



Standard Operating Procedures for Ergonomics

Musculoskeletal Disorders (MSDs) affect the muscles, nerves, blood vessels, ligaments and tendons. Workers in many different industries and occupations can be exposed to risk factors at work, such as lifting heavy items, bending, reaching overhead, pushing and pulling heavy loads, working in awkward body postures and performing the same or similar tasks repetitively. Exposure to these known risk factors for MSDs increases a worker's risk of injury.

Ergonomics is the study of the physical and psychological demands of activities in relation to the physical and psychological capabilities and limitations of people. The goal of ergonomics is injury prevention as discomfort often leads to pain and pain can lead to injury/illness. Ergonomics is the process of designing or arranging workplaces, products and systems so that they fit the people who use them. Work-related MSDs can be prevented. Ergonomics helps lessen muscle fatigue, increases productivity, and reduces the number and severity of work-related MSDs. Examples of Musculoskeletal Disorders (MSDs) may include the following:

1. **Cumulative Trauma Disorder (CTD)** – An injury to the tissues, nerves, tendons, tendon sheaths and muscles (predominantly of the upper extremities) is the result of repeated forceful actions over a period of time. One or a combination of the following may cause CTD:
 - a. Repetitive motion
 - b. Forceful exertions
 - c. Vibration
 - d. Hard and sharp edges
 - e. Sustained or awkward postures
 - f. Exposures to noise over extended periods

2. **Carpal Tunnel Syndrome (CTS)** – A form of cumulative trauma disorders which affects one's hands and wrists. The symptoms are tingling, numbness, and severe pain in the wrist and/or hand, reduced hand strength and an inability to make a fist or hold objects. These problems are typically not noticeable until after work in the evening. The more advanced cases may result in permanent loss of sensation and partial paralysis of the hand and wrist.

3. **Back Disorders** – An injury to the back involving pulled/strained muscles, ligaments, tendons, and disks. Most result from chronic injury not a single incident. One or a combination of the following may cause back disorders:
 - a. Excessive/repetitive twisting, bending, and or reaching.
 - b. Carrying, moving, and/or lifting loads that are either too heavy or too large.
 - c. Staying in one position for too long.
 - d. Poor physical condition.



- e. Poor posture.
- f. Prolonged sitting.
- g. Back degeneration due to age.
- h. Excessive activity without the benefit of prior physical conditioning.
- i. Stress.
- j. Vibration.

Overview of Controls for MSD Hazards

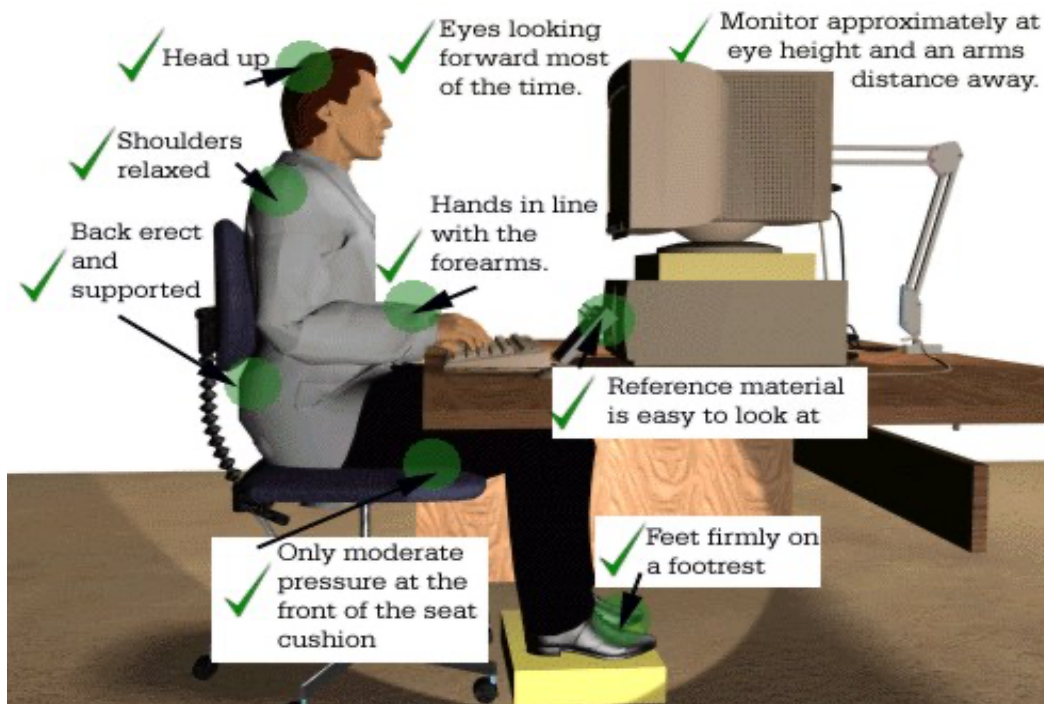
To reduce the chance of injury, work tasks should be designed to limit exposure to ergonomic risk factors. Engineering controls are the most desirable, where possible. Administrative or work practice controls may be appropriate in some cases where engineering controls cannot be implemented or when different procedures are needed after implementation of the new engineering controls. Personal protection solutions have only limited effectiveness when dealing with ergonomic hazards.

