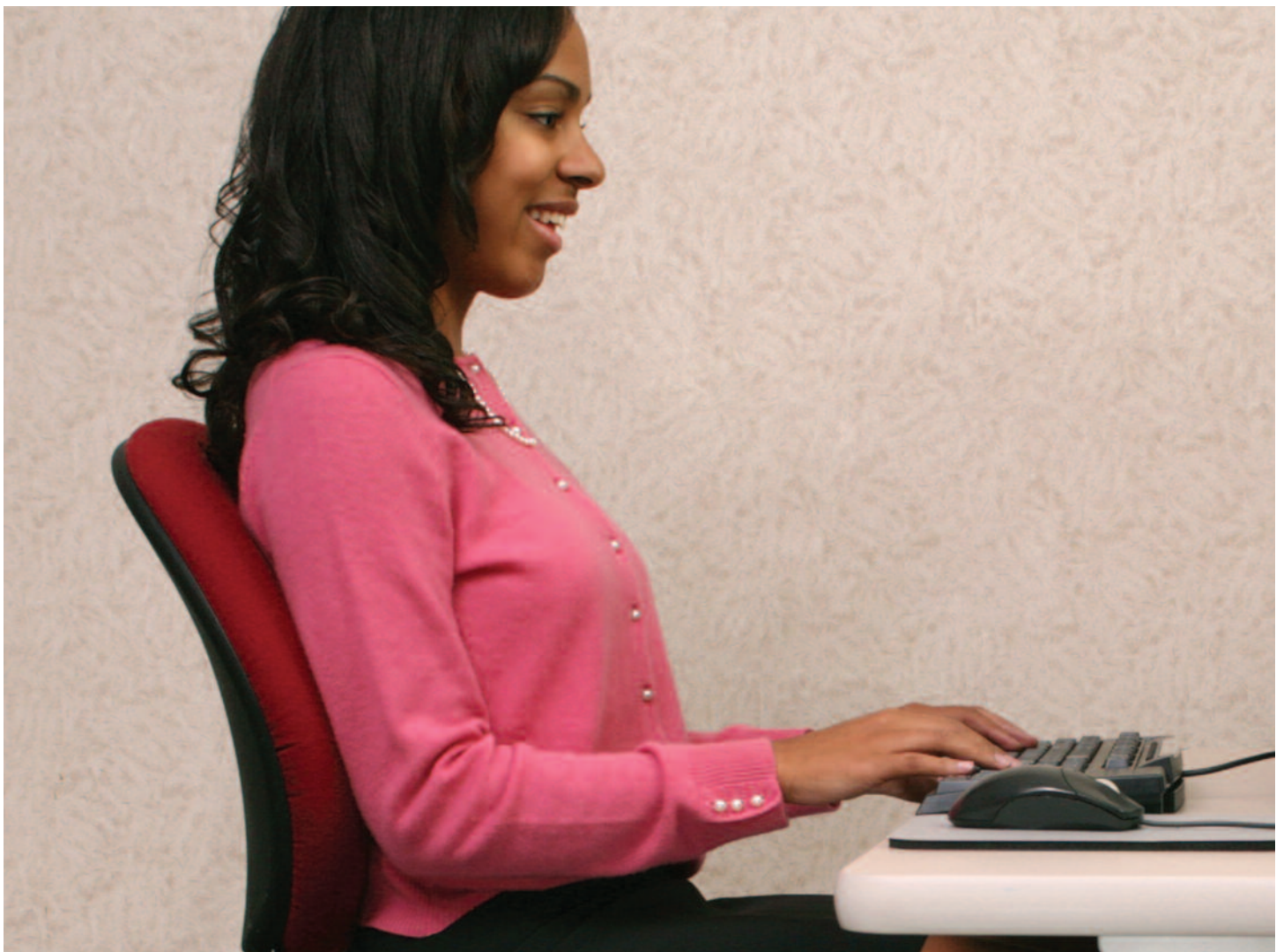


WORKPLACE ERGONOMICS

Your Guide to Health and Comfort at Work



YOUR COMPUTER WORKSTATION AND YOUR OFFICE ENVIRONMENT



CAN YOU ANSWER THESE SELF-HELP QUESTIONS?

