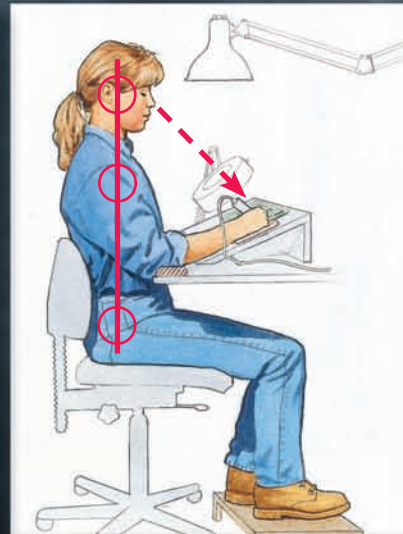
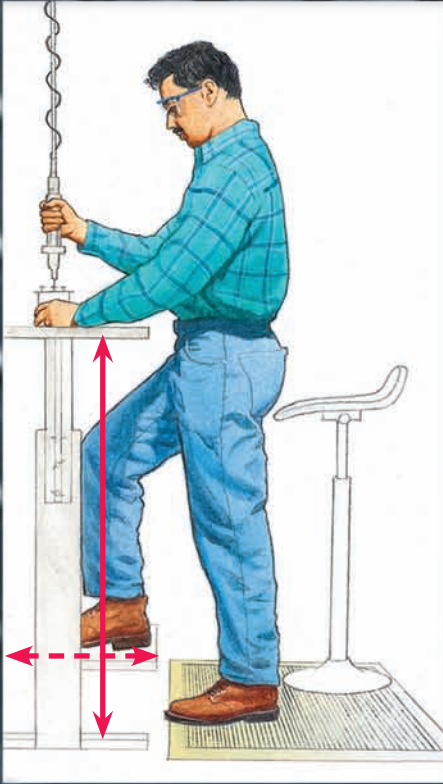


# Ergonomics and You



**A Commonsense Approach  
to Reducing MSD Risks**

# What Is Ergonomics?

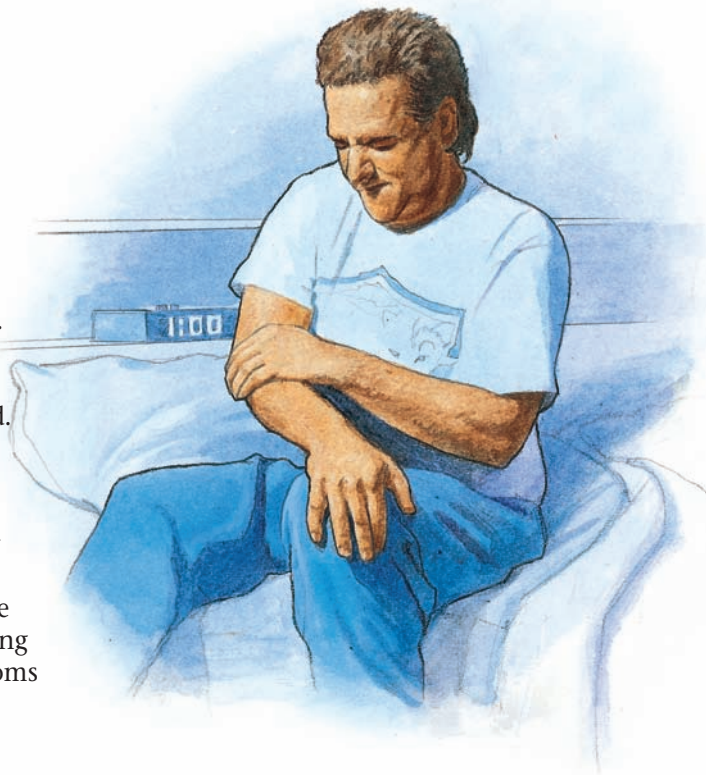
You may already understand the concept of ergonomics. In simple terms, it means improving the fit between your body and an activity. Adjusting a workstation so a small person can better reach materials or machinery is one example of using ergonomic principles. The result is increased comfort and efficiency. But ergonomics isn't just job-related. By applying ergonomic principles, you can make any task—done anywhere—less taxing on your body.

## Why You Should Care

If you don't pay attention to ergonomics, the activities you do today may—over time—lead to a **musculoskeletal disorder**. Commonly called **MSDs**, this group of physical problems usually affects **soft tissues** (muscles, tendons, and nerves) and joints. Although MSDs most frequently affect the back and wrists, your whole body is actually at risk. MSDs can damage fingers, elbows, and shoulders, as well as the neck and arms, and even the legs. Left untreated, an MSD may limit your range of motion or reduce your ability to grip objects.

## Symptoms of an MSD

MSDs often begin with a feeling of discomfort. You may notice swelling or muscle fatigue that doesn't go away with rest. A muscle may ache, as if it's been overused or slightly strained. Some people feel tingling or numbness. You may wake up at night with the sensation of pins and needles, like when you've slept on your arm too long. At first the discomfort may come and go. But with time, symptoms may become constant. Muscle weakness and nerve problems may develop. Fortunately, by applying ergonomic principles, you can reduce symptoms or avoid these problems altogether.



This booklet is not intended as a substitute for your employer's health and safety policies.

