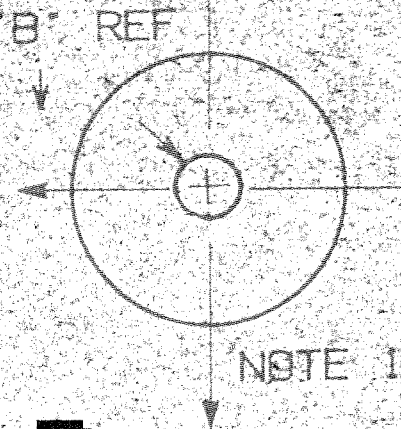
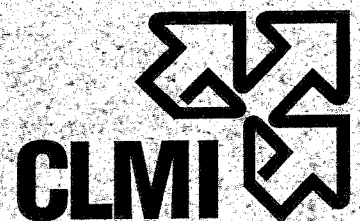
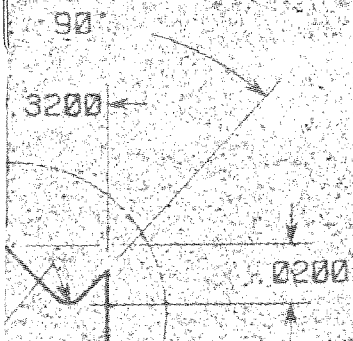
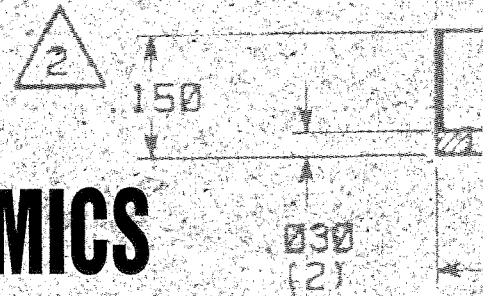




Blueprints®

for SAFETY

OFFICE ERGONOMICS



Office Ergonomics Employee Handbook

In this Information Age, an amazing amount of information is available literally at our fingertips. The use of computers and related technology has revolutionized most jobs and created endless possibilities for new ones.

While doing these jobs may require only small amounts of physical activity, we bring our whole bodies to work. And in order for us to work as efficiently as possible, we must accommodate our bodies by providing a safe, comfortable workplace.



In the past, the workplace was designed to move products and support machines efficiently. Since people always seemed so adaptable, how *they* fit into the workplace received less attention. But because of the increasing number of injuries caused by repetitive motion and stress — known as *Musculoskeletal Disorders (MSDs)* — ergonomics has become a critical factor in workplace safety.

Ergonomics is the science that seeks to adapt tasks and tools to fit the person. It's a way of looking at the designs of tasks, tools, equipment and workplace layouts and the overall organization of work to fit the job to the person, rather than the person to the job.

By understanding ergonomics — and how to analyze and adapt work to avoid ergonomic health hazards — we can all work in ways that reduce the risks for MSDs, control the costs associated with these injuries and increase everyone's safety.

What Are Musculoskeletal Disorders (MSDs)?

Musculoskeletal Disorders (MSDs) are characterized by wear and tear on tendons, muscles, joints and sensitive nerve tissue and are caused by repetitive use over an extended period of time. MSDs may include muscle strains and tears, ligament sprains, joint and tendon inflammation, pinched nerves and spinal disc degeneration.

What these conditions have in common is that they are cumulative and occur gradually over time. Fatigue and discomfort can result whenever force or pressure is placed on the body or the same movement is performed repeatedly over a long period of time.

MSDs that may result from office work can be grouped into three general categories:

1. *Hand and wrist MSDs* — The most common conditions include these:
 - Carpal tunnel syndrome: Swelling in the carpal tunnel inside the wrist, which places pressure on the median nerve and tendons
 - Raynaud's phenomenon: Increased sensitivity of the hand to cold
 - Trigger finger: Catching and pain that occurs with movement of the finger
2. *Tendinitis MSDs* — Tendinitis is inflammation of the tendons, which are the tissues that connect the muscles to the bones. Common types include the following:
 - Rotator cuff syndrome: Tendinitis of the rotator cuff inside the shoulder
 - Epicondylitis: Tendinitis of the elbow
 - DeQuervain's syndrome: Tendinitis of the thumb

3. *Low-back and neck MSDs* — Pain in the lower back or neck may indicate any of these conditions:
- Herniated spinal disc: Protrusion of the spinal disc, potentially placing pressure on a nerve
 - Sciatica: Pressure on the sciatic nerve in the low-back and buttocks area that results in pain running down the leg
 - Tension neck syndrome: Tightening of the muscles in the neck, causing pain

Any of the following common office activities can lead to developing MSDs:

- Working with bent or flexed wrists
- Making repetitive hand, arm and shoulder motions
- Making long reaches for materials
- Sitting or standing for long periods
- Working with the neck bent forward at an angle greater than 15 degrees for long periods
- Working at poorly adjusted workstations and chairs
- Working with inadequate lighting
- Holding pens or pencils with a pinch grip frequently
- Working under mental or physical stress
- Resting the forearms against the sharp edges of work surfaces
- Taking too few or too short rest breaks

What Causes MSDs?