Type of Control	Workplace Examples
<p>Engineering Controls (implement physical change to the workplace, which eliminates/reduces the hazard on the job/task)</p>	<ul style="list-style-type: none"> ▪ Use a device to lift and reposition heavy objects to limit force exertion ▪ Reduce the weight of a load to limit force exertion ▪ Reposition a work table to eliminate a long/excessive reach and enable working in neutral postures ▪ Use diverging conveyors off a main line so that tasks are less repetitive ▪ Install diverters on conveyors to direct materials toward the worker to eliminate excessive leaning or reaching ▪ Redesign tools to enable neutral postures
<p>Administrative and Work Practice Controls (establish efficient processes or procedures)</p>	<ul style="list-style-type: none"> ▪ Require that heavy loads are only lifted by two people to limit force exertion ▪ Establish systems so workers are rotated away from tasks to minimize the duration of continual exertion, repetitive motions, and awkward postures. Design a job rotation system in which employees rotate between jobs that use different muscle groups



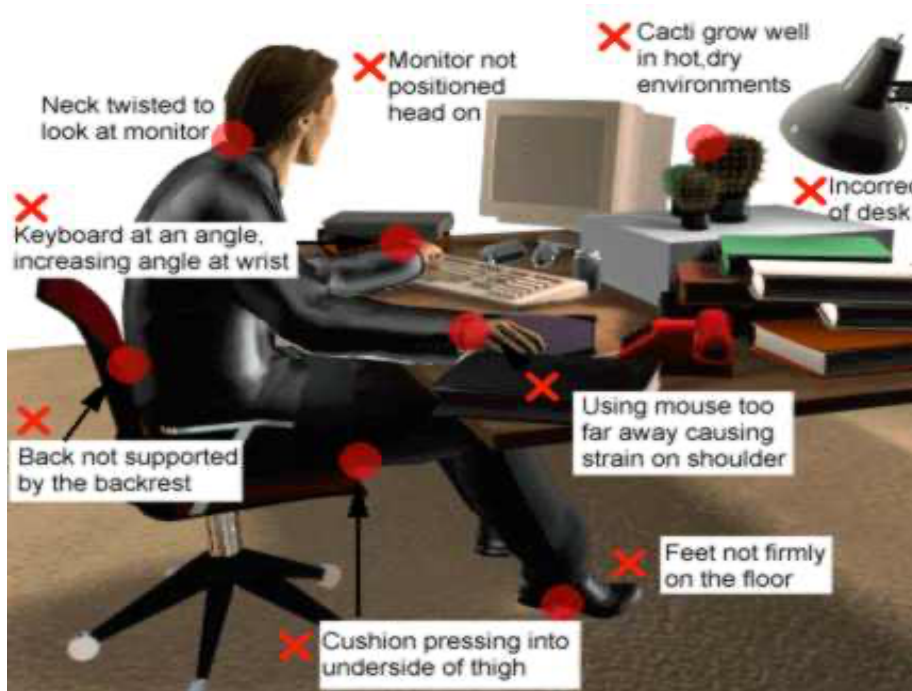
Type of Control	Workplace Examples
	<ul style="list-style-type: none">▪ Staff "floaters" to provide periodic breaks between scheduled breaks▪ Properly use and maintain pneumatic and power tools
Personal Protective Equipment (use protection to reduce exposure to ergonomics-related risk factors)	<ul style="list-style-type: none">▪ Use padding to reduce direct contact with hard, sharp, or vibrating surfaces▪ Wear good fitting thermal gloves to help with cold conditions while maintaining the ability to grasp items easily

Proper Work Station Positioning





Improper Work Station Positioning



Seating

- Neutral body positioning
- Relaxed and forward
- Back straight and fully supported S-curve in spine
- Head upright
- Hips, knees, and elbows at 90°
- Arms fully supported
- Feet flat the floor.