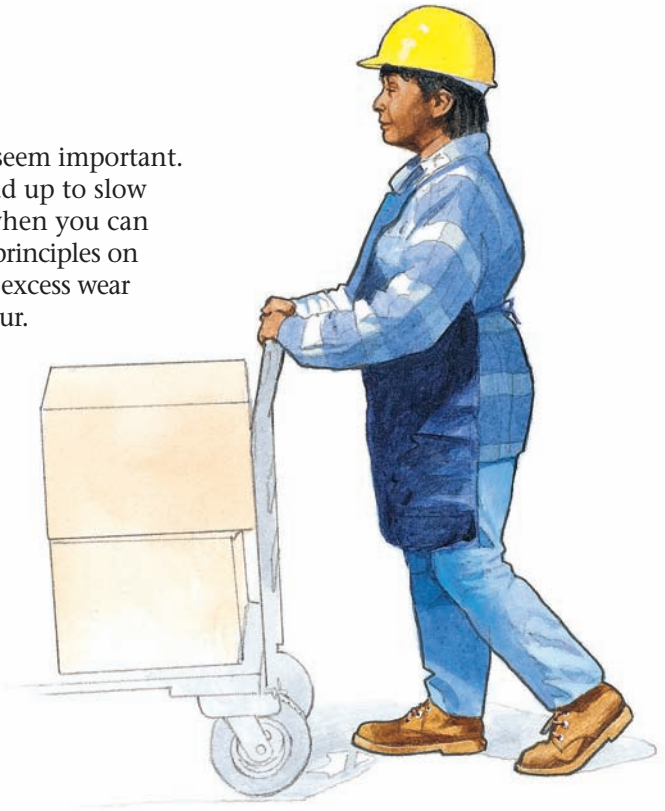
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## Avoiding Problems

If you're feeling fit, ergonomics may not seem important. But, over time, strain and overuse can add up to slow down your body. Why wait for trouble when you can lower your risk today? Apply ergonomic principles on and off the job. By doing so, you'll reduce excess wear and tear, making an MSD less likely to occur.

### At Work

Using ergonomic principles on the job reduces your risk of developing a work-related MSD. A few simple changes are often all it takes. When you work smarter, you stay safer and you feel better at the end of the workday. Make ergonomics a personal priority. By acting now, you may save yourself months of future discomfort and possible time away from work.



### At Home

Apply ergonomic principles to everything you do. Live a little smarter. Don't think of ergonomics only at work. After all, an MSD will limit more than your job abilities. Discomfort intrudes on home life, too. What if you couldn't lift your child or carry a pan from the stove to the table? Even simple, everyday activities—like buttoning a shirt—may be difficult with a full-blown MSD. So remember, if you want to keep feeling fit, treat your body right 24 hours a day.



### By Any Other Name...

According to OSHA (Occupational Health and Safety Administration), musculoskeletal disorders (MSDs) are defined as a group of illnesses associated with ongoing damage to soft tissues. Problems such as these may also be called:

- Repetitive motion injuries (RMIs)
- Repetitive strain injuries (RSIs)
- Cumulative trauma disorders (CTDs)

# Part of a Health and Safety Program

Reducing job-related injuries isn't a new idea. It's part of every health and safety program. If your eyes were in danger of injury, you'd reduce the risk by wearing safety goggles. Controlling your risk of developing an MSD is no different. Once you identify a risk factor, you can use ergonomic principles to control it. By taking responsibility for your health and well-being, you help prevent future injury and control any present symptoms.



## Take Ergonomics Personally

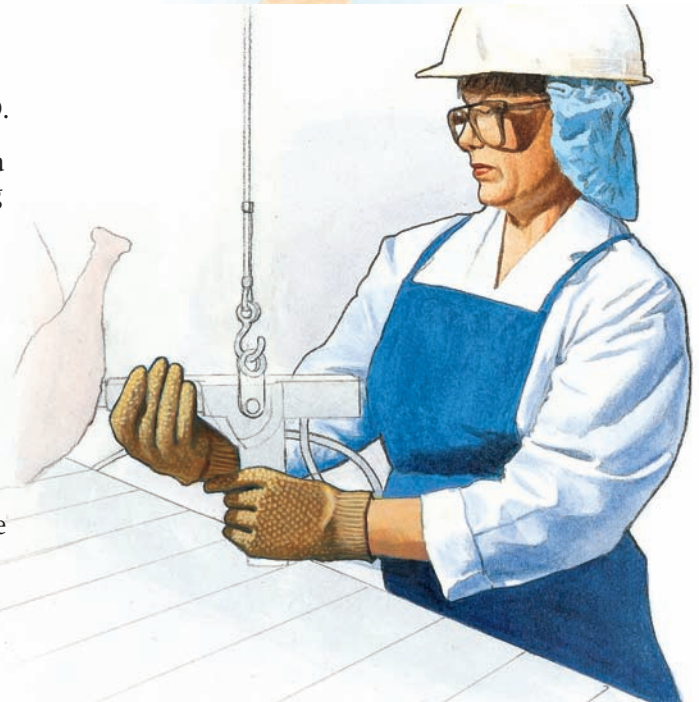
Each person's body deals with risks differently. Five people might do the same exact tasks, but it's possible that only one of them would develop an MSD. What if you're that one? No one can predict. That's why it's important to take responsibility for yourself. Be willing to make changes that reduce *your* risk of injury.



## Plan to Reduce Risks

Controlling your risk of MSDs is like dealing with any other safety hazard. In most cases, you'll get the best results when you tackle the job in an organized way. Talk with your supervisor if you think you're at risk. Then work together to plan a risk-reduction program that includes the four steps listed below.

- **Identify risk factors:** Pinpoint the specific tasks or actions that increase your likelihood of developing an MSD.
- **Assess the level of risk:** How serious a threat is it? This may mean measuring how much contact (**exposure**) you have with risk factors.
- **Reduce the risk:** Work with your supervisor to find ways of stopping or controlling risk factors. You may need to make several changes before your risk really decreases.
- **Monitor the situation:** Be sure the controls are working and your exposure to risk factors is actually reduced.



## Your Role

It takes more than planning to prevent or control MSDs. You've got to be willing to accept new ideas and make changes. Anytime you receive training, put your new knowledge to use. Once you know the proper way to do a job or use a tool, do it right every time. If you're aware, you can spot and control a risk factor before it leads to an injury.