In office work environments, these major risk factors can lead to MSDs:

- *Awkward postures and positions:* Working in ways that place increased demands on the body
- *Force:* Requiring the muscles and joints to work harder or to exert more effort
- *Repetition:* Making the same movement repeatedly or frequently

Awkward Postures And Positions

Working in awkward postures and positions can put added demands on your wrists, hands, arms, shoulders and back. Here are some examples of awkward postures and positions found in office work:

- Bending your wrists

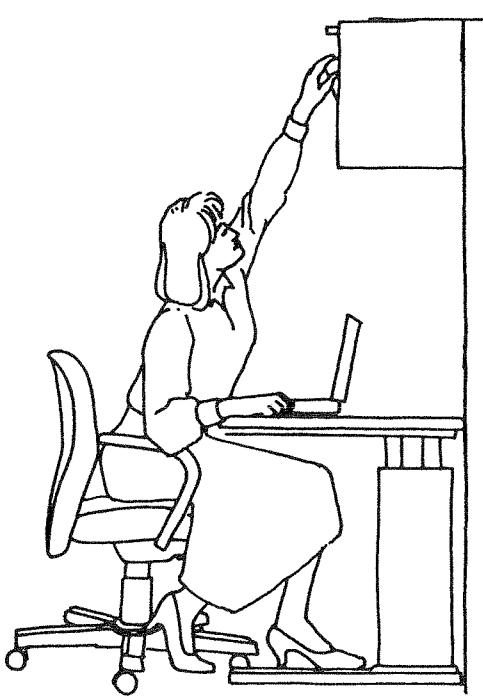


- Holding your elbows away from your body



- Stretching your arms out

- Sitting or standing with your back rounded or your shoulders slumped forward



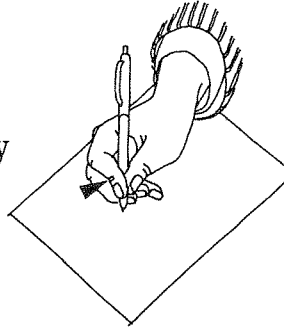
- Making long reaches for materials

In addition to potentially causing MSDs, working in awkward postures and positions can lead to fatigue during the workday, causing drops in productivity and efficiency.

Force

Injuries due to force are usually associated with industrial and manufacturing jobs. However, such injuries also occur in office work as a result of performing tasks like these:

- Holding a pen or pencil in a pinch grip
- Using excessive force when moving equipment or supplies
- Hitting the keys harder than necessary while doing data entry or typing



Tasks such as these can put excessive force on your hands and wrists, causing fatigue and — if done for long periods of time — MSDs.

Repetition

The more you repeat the same movement using the same position during the workday, the greater the chance that you will develop an MSD. Here are some examples of office jobs with high repetition:

- Keyboarding and typing
- Sorting
- Stapling
- Filing

These jobs are performed with the same movements and hand positions and repeated many times during the workday.

Keep in mind, however, that repetition itself is not necessarily harmful. The problem lies in the frequency of the task and combining it with awkward postures and high levels of force.

What Are The Signs And Symptoms Of MSDs?

You should be aware of the following signs and symptoms of MSDs:

- Pain
- Numbness
- Tingling
- Burning
- Cramping
- Stiffness
- Decreased range of motion
- Deformity
- Decreased grip strength
- Loss of muscle function

These symptoms may be worse at night or even first noticed at night.

How Can MSDs Be Prevented?

How you move and use your body while performing work activities will determine how healthy and comfortable you feel on the job. To ensure that everyone feels as healthy and comfortable as possible, workplaces, machines and tasks should be reviewed according to the principles of *ergonomics*. Doing so is the most effective way to prevent the development of MSDs.

One of the basic principles of ergonomics is to use good body positions that keep you *working in neutral*. This means keeping your joints in their strongest, most stable and least stressful positions while you work.



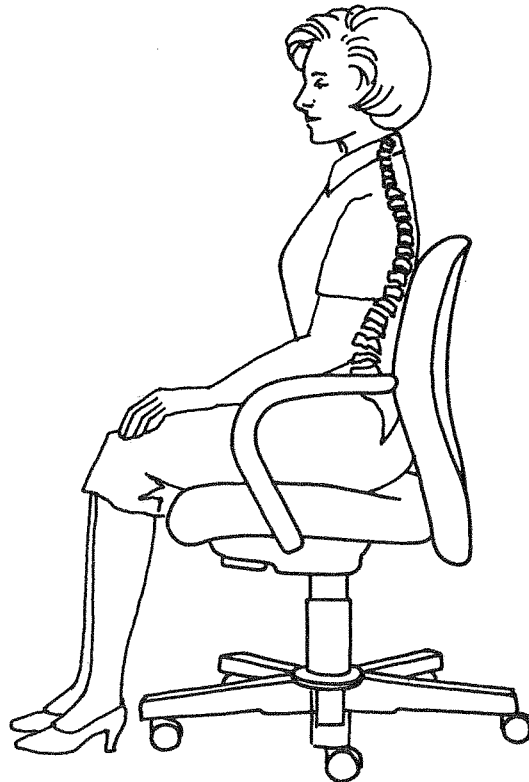
For example, if you spend a good part of your workday at a computer, pay attention to how you position your arms and wrists. To reduce muscle strain on your upper body, keep your elbows close to your body and your shoulders down and relaxed. And as much as possible, work with your forearms, wrists and hands relaxed and in a neutral position.

Also think about your posture. When you sit or stand, try to maintain the normal slight inward curve in your lower back. Keeping your lower back in this position helps align your neck, head and shoulders and also reduces the stress to your lower back. In addition, aligning your head over your shoulders reduces the strain on your neck and improves bloodflow to your upper body.

Poor posture



Improved posture



Finally, be sure to give your body a rest by taking a series of short breaks, or *microbreaks*, throughout the workday. The human body is designed to move, so holding one position or performing one task for a long time increases the stress on muscles and joints. Taking breaks will help minimize muscle fatigue and the tightness that results.