Work Surface

- Chair at a comfortable height to allow for neutral body positioning
- Knees and elbows bent approximately 90 degrees
- Thighs parallel to floor
- Feet flat on the floor or on a footrest
- Obstructions removed.



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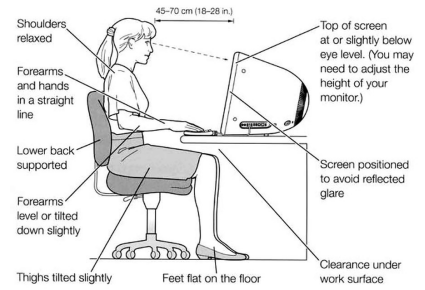
Monitors

- Directly in front of you
- The top of the monitor should be at or slightly below eye level.
- Arm’s length away (24-30” approx.)
- Up to 10° backward tilt or flat
- Text size may need to be increased for smaller monitors.



Keyboard and Mouse

- Directly in front of you.
- Distance that allows your elbows to stay close to your body with your forearms parallel with the floor.
- Elbows not extended forward or backward
- Hands not flexed up or down, or bent inward or outward
- Control mouse movement from the elbow
- Your hands should move freely and be elevated **above** the wrist/palm rest while typing.
- When resting, the pad should contact the **heel or palm** of your hand, not your **wrist**.
- Some desks and computer equipment have hard, angled leading edges.



Accessories

- Depending on usage patterns the location of frequently-used items should remain within the primary work zone, such as keyboard, mouse, telephone. Although other items, such as printers and calculators should remain within the secondary work zone.
- Phone Use
 - Avoid the shoulder-rest device if at all possible.
 - Consider a phone headset instead.
 - Use a speaker phone or head set for long conversations.

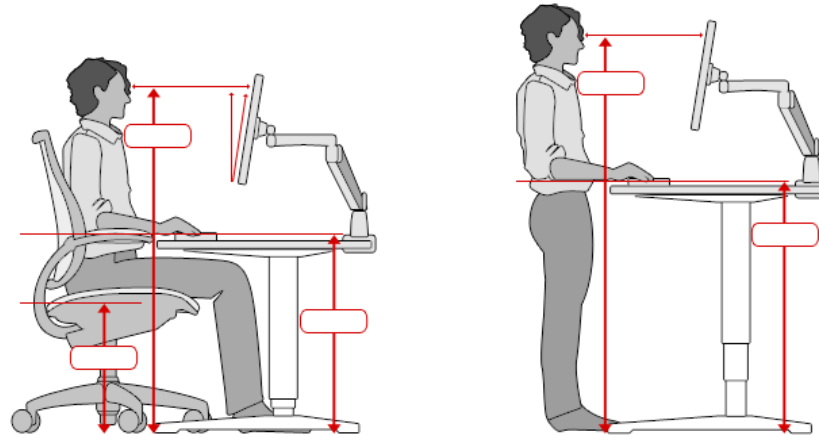


Sitting vs. Standing

- Regardless if working from a seated or standing position, work from a position that is at an appropriate height and distance to an employee’s workstation, as well as centered to their computer components, so that they may maintain proper body positioning and receive the appropriate support is critical.

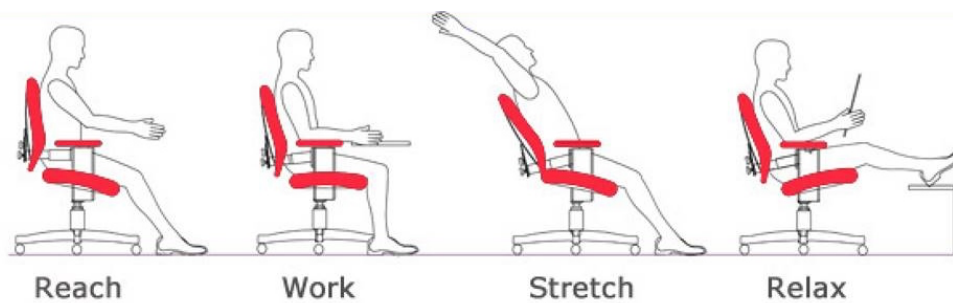


- A standing workstation must be able to support all of the computer components (monitors, keyboard, and mouse), so that they are at the proportional height. Depending on the floor type, an anti-fatigue mat may also be required.