- *How do you adjust your chair for good posture and comfort?*
- *How do you position your screen to reduce glare?*
- *How do you adjust the brightness and contrast to improve the clarity of the characters on your screen?*
- *Do you remember to take your breaks, stretch and change your position during the day?*
- *Do you routinely clear your workstation of clutter?*
- *What workstation exercises do you perform regularly?*

Read on to learn how to make yourself more comfortable at work. See page 6 for additional self-help questions.

Each individual is a natural biological system. We can perform our jobs only to the extent that our muscles, nerves, joints and blood circulation will allow. There are functions we can do efficiently and others for which we are limited. Knowing those limits relates directly to how well we perform at work. Making our working conditions fit our human capability is called ergonomics.

Today we face expanding levels of technology and many new tools. The computer is a widespread information management tool. Chances are you spend a good part of the day at a computer workstation.

The way you manage and arrange your work-station affects your productivity and comfort. This booklet is designed to help you use some basic guidelines and techniques to enhance your work routine. Adjusting your workstation, sitting with good posture, taking short scheduled rest periods, alternating tasks and doing simple exercises can make a significant difference in the way you feel.

Your Computer Workstation and Your Office Environment

Your workstation is located within your work environment. Since you have the most control over your workstation, we will start there.

Your Workstation

A well-arranged workstation can enhance your productivity and comfort. Good posture and arm positioning will help you perform tasks.

You need to take full advantage of adjustable equipment features. Discomfort may occur if these adjustments do not meet your needs. Therefore, your workstation needs to be designed to fit you.

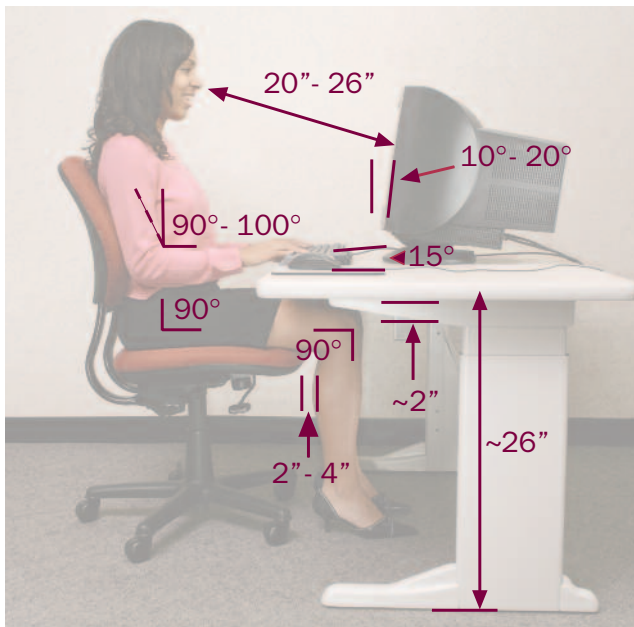
You should be able to easily reach frequently used items whether you are sitting or standing. Your reach for routine tasks should not be over-extended. Unwieldy items, such as heavy manuals, or continually used service aids, such as a telephone, should be kept close.

Four common classifications of equipment can be used at your workstation. They are: chair, work surface, computer and accessory items. Their use, placement or correct adjustment will affect your workday.

Your Chair

Your chair may provide the greatest degree of adjustability of all your workstation equipment. Common chair adjustments include seat height, backrest angle, seat pan angle, backrest height and armrest height. Adjust your chair to meet the following criteria:

- Your feet should be flat on the floor (or on a slightly angled footrest) with your knees near 90°.
- Your seat should support your legs without excessive pressure on the back of your thighs.
- Your back should be snug against the seat (or support cushion) to fit your spinal contour. Your thigh-to-trunk angle should be about 90°.
- The distance from the front edge of your chair to the hollow of your knee should be 2-4 inches.
- With your upper arm close to your side, your forearm should be parallel to the floor and your wrist in a neutral (near straight) position. The elbow should be level with the home row (ASDFGHJKL) of the keyboard.