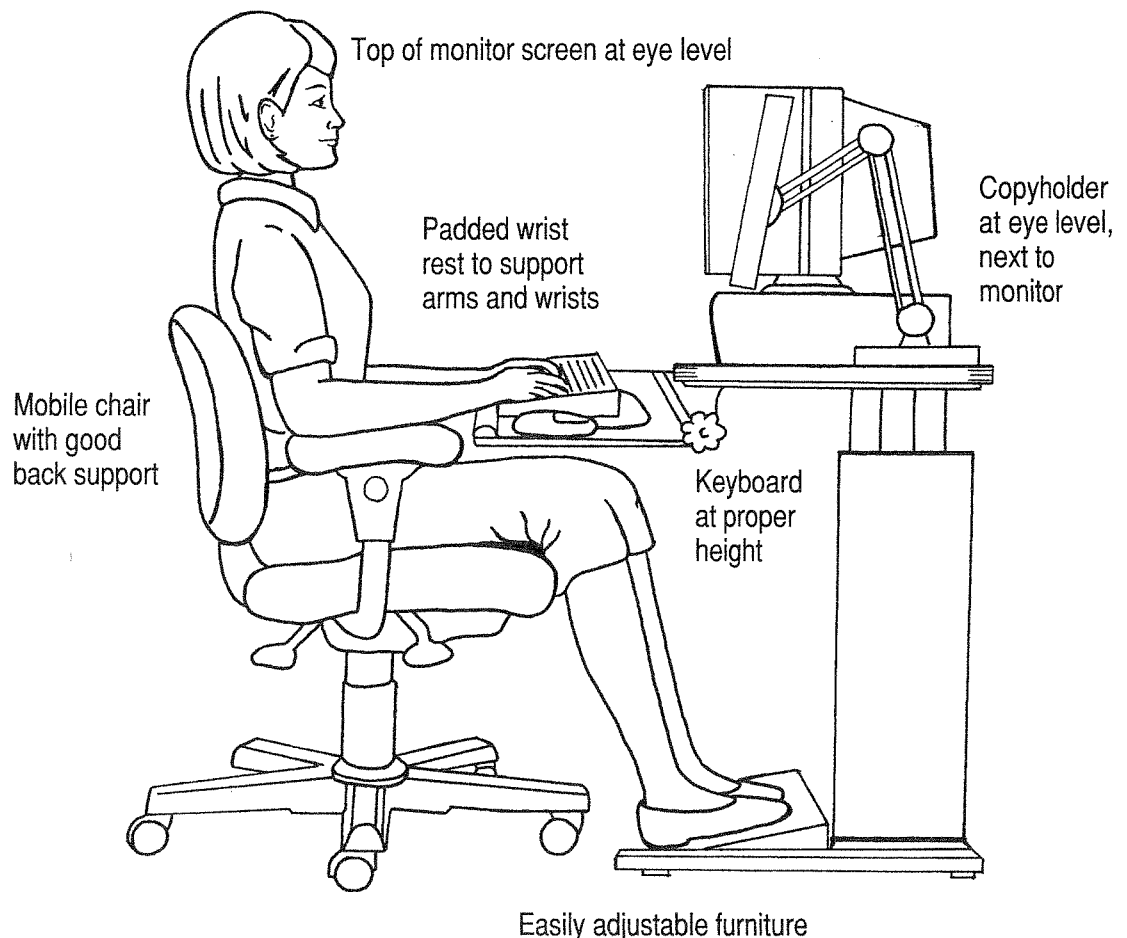
We'll look at this subject in more detail later in this handbook (see pages 19–23).

Ergonomic Design

To keep your body working in neutral, you should adjust your workstation to your body, rather than adjust your body to your workstation. These adjustments are made possible through *ergonomic design*: the practice of designing workplaces, machines and tasks to match the capabilities and limitations of the human body. The goal is to create a workplace in which employees can work in neutral, minimizing wear and tear on their bodies.

Employees come in all shapes and sizes, yet most work using the same office equipment. The following elements of the work environment should be adjusted to fit each individual employee:

- Chairs
- Keyboards and mice
- Computer monitors
- Copyholders
- Work habits
- Visual comfort



Applying Ergonomic Principles In The Office Workplace

Chairs

The ideal chair for a workstation can be easily adjusted from a seated position. The seat height should be set so that your thighs are nearly parallel to the floor and your feet are resting flat on the floor or a footrest.

The seat pan depth (which is the distance from the front to the back of the seat) should be adjustable so that you can sit back comfortably against the backrest. And the front edge of the seat should be rounded (called a *waterfall front*) so it doesn't press into the backs of your knees.

If the chair has armrests, they should be well padded. They should not be so high as to force your shoulders upward or so wide as to force your elbows away from your body.



The chair backrest should adjust and support your back. The chair should allow you to lean back about 10 to 25 degrees, which is similar to the way you would sit while driving a car.

The chair should also be stable; five legs are better than four. And the chair should be mobile, swiveling easily and rolling smoothly on casters.