Posture

Over time, poor posture and back pain may be caused by habits from everyday activities such as sitting in office chairs, looking at the computer, driving, standing for long periods of time or even sleeping. Poor posture can become second nature, causing or aggravating episodes of back pain. Fortunately, the main factors affecting posture are in our control with some simple changes.



Below are some tips to help improve your posture:

- **Distribute body weight evenly to the front, back, and sides of the feet while standing.** While sitting in an office chair, take advantage of the chair's features. Sit up straight and align the ears, shoulders and hips in one vertical line. Any single position, even a good one, will be tiring. Leaning forward with a straight back can alternate with sitting back, using the back support of the chair to ease the work of back muscles. Also be aware of and avoid unbalanced



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postures such as crossing legs unevenly while sitting, leaning to one side, hunching the shoulders forward or tilting the head.

- **Get up and move.** Take a break from your office chair every 30 minutes to stretch, stand or walk. As muscles tire, slouching, slumping, and other poor postures become more likely; this puts extra pressure on the neck and back.
- **Use exercise to help prevent injury and promote good posture.** Regular exercise such as walking, swimming, or bicycling will help the body stay aerobically conditioned, while specific strengthening exercises will help the muscles surrounding the back to stay strong. There are specific exercises that will help maintain good posture. In particular, a balance of trunk strength with back muscles about 30% stronger than abdominal muscles is essential to help support the upper body and maintain good posture.
- **Wear supportive footwear when standing.** Avoid regularly wearing high-heeled shoes, which can affect the body's center of gravity and change the alignment of the entire body, negatively affecting back support and posture. When standing for long periods of time, placing a rubber mat on the floor can help improve comfort.

Review [this video](#) showing how to sit better at work.

Minimizing Eye Strain

Use proper lighting:

- Eliminate exterior light by closing drapes, shades, or blinds. Reduce interior lighting by using fewer light bulbs or fluorescent tubes or use lower intensity bulbs and tubes.
- Also, if possible, position your computer screen so windows are to the side, instead of in front or behind it to minimize glare.
- Many computer users find their eyes feel better if they can avoid working under overhead fluorescent lights. If possible, turn off the overhead fluorescent lights in your office and use floor lamps that provide indirect "soft white" LED lighting instead.

Adjust Your Computer Display Settings to Reduce Eye Strain and Fatigue:

- *Brightness:* Adjust the brightness of the display so it's approximately the same as the brightness of your surrounding workstation.
- *Text size and contrast:* Adjust the text size and contrast for comfort, especially when reading or composing long documents. Usually, black print on a white background is the best combination for comfort.



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- *Color temperature:* This is a technical term used to describe the spectrum of visible light emitted by a color display. Blue light is short-wavelength visible light that is associated with more eye strain than longer wavelength hues, such as orange and red. Reducing the color temperature of your display lowers the amount of blue light emitted by a color display for better long-term viewing comfort.

Blink More Often:

- When staring at a screen, people blink less frequently. Blinking is very important when working at a computer as blinking moistens your eyes to prevent dryness and irritation. Tears coating the eye evaporate more rapidly during long non-blinking phases and this can cause dry eyes.

Exercise Your Eyes:

- Another cause of computer eye strain is focusing fatigue. To reduce your risk of tiring your eyes by constantly focusing on your screen, look away from your computer at least every 20 minutes and gaze at a distant object (at least 20 feet away) for at least 20 seconds. Looking far away relaxes the focusing muscle inside the eye to reduce fatigue.
- Another exercise is to look far away at an object for 10-15 seconds, then gaze at something up close for 10-15 seconds. Then look back at the distant object. Do this 10 times. This exercise reduces the risk of your eyes' focusing ability to "lock up" after prolonged computer work.

Take Frequent Breaks:

- To reduce your risk of eye strain and neck, back and shoulder pain, take frequent screen breaks during your workday (at least one 10-minute break every hour). During these breaks, stand up, move about and stretch your arms, legs, back, neck and shoulders to reduce tension and muscle fatigue.