### Identify and Assess Risks

Many people don't know they're at risk for an MSD until they begin having discomfort. This needn't be true for you. Look for any risk factors you're exposed to, then talk with your supervisor. He or she can help determine the level of risk. If you're already noticing MSD symptoms, such as ongoing muscle fatigue or numbness, a medical evaluation may also help assess your risk.

### Reduce Risks

Reducing your risk of an MSD doesn't have to be costly or complicated. In many cases, improving body posture and rearranging your workspace can make a big difference. Be sure to apply these ergonomic principles at home, too. Whether you're carrying groceries or working on a hobby, keeping a safe body position has a lot to do with reducing your risk of injury.

### Monitor and Communicate

Ongoing awareness and communication also play a big role in reducing the risk of MSDs. Don't forget about a problem just because you've made an effort to control it. As time passes, try to notice if your risk truly is being reduced. Also, make sure the control measures aren't causing any new problems that could become risks. And be sure to let your supervisor know how well the controls are working. In some cases, a little fine-tuning may be needed.



*If you share a workstation, you may need to adjust equipment and materials to meet your needs before you can start work. Mark individual settings, such as chair heights, to make this daily process quicker and easier.*

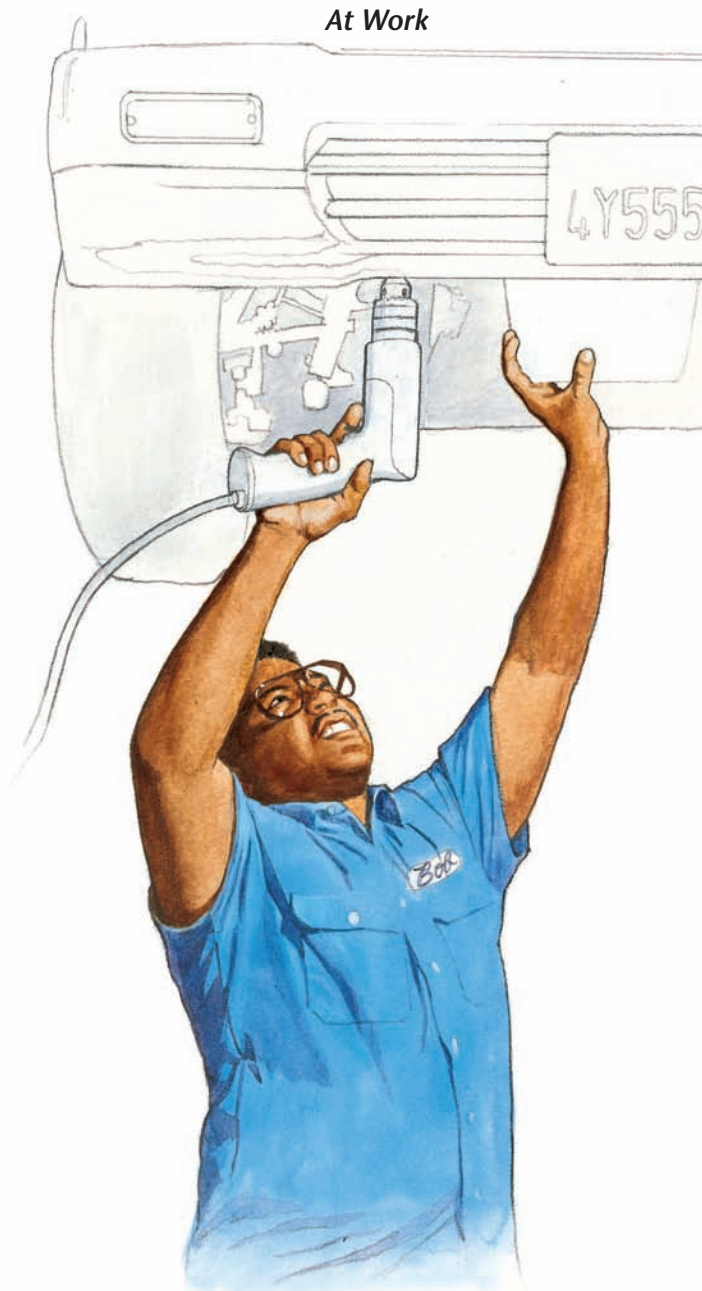
# Identify the Risks

No one can predict who'll get an MSD. In fact, most people never develop one. Even so, you should recognize and reduce any activity-related or personal risk factors. Doing so is the only way to prevent musculoskeletal disorders. If you already have symptoms, knowing your risks is vital. You can't stop a problem unless you identify its cause.

## Activity-Related Risk Factors

The risk factors defined below may be linked with work and home activities. Since each risk factor increases your chances of developing an MSD, think carefully. Are you at risk for any of the following?

- Posture** is a problem when you slouch or when you bend, twist, or reach too far. Awkward postures overwork soft tissues and joints. In addition, any body position can be a risk if it's held so long that muscles tense up and blood flow is reduced (**static posture**).
- Force** is pressure or strain on the body. You create force when you grip or when you pull, push, or lift heavy materials. **Contact force** occurs when you lean or press against a hard surface or sharp edge.
- Repetition** is doing the same task or using the same set of muscles over and over again.
- The environment** is your surroundings, including cold temperatures, vibration, and lighting.
- Duration** is the length of time you are exposed to a risk factor. The longer the exposure, the higher your risk.
- Recovery time** is the amount of time the body needs to rest after performing a repetitive task or being in an awkward posture. Recovery time becomes a risk when the time between activities is *not long enough* to allow the body to recover.



## Two Risks Are Greater than One

The more often you're exposed to a risk factor, the more likely you are to develop an MSD. In addition, your chance of injury greatly increases when risk factors are combined. For example, frequent repetition becomes even riskier when it's combined with excessive force.