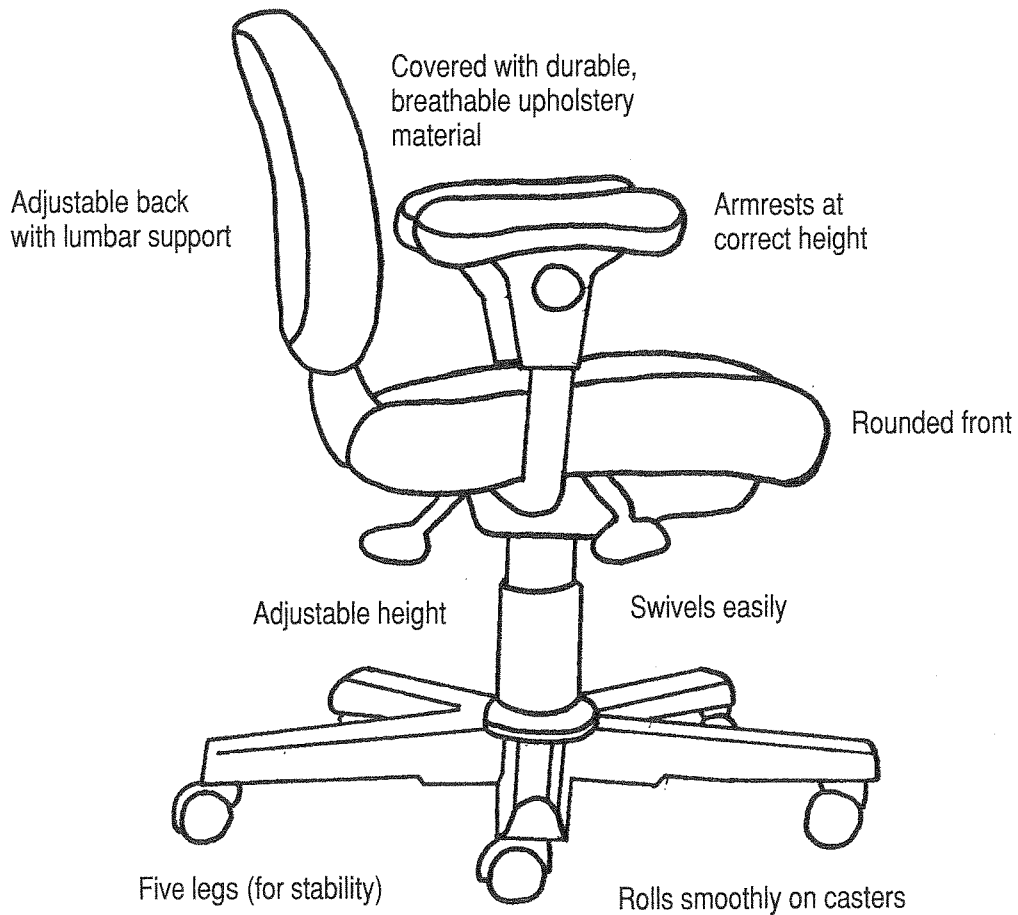
Finally, the cushions of the chair should be covered with durable yet breathable upholstery material.

If a chair cannot be adjusted, it can be improved in several ways:

- Attaching a pillow or rolled towel to the lower part of the chair back will provide support to the lumbar (lower) part of your back.
- Back supports are also available in a variety of shapes and sizes to provide support.
- If your feet cannot reach the floor, use a footrest that allows your heels to be lower than your toes.



Even so, no chair — not even one that's adjustable — will be ergonomically appropriate if it's not used correctly. Be sure to adjust your chair as needed in order to work in neutral. And remember that no single position is appropriate for extended periods of time. You should stand periodically to reduce the pressure on your back and to improve your circulation.



Keyboards And Mice

The first ergonomic consideration for a keyboard and mouse is height. This depends on the height of the work surface your keyboard rests on and the height of your chair.

Ideally, the keyboard and mouse should be level and about 1" below the bottom of your elbow. When seated in a comfortable position, your arms should rest at your sides, forming approximately a 90 degree angle at each elbow. Your forearms, wrists and hands should be relaxed and aligned.



An adjustable keyboard tray allows changing the height and angle of the keyboard and mouse to suit individual needs. If such a tray is not available, try these simple measures to adjust the height of your keyboard and mouse:

- If the keyboard and mouse are too low, raise them by placing pads of paper or a flat piece of wood under them.
- If the keyboard and mouse are too high, raise the chair and add a footrest.

When you work at a keyboard, typewriter or calculator, make sure that you hold your wrists and hands in a neutral position. Your fingers should rest flat or level on the work surface in order to keep your wrists working in neutral and to allow your muscles to work more efficiently.

Using a wrist support or palm rest is another solution that allows you to relax your arms and keep your wrists straight while working at a keyboard or mouse. The support or rest should be level with the keys on the keyboard.

It's best to use the wrist or palm rest while you are taking a break — for instance, looking at the monitor to review what you have keyed in. You should keep your hands and wrists hovering over the keys while you are actually typing.

Another important ergonomic consideration is how to position the keyboard in relation to the monitor. The keyboard should be aligned with the monitor, and in most office work situations, both should be positioned directly in front of you.

If you work extensively with a mouse, you should also follow these guidelines:

- Position the mouse and mouse pad next to the keyboard to keep your wrist straight and to avoid making long reaches.
- When using the button on the mouse, keep your index finger relaxed by resting it on or around the mouse, rather than holding it poised above the button.

Computer Monitors

To maintain correct posture and proper head and neck position while seated at a computer, the top of the monitor screen should be at or just below your eye level. In addition, the monitor should be positioned approximately 24 to 30 inches from your face — about an arm's reach.

As mentioned above, also consider how the computer monitor and keyboard are positioned. The monitor should be aligned with the keyboard. Avoid setups in which you have to turn your head or bend your neck to look at the monitor and see what you have typed.

Be sure to adjust monitor controls for brightness, contrast and the like as needed for comfortable viewing.

If you wear bifocals and look at the screen through your lower lenses, lower your monitor as much as possible and sit further back.

Copyholders

Using a copyholder while working at a keyboard can help reduce eye motion and discomfort and allow you to maintain proper neck posture. However, the copyholder must be positioned correctly to prevent neck and eye strain.