Recommended Guide for Comfortable Posture

Your Work Surface

The amount of leg room and the height of your work surface are important in making you comfortable. Allow yourself a clear space underneath your work surface for leg movement. Plugs, wires and connectors should be away from your feet.

For computer use, your work surface should be somewhat lower than your desk. A commonly preferred surface height for computer keyboard tasks is 25-26". Conventional tables or desks for writing tasks are usually about 29" high. Adjustable keyboard trays are effective only in limited applications (e.g. data entry operations). Stability of the work surface, mouse support space, and accessibility to the main work surface are important factors to consider.

Non-adjustable work surfaces for keyboards should fit the largest or most frequent user. Footrests can be provided for smaller people in combination with properly adjusted chair height to make the workstation more comfortable for keyboard tasks.

Your Computer

Your computer consists of a display screen, a keyboard, a central processing unit (CPU), and a mouse and/or other input device. Using the following guidelines when arranging your display screen should provide additional comfort:

- A distance of 20-26" between the eyes and the display screen is comfortable for most users.

- It is essential that the top of the screen be located below eye level. This will reduce fatigue in the neck.
- It is best to have your keyboard and display screen in line and centered. Viewing your screen off-center may cause neck and back stress.
- For an adjustable screen, tilt the top of the display away from you 10°-20°. Placing a flat object under the front of the screen can also give you the desired tilt.
- Place your document holder near the screen at about the same height and angle.
- Keep your screen free of fingerprints and dust. Both reduce clarity.

Your Input Device

Your keyboard, mouse or other input device should be placed at a height and within a reach that is comfortable for you.

Comfort during inputting and other system navigation depends on arm position. The following points will aid your positioning:

- Your upper arm should be nearly vertical at your sides, with shoulders relaxed.
- Your forearms should be nearly horizontal, elbows near 90°-100°.
- Avoid resting your wrists or forearms on the desk or table edge.
- An optional wrist rest will cushion your wrists *between* data entries. People who rest their wrists during inputting may also find wrist rests comfortable. Location of the keyboard at the edge of the desk – with no wrist rest – is the preferred arrangement.
- Try to keep your hands in line with your forearms.
- Adjust your keyboard angle so that your wrists are neutral (nearly straight).
- The mouse should be located at keyboard height and at a distance which allows the elbow to remain at the side at an approximate angle of 90°. For most people, this positions the mouse alongside the keyboard on the dominant side.
- Other input devices should be positioned within comfortable reach, allowing the user to maintain the recommended arm posture.



Accessory Items

Accessory items can improve your comfort. They are available from office supply sources. The costs are reasonable for the relief they provide.

- phone head set for extensive phone use
- document holder
- anti-glare screen
- wrist rest
- foot rest
- mouse rest
- task lamp

Portable Computers (Laptops and Pentops)

Portable computers can be moved around easily. However, most models offer limited adjustability of individual component parts (keyboard, screen) because of their single-unit design. The basic principles of body mechanics and posture apply in all computing situations. Therefore, users of portable units should follow the applicable recommendations discussed in this booklet.

Telecommuting

The basic principles of ergonomics illustrated in this booklet also apply to telecommuters who work out of home offices or "telebusiness centers." It is important to address issues of the home workstation configuration and work practices.

Preplanning and support in equipment selection are necessary. A successful safety approach to telecommuting should include training programs to address equipment needs, resources, and how to set up a home office. Periodic inspections with proper notice are reasonable.

The Work Environment

The work environment extends beyond your workstation. You may have little control over it. This is especially true for factors like temperature, ventilation and humidity. Your facilities manager should be notified of problems in these cases. Lighting and noise, however, can be more easily managed.

Lighting

Glare is probably the most notable and frequent problem with lighting in a work area. Properly adjusted window treatments (blinds, curtains, reflective films) can reduce glare.

