position. This can be achieved by installing a keyboard extender or tray.
- The working position should be with the forearms parallel to the floor and elbows at the sides,
- The wrist should be in line with the forearm,
- A padded wrist rest can help keep the operator's wrists and hands in a straight position while resting between keying.

*Mous*e. The mouse should be positioned at the operator's side with his or her arm close to the body for support, while maintaining a straight line between the hand and forearm. The upper arm should not be elevated or extended while using the mouse. The top surface of the wrist should also be flat, not angled. A mouse pad or rest can be used to help maintain straight wrists.

Work Practices
Jobs should be designed so that employees can vary computer tasks with other tasks. Rest pauses to alleviate or delay the onset of fatigue, are recommended:
- Take short, frequent breaks and rest pauses,
- Rest pauses should occur every 30 minutes and last for one minute,
- Rest pauses should incorporate exercises, stretches, and movement to increase blood flow and strengthen muscles,
- Take a 15 minute break from the computer at least every 2 hours to get up and move around, if the situation allows,
- Blink often to keep your eyes moist,
- Refocus eyes by looking away from the screen and focusing on a distant object at least 20 feet away every 10 minutes or so,
- Release tension in the neck by looking back over the shoulder while sitting up straight. Hold for 10 seconds, then slowly turn head and look back over shoulder and hold,
- Relax shoulders by rotating them backwards several times and then forwards,

- Spread fingers as far apart as possible and hold for 5 seconds, then make a fist, repeat several times,

Adapted from OSHA fact sheet located at:
http://www.osha-slc.gov/SLTC/computerworkstations_ecat/index.html