Specifically, the copyholder should be placed between the keyboard and the monitor or directly next to the monitor on either side. The copyholder should also be positioned at the same height and distance from your face as the monitor — about an arm's reach.

Work Habits

Working efficiently doesn't always mean working continuously on one task. In fact, an employee who focuses solely on one big project until it's been completed may not be as efficient as one who alternates tasks and takes breaks periodically to provide his or her mind and body with a needed break.

To work efficiently, the human body needs to change positions and move throughout the day. Your concentration will increase and your fatigue — both mental and physical — will decrease if you spread out or break up tasks whenever possible.

One way of breaking up and spreading out work is to take regular stretch breaks throughout the day. Your goal should be to do frequent but mild stretches within a pain-free range. Doing so will not only reduce the muscle fatigue that comes from doing repetitive tasks and holding awkward positions but will likely improve your productivity, as well.

You'll find a series of good stretches and exercises later in this handbook (see pages 19–23).

Also practice these good work habits to reduce stress and fatigue:



- Keep your elbows at your sides or use an armrest or wrist rest for support. (But make sure the arm or wrist rest is adjusted appropriately for your body size.)



- If you use the phone frequently or for prolonged periods of time, use a telephone headset.



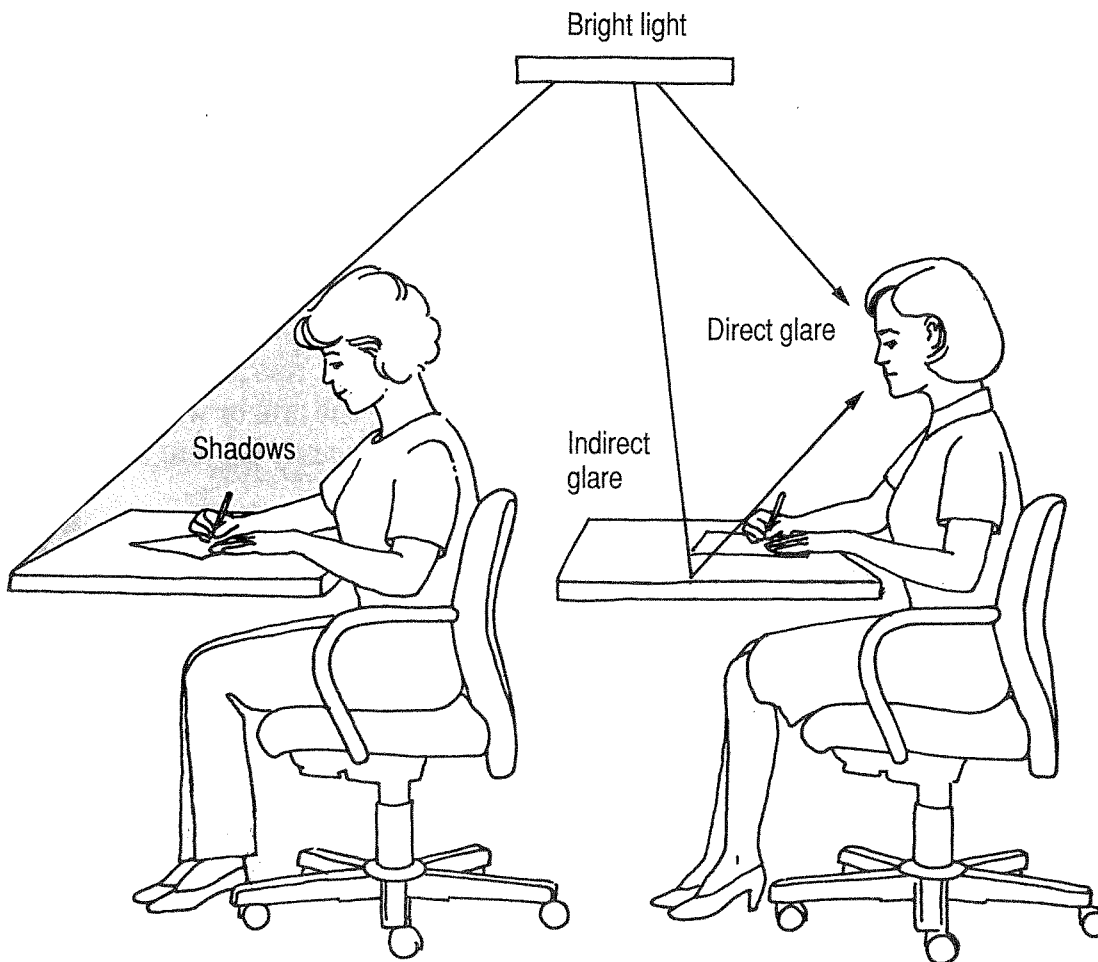
- Position work equipment and materials so that the most frequently used items are within a comfortable arm's reach and less used items are farther away.

Visual Comfort

Visual comfort plays a major role in your ability to complete job tasks. This means that lighting should be considered when designing a work area according to ergonomic principles. There should be enough light to allow you to read documents, but this does not necessarily mean bright light. The goal is to prevent or reduce glare.