### *At Home*



*Exposure to the same risk factors at home and at work increases your chance of developing an MSD.*

## Personal Risk Factors

Some risk factors aren't activity-related. Instead, they are due to your health and general well-being. Many of these risk factors, such as body weight and fitness level, can be controlled. Others—specifically, previous injuries—cannot. These risks are with you for life. And since old injuries sometimes weaken soft tissues, they may multiply the effects of any activity-related risks.

### **Hampered by Poor Health?**

Your body needs good blood flow to work well. When health conditions restrict blood flow, too little oxygen is delivered to your tissues. As a result, muscles and tendons are more easily damaged, and injuries heal more slowly. Some health problems, such as diabetes and tissue damage due to smoking, restrict blood flow by affecting the vessels directly. Other health conditions—hormonal changes and obesity, for example—affect blood flow indirectly. Conditions such as these increase the amount of fluid held in the body. This causes swelling, which places extra strain on your soft tissues. So if you have health problems, do your best to control them.



*If you're out of breath after climbing a few stairs, imagine the strain a full workday puts on your body. When was the last time you felt fit?*

# Reduce Risks: Correct Posture Problems

Standing, sitting, and moving incorrectly all increase your risk of MSDs. Why? Because posture problems overwork your body. They strain your muscles and tendons and stress your joints. With a little adjustment, however, you can correct most posture problems. Whatever you do, try to stay near neutral position and to work within easy reach. Tasks take less force when you work from a stable base.

## Stay Near Neutral

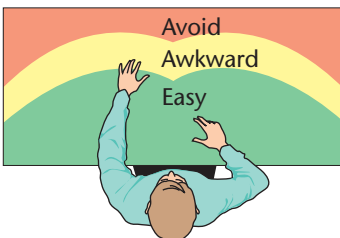
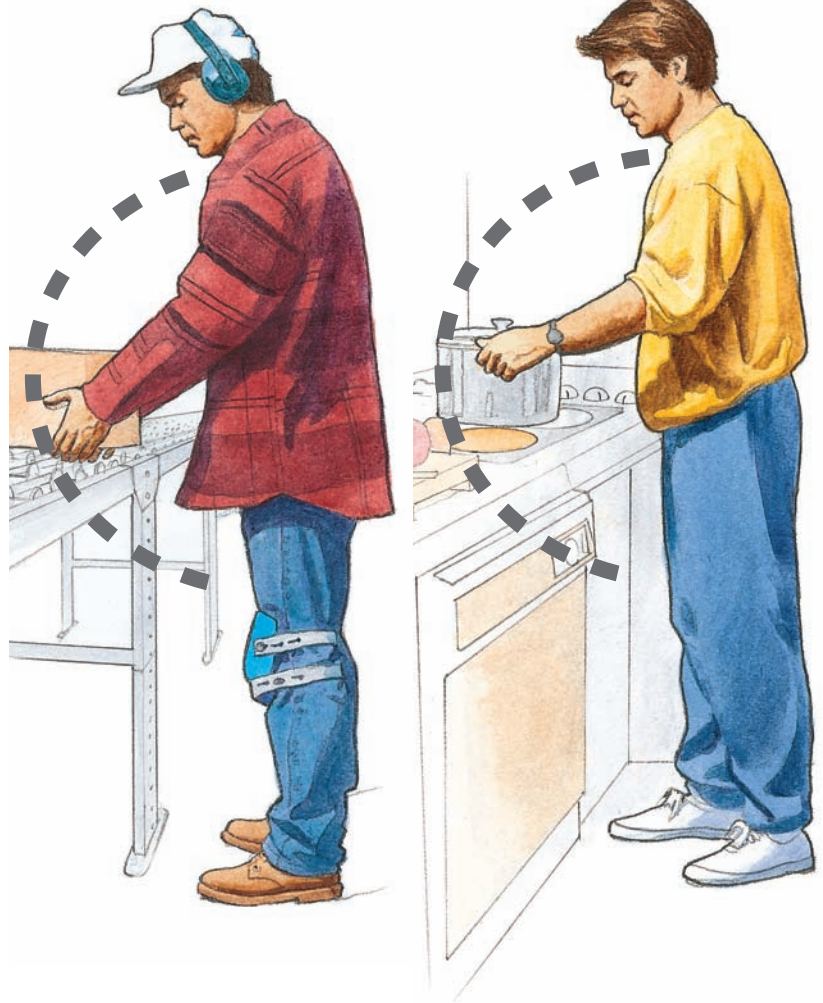
Whether you're standing or sitting, neutral position places the least amount of stress on your body. To find neutral, line up your ears, shoulders, and hips. Keep your head upright and relax while you do this. If you're holding your breath or your shoulders are creeping toward your ears, try again. Your shoulders should be level, with your arms near your sides. You can rest your body by returning to neutral as often as possible.

## Work Within Reach

Keep your work within 14 to 18 inches of your body, depending on your size. Reaching too far can be awkward. It also reduces your muscle power, so you need to use more force. Never lock a joint by extending it until it can't go any farther. Also, avoid reaching overhead or behind your back, if you can. If you can't, return to neutral as soon as possible.

At Work

At Home



**Get close to your work.** You use less force when tasks are done within easy reach. If you're lifting or moving materials, protect your back by keeping the load close to your body.

## A Stable Base

Proper posture reduces strain on soft tissues. When you're in neutral position, your bone structure supports you and provides a stable base to move from. As a result, your movements carry more power, and muscles and tendons don't need to work overtime just to keep you upright. To stay close to neutral, try the tips below.