Positioning your display screen perpendicular to windows or other bright light sources reduces the likelihood of glare. If you are uncertain as to the source of the glare, hold a small mirror on the screen. The reflection will help you determine the origin of the stray light. Properly placed partitions can also help block excess light.

Dimmer switches and diffusing cover panels can control man-made light. Repositioning the display screen can eliminate glare. An anti-glare screen may be placed on the display.

Excessively bright light can cause eye discomfort over time. Headaches may result. If you are squinting, the lighting is probably too bright. Sometimes too little light may be the problem. Use a task lamp to supplement lighting for detailed work, writing, or suiting personal preference.

Noise

Copiers, telephones, printers, people talking and traffic are typical sources of noise in an office environment.

While noise levels are not usually a health hazard in the office, they can interrupt, annoy and distract. They can negatively affect performance and concentration. To the extent possible, each person should be aware of how his or her own conversations and activities contribute to office noise. A number of control measures are available:

- Schedule noisy activities when few people are around.
- Specify quiet products and equipment for office use.
- Maintain equipment and report problems quickly.
- Move loud equipment away from people.
- Shield, partition, sequester or cover loud equipment.
- Recommend acoustical materials for walls, partitions, ceilings and floors to absorb noise.
- Place equipment on rubber mats to absorb vibration.
- Review office modifications or equipment additions with the people who will be using the office.

Your Health

Many things contribute to your personal health: exercise, diet, personal habits and medical check-ups. Each of us can and should take an active role in our health.

Operator Exercises

Maintaining a static, unmoving position can produce muscle tension, stiffness and aches. You know best when discomfort begins to develop. A well-adjusted workstation and alternating tasks can reduce the likelihood of encountering discomfort.

Exercise improves circulation to tense, static or fatigued muscles. Exercise as simple as standing up and stretching, walking to a window or taking regular breaks can help relieve muscle tension and strain. You can remain seated in a stable chair and try some of the following exercises. Repeat them as needed. Do not do them if they hurt you.

Remember: don't strain; these are relaxation exercises.



Deep breathing is a good warm-up. Sit up straight. Place one hand on your stomach. Inhale slowly through your nose, hold your breath for 1-2 seconds, and exhale completely through your mouth.



Bend your elbows with your hands near your shoulders. Pull your elbows back, bringing your shoulder blades together and stretching your chest.



Look away from your task into the distance several times an hour to rest your eyes. With your head steady, roll your eyes slowly in a circular motion clockwise, then counterclockwise.



Alternately open your hand stretching your fingers and then make a fist.



Let your head fall gently forward and to one side. Hold for 5 seconds and return head to midline. Repeat to the other side.



Exhaling, lower your head and slowly roll toward your knees. Let your hands drop at your ankles. Inhal-ing, unwind, slowly raising your head and shoulders to an upright position.



Interlace your fingers, and with your palms facing upward, stretch your arms, pressing your hands upward. Next, press your hands forward at shoulder level.



Grasp one shin. Pull your leg slowly up toward your chest. Hold 5-10 seconds. After lowering your leg, repeat with the opposite leg.

Vision Care

While current research indicates that the light from computer monitors does not present a risk to vision, temporary discomfort can occur. Vision-related discomfort using computers usually results from any number of common causes:

- One person in five needs correction for their vision. Natural changes in vision can begin as early as age 30.
- Undetected vision changes often become noticeable if new tasks using a computer are required.
- Some people do not use their prescription eyewear when they should.
- Improper lighting and humidity levels (too much or too little).
- Prolonged close work and lack of rest breaks may fatigue the eyes.
- Bifocal or trifocal users may tilt their heads back, extending their necks. Over a period of time, neck fatigue may be noticed.
- Use of tinted lenses may strain the eyes because sharpness and contrast of the image can be reduced.
- Maintaining little contrast between the screen background color and the display characters can make characters hard to distinguish.
- The display screen may be located too close or too far away from the eyes.
- People blink less frequently when focusing on a display screen.