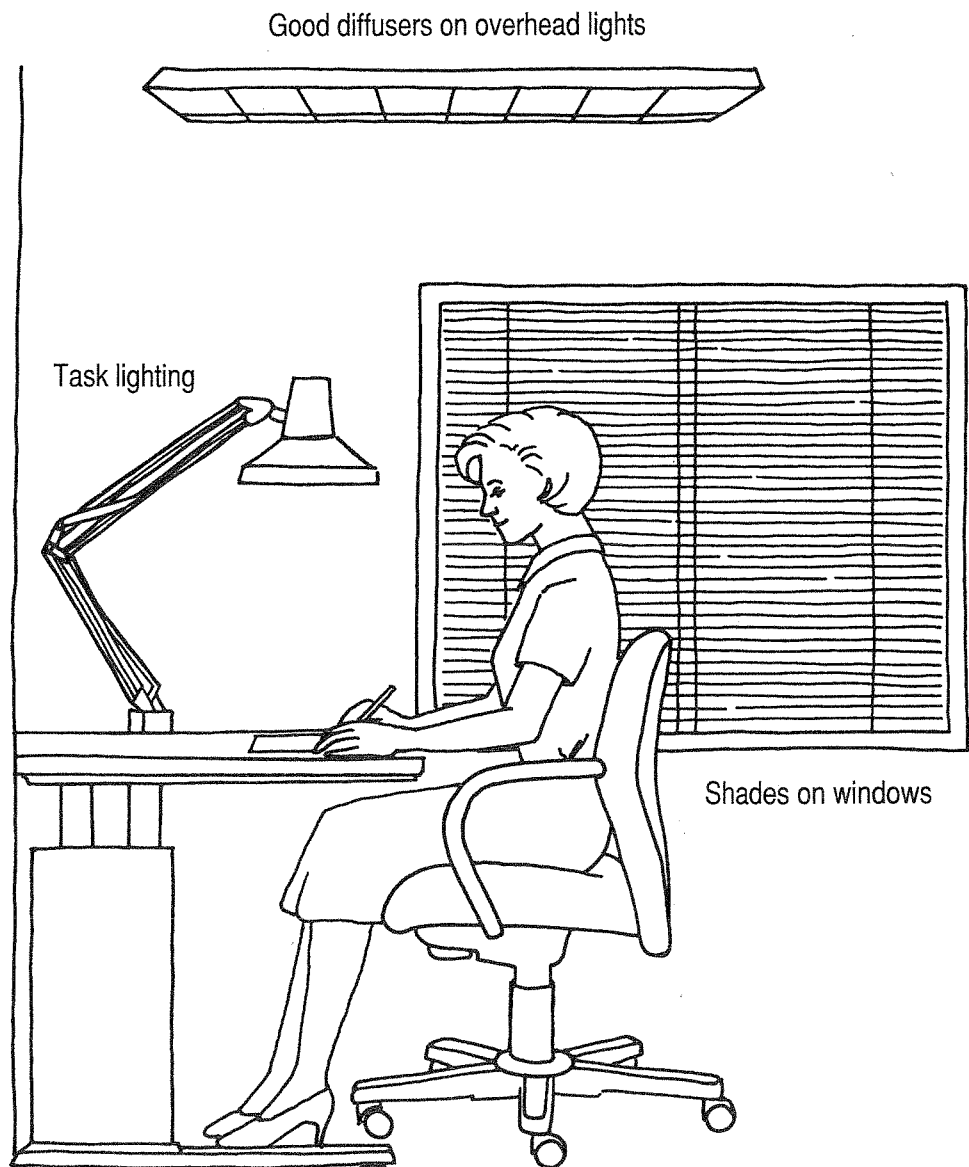
There are two types of glare:

- *Direct glare* is caused by intensely bright light sources, such as the sun shining in windows and bright light fixtures shining down from the ceiling.
- *Reflected glare* includes bright spots that are caused when light reflects on a computer monitor or work surface.



To improve visual comfort and reduce glare, use any of these effective measures:

- Provide indirect lighting.
- Place good diffusers on overhead lights.
- Lower the general level of light in the work area, and provide task lighting (that is, lights directed on specific work, such as documents).
- Add shades to windows.



Also avoid using bright overhead lighting, which can cause shadows along with direct and reflected glare.

Control glare on *computer monitors* using any of the following methods:

- Install blinds on windows near monitors.
- Adjust the controls for brightness and contrast on the monitor.
- Use a nonglare filter to cover the screen on the computer monitor.
- Tilt or move the monitor so that it doesn't reflect light sources.
- Position the desk so that light sources (such as windows) are perpendicular to the monitor, rather than directly behind you or the monitor.
- Lower the level of area light.

If your eyes feel dry at work, it may be that the airflow from the ventilation system is blowing on you, either directly or deflecting off a window or wall. Correct this problem by redirecting the airflow or moving your desk.

If you wear glasses, you should consider one additional factor for visual comfort: Your prescription should be adjusted so it's correct for the distances involved in doing your job. For instance, if you work at a computer, you should be able to read what's on the monitor without tilting your head forward or backward.

This may be a particular problem if you wear bifocals. In general, lower your monitor as much as possible. To ensure comfort and reading ability, you may need to consult your eye doctor and consider having a special pair of glasses made just for work.

Stretching, Warm-Up And Relaxation Activities

Obviously, muscles that are used in one position for a long period of time will get tired. This affects circulation to the working muscles and makes any job more difficult and more uncomfortable. By completing stretching, warm-up and relaxation activities, you can help avoid fatigue and prevent MSDs.

Stretching improves the bloodflow and keeps the working muscles fresh and loose. Doing stretching exercises can relieve the muscle strain and tightness caused by work involving awkward postures and positions, force and repetitive movements.

Guidelines For Stretching And Relaxation Activities

The next section presents a series of stretching and relaxation activities that you can do right at your workstation. When you do them, keep in mind these general guidelines:

- Start out easy, doing neither too many nor too demanding movements.
- Stretch regularly throughout the day.
- Hold each stretch for 10 to 20 seconds.
- Don't bounce.