**Face your work.** If you need to change direction, move your whole body instead of twisting.

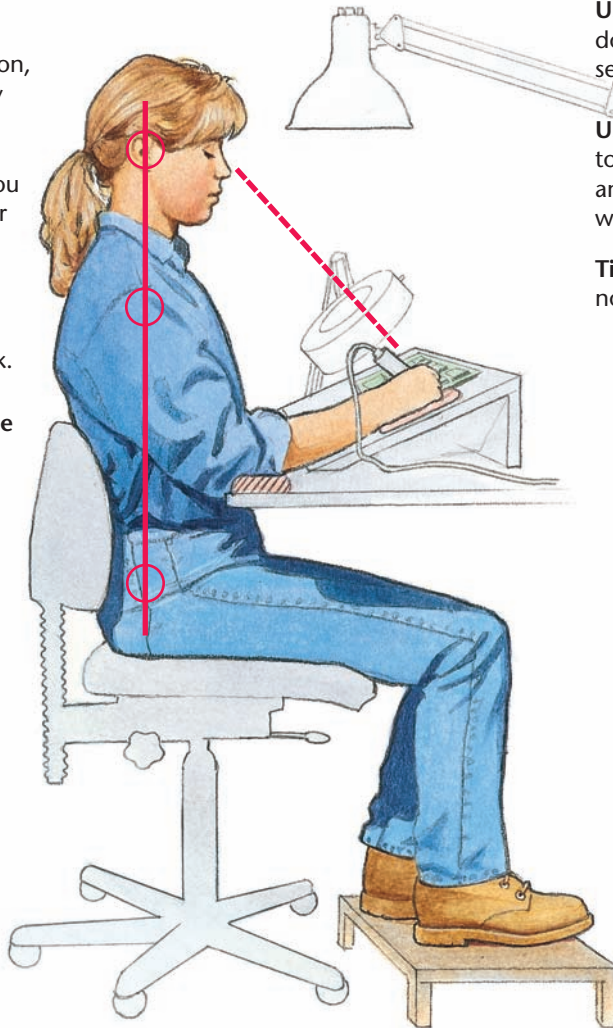
**Position yourself** so you don't have to stretch or slouch to reach your materials. You should be able to move your forearms straight out from your body to work.

**Grasp with your whole hand** instead of with just your fingers.

**When seated, keep your feet flat** on the floor or on a foot support. When standing, put a foot up on a ledge or stool to take pressure off your back.

**Clear away clutter** between you and your work.

**Wait for items** on an assembly line to reach you. Don't stretch to meet them.

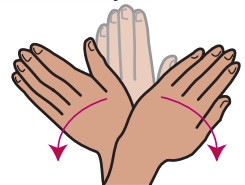


**Use task lighting** so you don't have to lean over to see your work.

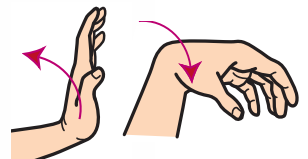
**Use a magnifying device** to protect both your eyes and your posture if you work with small items.

**Tilt the angle of your work,** not your head and neck.

**Keep your wrists straight** whenever you can.



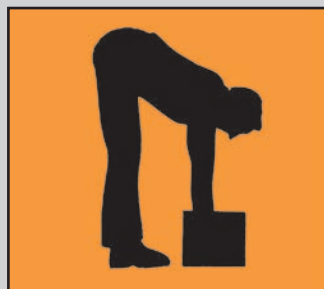
**Avoid twisting** your wrists too far to either side.



**Avoid bending** your wrists too far up or down.

## Test Yourself

Look closely at the pictures shown here. Then think about the information you've read on these pages. Which of these two positions is correct? What could be done to improve the situation that is incorrect?



# Reduce Risks: Rearrange Your Workstation

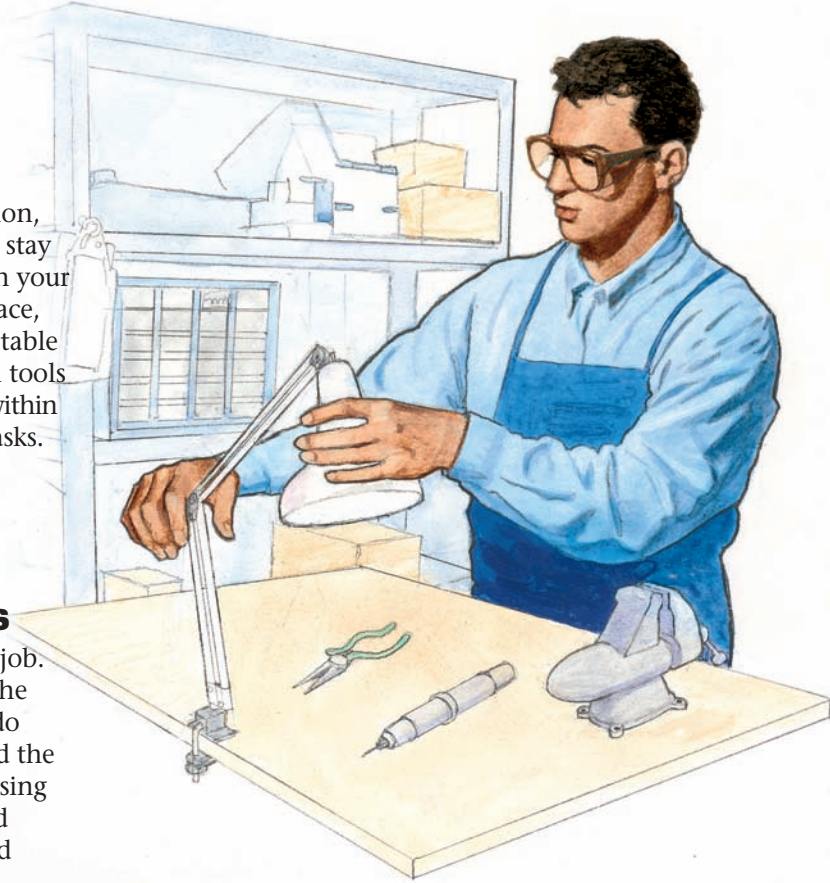
You'll probably find that improving your posture requires adjusting your work area as well as your body position. This is because the way you do a task is affected by where you do it and the tools you use. After all, this is what ergonomics is all about.