Radiation and Computers

A recently completed study by the National Institute of Occupational Safety and Health confirmed that computer monitors do not emit hazardous levels of radiation. What is emitted is no higher than naturally occurring background radiation. Present research indicates that no special protection is required by the user.

Exercise, including those identified in this document, may result in injury. Always consult with your physician or health care professional before beginning any new exercise program or performing any new exercises, particularly if you are pregnant or nursing, elderly, or have any chronic or recurring physical conditions. If you feel faint, dizzy or have physical discomfort at any point during the performance of these exercises, stop immediately and consult a physician.

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Additional Self-Help Evaluation Questions

These questions supplement the questions listed inside the front cover of this booklet. After reviewing the material in this booklet, you are probably in a much better position to answer these questions. If you are unable to answer them, or have additional questions, contact the appropriate resource person in your office to request assistance.

- Do you take responsibility for your own comfort at home and at work?
- Do you know who to call with a workstation problem?
- If you cannot see your work clearly, what should you do?
- Can you conveniently reach the materials you need?
- If you sit in one position for long periods of time throughout the day, what can you do to reduce fatigue and discomfort?
- If you perform the same task for long periods of time throughout the day, what changes can you make to increase your comfort?
- Have you adjusted your workstation to the best of your ability?

In Summary

Modification of your personal routines can help to reduce the influence of fatigue. These daily routines and workstation adjustments should match your assigned tasks. You know best when this has been accomplished. If your workstation restricts your productivity or makes you uncomfortable, discuss the circumstances with your supervisor. Through these actions and early intervention, you can be the most effective agent of change.

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WHAT'S WRONG WITH THIS PICTURE?

1 Eye Strain

- Screen too far or too close
- Poor screen resolution/clarity
- Poor visual acuity

2 Neck/Shoulder discomfort

- Screen too high
- Hard copy too far from screen
- Screen off to side of keyboard
- Work surface too high; raised shoulders
- Keyboard, mouse or work too far or too high

- Arms held static in forward position
- Holding phone with shoulder
- Frequently used materials located at arm's length

3 Back discomfort

- Chair too high or too low
- Backrest not used
- Seat pan tilted down
- Seat pan too long
- Asymmetrical posture

4 Numbness, tingling in palm or any of the first four fingers; forearm discomfort

- Work surface too high
- Wrist or forearm resting on sharp edge of work surface
- Arms held static in forward position
- Fingernails too long

5 Wrist discomfort on the little finger side

- Over-stretching to reach key functions from a set wrist position
- Large rings interfere with movement
- Elbows away from body; keyboard too high or too close
- Excessive keystroke force
- Keyboard angle too steep

6 Back of wrist/top of forearm discomfort

- Keyboard too far forward
- Keyboard too high on work surface
- Keyboard angle too steep; over-extending wrist
- Fingers held static over mouse

7 Numbness or tingling of little finger, side of ring finger next to little finger or edge of hand

- Pressure on elbow
- Resting forearm (little finger side) on work surface edge
- Work surface too high

8 Discomfort in thumb or thumb side of wrist

- Repetitive, forceful spacebar use or keystrokes
- Repetitive paper-folding using thumb to crease
- Writing with forceful grip or awkward thumb angle

9 Lower legs go to sleep; circulation reduced

- Feet not supported
- Seat pan too long
- Chair too high
- Leg movement restricted
- Sitting on crossed leg



Office

Stretch your comfort level

with simple workstation exercises

Just as athletes need to warm up before competition, office workers need to warm up to meet the physical demands of their jobs. Stretching exercises warm up muscles and improve muscle elasticity.

General guidelines

Simple stretching exercises will help keep you comfortable at work. Follow these general guidelines:

- **Breathe while exercising.** Don't hold your breath.
- **Stretch gently.** Avoid jerky movements.
- **Go easy at first.** Start with a few exercises and gradually increase.
- **Exercise regularly.** Develop a pattern of exercising various parts of your body at regular intervals throughout your workday – before discomfort occurs. (See Sample Exercise Schedule at right)
- **Discontinue if pain occurs.** Pain and discomfort after you exercise may indicate that you did too much. Check with a medical professional when in doubt.