Also remember these points:

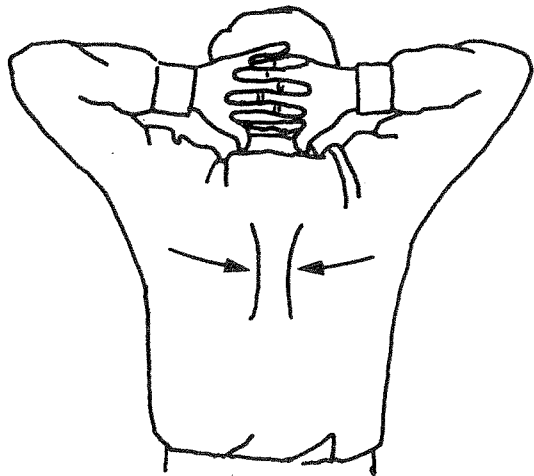
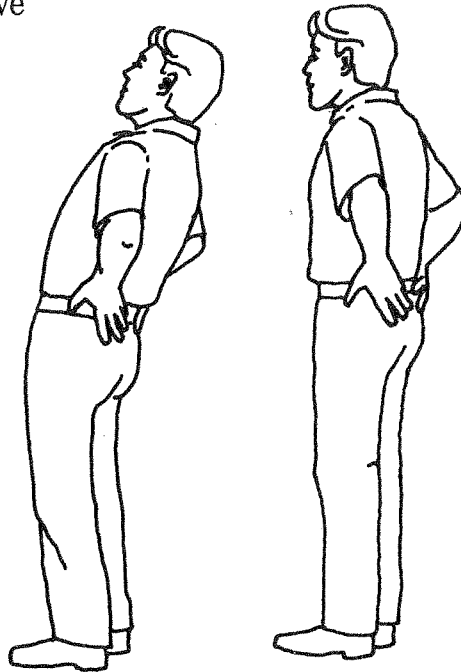
- You may feel some discomfort when doing certain stretches, especially if your muscles are stiff or weak. *However, stretching exercises should never cause pain.*
- If you already have an MSD, get specific advice from your health care provider.
- If you have other medical problems, consult your health care provider before doing stretching activities.

Relaxation And Stretching Activities For The Office

Try these activities to help you relax and relieve the stress of sitting and concentrating for long periods of time. Repeat each activity 3 times, holding the position 10 to 20 seconds.

Lower Back

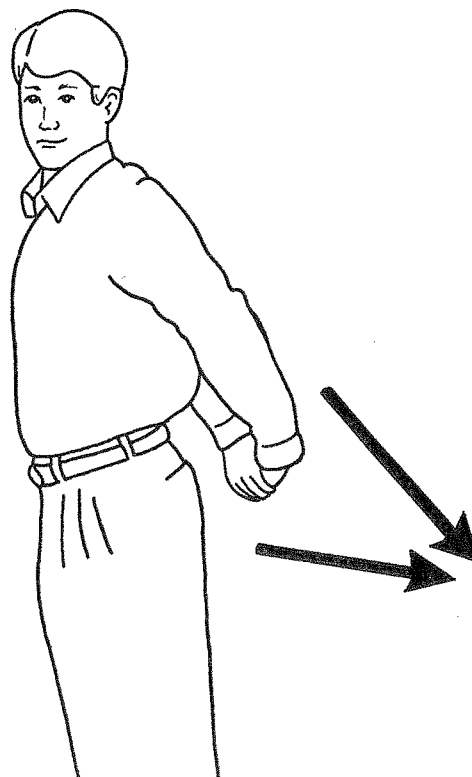
Place your hands on your hips, and bend back gently. ►



Shoulders, Arms And Upper Back

◄ With your fingers interlaced and your hands locked behind your head, gently move your shoulder blades together and then apart. Do not push on your head.

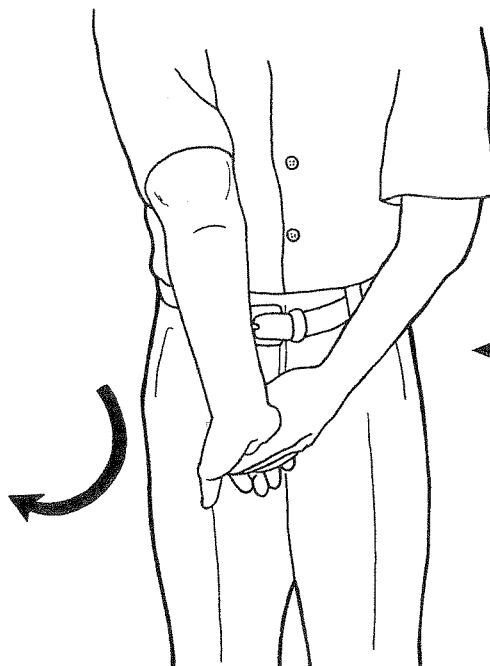
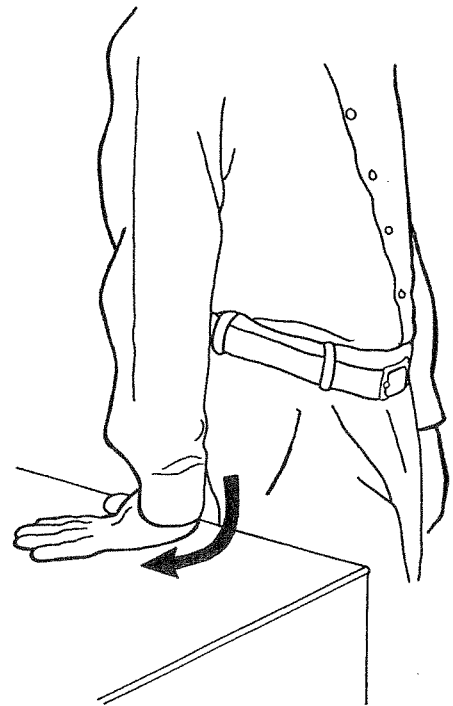
Stretch your arms out and down. ►
You should feel the stretch in your chest and upper back.