## Organize Your Work Area

Once you've found neutral position, set your work area up to help you stay aligned. Direct lighting to shine on your tasks. Raise or lower the work surface, so your movements are as comfortable and powerful as possible. Position tools and materials you use most often within easy reach. And think about your tasks. You can reduce wasted motion by placing incoming and outgoing work in order.

## Pick the Right Tools

Use the tool that's correct for the job. This reduces force and, possibly, the number of repetitions needed to do the task. Tool handles should extend the length of your hand to avoid pressing into your palm. Keep tools in good repair. The work may go faster and you'll probably use less force.



## Prepare for the Environment

When work conditions are less than ideal, be prepared. Wear personal protective equipment to reduce the effects of drafts or cold temperatures. Reduce your risk of vibration by using low-vibration tools or by padding tools with vibration-absorbing materials. Dampening mats, cushions, gloves, and shock-absorbing shoes also help.

*By taking control of your work area and tools, you can reduce your risk of developing an MSD.*



## A Successful Setup

Whenever you can, make choices that reduce your risk of MSDs. You probably can't use every tip offered here, but do your best to find a few that work for your situation. If you can control an identified risk factor, you've been successful. Remember: Anytime you reduce your risk, you lessen your likelihood of injury.

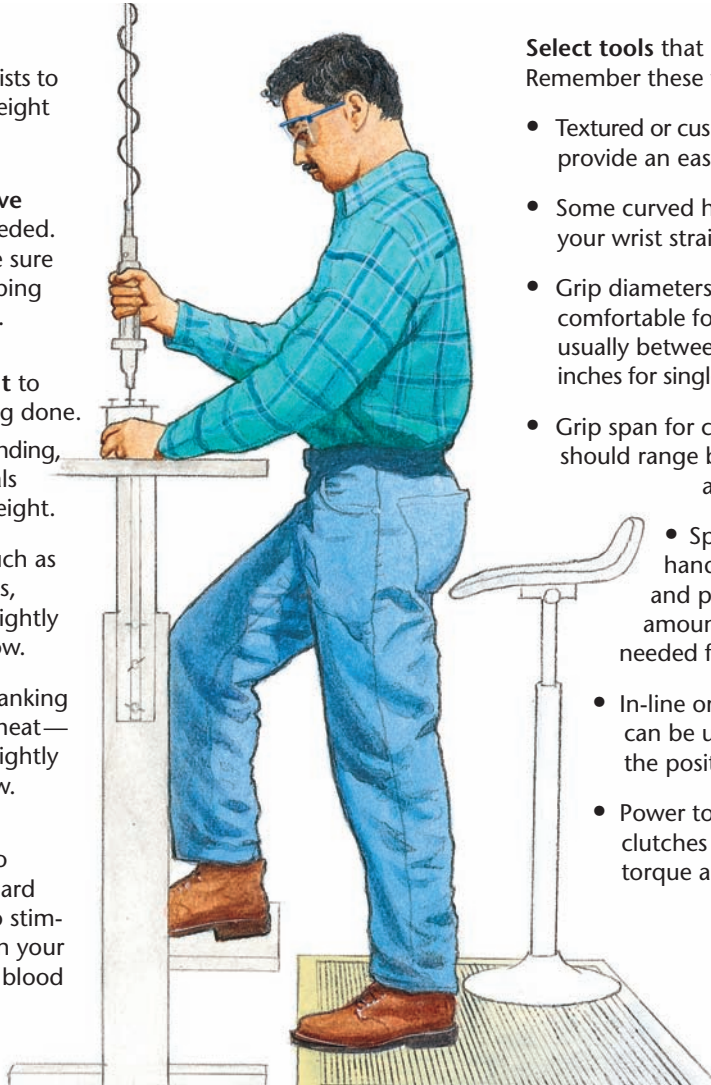
**Use tools with counter-balances or overhead assists** to reduce the amount of weight your body must support.

**Wear personal protective equipment** when it's needed. If you need gloves, make sure they fit properly, so gripping isn't made more difficult.

**Adjust your work height** to suit the type of task being done.

- For general tasks—grinding, for example—materials should be at elbow height.
- For precision work, such as assembling small parts, materials should be slightly higher than your elbow.
- For forceful tasks—cranking a wrench or cutting meat—materials should be slightly lower than your elbow.

**Use anti-fatigue mats** to cushion your feet from hard surfaces. These mats also stimulate small movements in your foot muscles, improving blood flow through your feet.



**Select tools** that make the job easier. Remember these tips:

- Textured or cushioned handles provide an easier grip.
- Some curved handles help keep your wrist straight.
- Grip diameters should be comfortable for your hand, usually between 1.25 and 2 inches for single-handed tools.
- Grip span for cutters or pliers should range between 2.5 and 3.5 inches.
- Spring-loaded handles on cutters and pliers reduce the amount of force that's needed for use.
- In-line or pistol-grip tools can be used, depending on the position of the work.
- Power tools with adjustable clutches help prevent high torque and sharp kickback.

## Test Yourself

Look closely at the pictures shown here. Then think about the information you've read on these pages. Which of these two positions is correct? What could be done to improve the situation that is incorrect?