Fit exercise into your workday

Having a plan will help you remember to exercise. Here's a sample schedule that you can follow, or select your own combination of these exercises and adjust the schedule to fit your workday.

Sample exercise schedule

Time	Exercise	Minutes
8 a.m.	Head turn Arms, shoulders and rib cage Shoulders, back and hips	2 - 3
10 a.m.	Shoulder circles Wrists Legs	2 - 3
12 p.m.	Eye circles Hands and fingers Leg raise	2 - 3
2 p.m.	Eye cover Shoulder circles Shoulders, back and hips	2 - 3
4 p.m.	Head turn Arms, shoulders and rib cage Legs	2 - 3



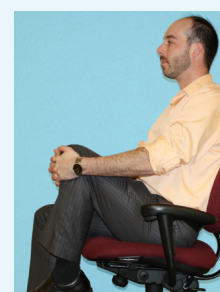
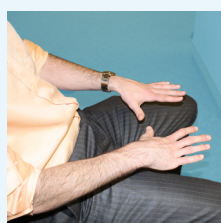
Head turn

- Start with your head facing forward.
- Turn your head slowly to one side as far as comfortable.
- Then turn to the other side.
- Repeat 5 times.



Hands and fingers

- With your arms in a comfortable position, make a fist and hold for 2 or 3 seconds.
- Stretch your fingers out and hold for 2 or 3 seconds.
- Repeat, alternating hands, 5 times each hand.



Legs*

- Using both hands, grasp one shin.
- Pull your leg slowly up toward your chest. Hold for 5 seconds.
- Lower your leg.
- Repeat, alternating right and left legs, 5 reps each leg.



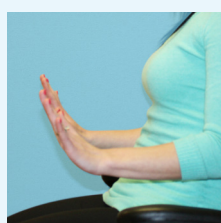
Shoulder circles

- Slowly move your shoulders in a circular motion: upward, forward, downward, and backward for forward circles.
- Reverse the direction for backward circles.
- Repeat 5 times each direction.



Wrists

- With your forearm in a comfortable horizontal position and your palm toward the floor, bend your wrist down.
- Then raise your hand, extending your wrist.
- Repeat 5 times.



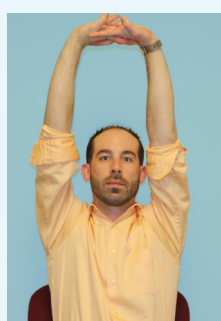
Leg raise*

- In a seated position, use your hands on armrests or seat to maintain balance.
- Slowly straighten your knee, extending your right foot in front of you.
- Slowly bring your foot back to original position.
- Repeat, alternating right and left legs, 5 reps each leg.



Eye circles

- With your head steady, roll your eyes clockwise in a circular motion.
- Reverse the direction and roll your eyes counter-clockwise in a circular motion.
- Repeat, alternating direction, 5 times each direction.



Arms, shoulders and rib cage

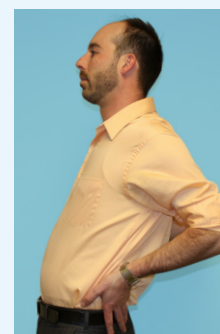
- Interlace your fingers.
- With your palms facing upward above your head, press your hands upward, stretching your arms.
- Hold for 5 seconds.
- Repeat 5 times.

Variation: Press hands forward at shoulder level.



Eye Cover

- Cover one eye with a cupped palm and focus on the palm of your hand.
- Hold for 15 to 30 seconds.
- Repeat with other eye, 5 times each eye.



Shoulders, back and hips

- Place your palms on your lower back in a standing or sitting position.
- Leaning your shoulders back, stretch your upper body backwards. Hold this position for 5 seconds.
- Return to a neutral position. Repeat 5 times.

* Use caution when performing leg exercises. Maintain balance by performing exercises in a seated position, or while standing and holding onto a stable surface.

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