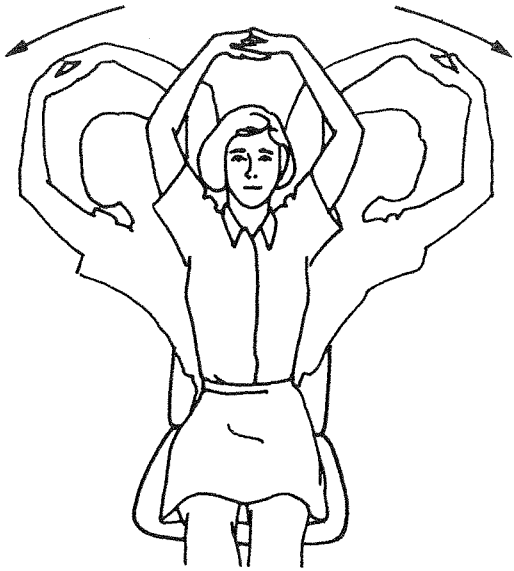


◀ Lean your head gently to one shoulder. You should feel the stretch in your neck on the opposite side that you are leaning.

With your palm up, stretch your wrist ▶ gently backward by leaning on a firm surface. You should feel the stretch in the front of your forearm.



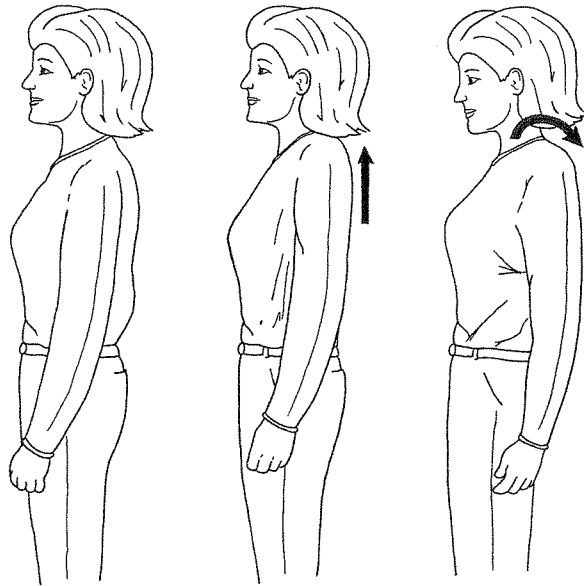
◀ Stretch the back of your hand gently upward. You should feel the stretch in the inside of your forearm.



Shoulders, Arms And Torso

- ◀ Reach overhead with your arms as far as you can, and hold them stretched upward for a few seconds. At the same time, bend gently from side to side to stretch the muscles that become stiff while sitting.

While keeping your arms at your sides, slowly roll your shoulders upward and backward. ▶



- ◀ Place your palms together in front of your chest. Keeping them together, slowly lower your hands until you feel a mild stretch in your forearms.



Hands And Wrists

- ◀ Make a fist with each hand, and then open it, spreading out your fingers as far as you can.

Hips And Lower Back

Cross your ankle over the opposite leg. Lift the top knee to the opposite shoulder. You should feel the stretch in your gluteus muscles (or buttocks). ▶



Reducing Eye Strain

Your eye muscles also need an occasional break. To do so, simply change focus from time to time. For instance, look out the window or across the room and focus on something at least 20 feet away for a few seconds. This will reduce the strain of looking at a monitor as well as keep your eyes relaxed.

You can also reduce eye strain in these ways:

- Move your eyes in all directions: up, down, around and diagonally.
- Trace the edge of the ceiling with your eyes.
- Close your eyes for a few seconds.
- Get up and move around on breaks. (It's important to step outside the work environment from time to time, even if it's only for a few minutes.)
- Blink more often.

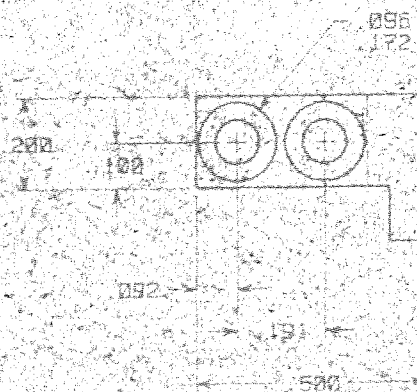
Early Reporting Of MSDs

No one knows your body like you do. So when you're experiencing the signs or symptoms of an MSD — for instance, pain, tingling or muscle fatigue — be sure to report it immediately. Don't wait until the problem becomes severe. *The importance of early reporting of MSDs cannot be overstated.*

Remember that MSDs develop gradually over time. This means that the signs and symptoms will only become worse the longer you continue the activity that has caused them. The sooner you report the problem, the sooner the source will be discovered and treatment will get underway. By reporting the problem promptly, you will recover sooner and with less pain and stress.

The early reporting of MSDs will also benefit your workplace. Identifying risks and making ergonomic improvements to eliminate MSDs will improve employee comfort and morale and thus increase efficiency and productivity.

Making ergonomic improvements in the workplace is an ongoing process. Do your part by knowing your company's policies for reporting MSDs and by reporting any problems immediately.



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