# Reduce Risks: Take Good Habits Home

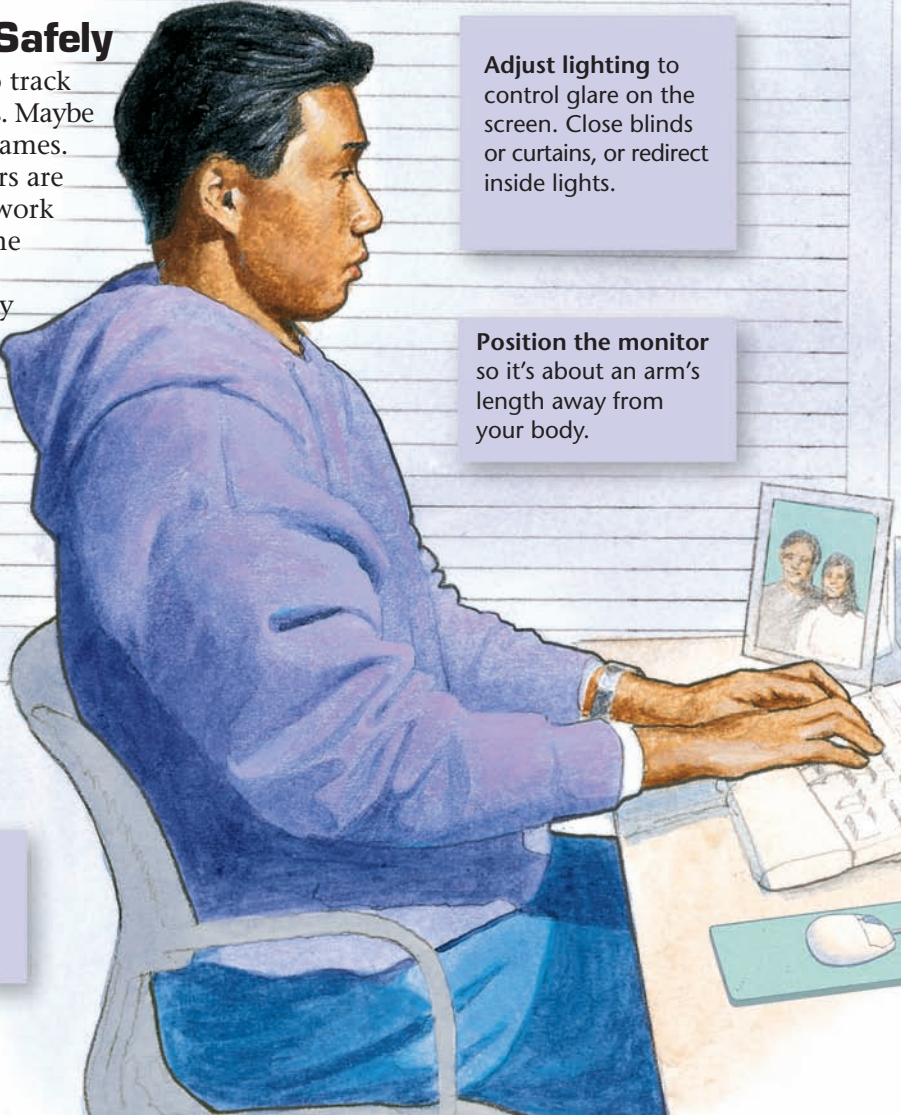
Reducing your risk of job-related injuries is important. But don't stop using ergonomic principles just because your workday is over. Activity-related risk factors may be present with anything you do. Have you considered your posture when you're working at a home computer? How about when you watch TV? Anytime you're not near neutral position, you may be straining muscles or joints. And don't forget your personal risks. Your health and habits follow you everywhere.

## Be Aware

Whether you're driving in traffic or mowing the lawn, look out for activity-related risk factors. Posture, force, repetition, environment, duration, and recovery time—these risk factors will follow you home. So take good habits home, too. No matter what you're doing, work within reach. Also, don't forget to pick the best tools for the job. This may mean using an electric mixer instead of a wooden spoon, or standing on a stepladder instead of overreaching.

## Use Computers Safely

You may use a computer to track bills or to inventory supplies. Maybe you like to play computer games. For many people, computers are part of daily life—both at work and at home. But when time on a keyboard starts to add up, your risk of an MSD may rise, too. Protect yourself by setting up your equipment to fit your body. Whether you sit or stand at the computer, follow these tips to reduce your risk of developing an MSD.



**Adjust lighting** to control glare on the screen. Close blinds or curtains, or redirect inside lights.

**Position the monitor** so it's about an arm's length away from your body.

**Stay near neutral position** whether you sit or stand at the computer.

## Support Your Body

The cause of excess wear and tear isn't always obvious. Just sitting on a sagging sofa every evening may be enough to strain your back. Save yourself the discomfort that comes from acting without thinking. Always support your body so you're comfortable. If a couch or chair doesn't provide good support, place a rolled-up towel or a small pillow in the curve of your low back. And don't forget to rest your feet. Raise them above heart level to reduce swelling and leg fatigue. Also, use a bed that is firm, yet has enough cushion to absorb your back's natural curves. If possible, avoid twisting your wrists while you sleep.



**Adjust the screen** so the top of the monitor is near eye level.

**Raise or lower the keyboard** so your wrists are straight when your fingers are on the middle row.

## Living Healthier

Lifestyle choices affect your health, and they're under your control. Take a look at the choices you make. Living healthier may mean making a few changes.

### Eat Right and Exercise

When you eat balanced meals, the food fuels your body. You stay healthier, and injuries heal faster. Good food choices include plenty of fruits and vegetables, low-fat dairy products, grains, and lean meats. When you're well fueled, exercise is easier. You're more likely to take a walk or climb the stairs. This, in turn, helps tone your muscles and gets your blood moving, making an MSD less likely. Besides, you'll feel better.



*Do things you enjoy. Play ball. Walk the dog. Exercise doesn't have to hurt to do you some good. Even moderate activity for a total of only 30 minutes each day brings health benefits.*

### Control Health Risks

If necessary, find support to help you make difficult changes. Programs abound to help people lose excess weight, stop smoking, or stop abusing alcohol or drugs. If you have an ongoing health condition, do your best to keep it under control. Keep doctor's appointments, follow medical orders, and take any medication only as directed.

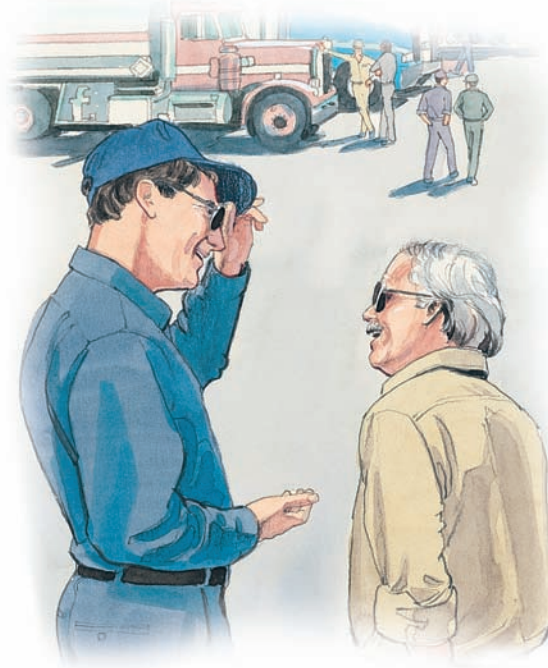
# Communication Counts

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When it comes to applying ergonomic principles on the job, don't feel foolish about asking for help. If you're at risk for an MSD or if you're already noticing symptoms, don't just "grin and bear it." Talk with your supervisor. Can the risk be controlled? Maybe a coworker has a suggestion. If you need a medical evaluation, be sure to answer your healthcare professional's questions fully.

## Share Concerns with Your Supervisor

If you think your job puts you at risk for an MSD, let your supervisor know. Think through your tasks, and be specific about identifying risk factors. If you know a way to reduce your risk, suggest your idea. You may already have tried a makeshift control measure that works—wrapping a tool handle with tape to improve the grip, for example. By sharing concerns with your supervisor, you can work together to find a better way of getting the job done.



## Exchange Ideas with Coworkers

Do you share a workstation, or are you part of a group of employees doing the same job? If so, your coworkers may also be aware of MSD risks. Exchanging ideas about work flow, tools, and equipment may be helpful. Perhaps you can find a way of rotating tasks throughout the shift. Using different muscle groups is one of the best ways to reduce repetition and duration.

## Be Honest with Healthcare Professionals

If you have a medical evaluation for a possible MSD, tell your healthcare professional all you know about your condition. Some soft tissue problems are hard to pinpoint, so your comments may prove helpful. Be specific about symptoms. Do you feel discomfort all the time or only during movement? Explain when you first noticed the problem and whether you've injured this area before. Also, be sure to mention any activity, such as a home hobby, that may make symptoms worse. In fact, you may want to write down your thoughts ahead of time. This way, you won't forget important points during the visit.



# Quiz

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Name: \_\_\_\_\_

Dept.: \_\_\_\_\_

Date: \_\_\_\_\_

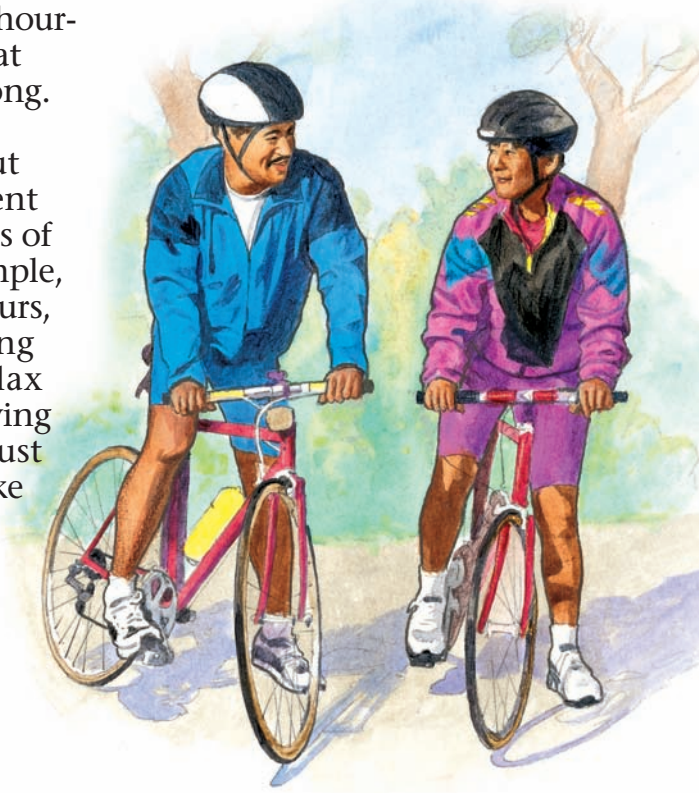
Take this short quiz to find out how much you know about ergonomics and MSDs. Select the one best answer for each question.

- T**      **F**
1. Ergonomic principles are intended to improve the fit between a worker and an activity.
2. Ergonomics is a topic that's important only in the workplace.
3. An MSD may cause numbness and tingling in the affected body part.
4. Cumulative trauma usually damages soft tissues, such as muscles and tendons.
5. If you have an MSD risk factor, you'll always get an MSD.
6. MSD risk factors are all activity-related.
7. Reducing risk factors always involves spending a lot of money.
8. Proper posture includes the positioning of your entire body.
9. Frequent stretching overhead to reach materials is okay as long as you don't twist your body.
10. Your overall health may affect your risk of MSDs.
11. MSD risk factors include:
- a. long duration.
  - b. too short a recovery time.
  - c. frequent force.
  - d. all of the above.
12. Your body can be stressed by:
- a. vibration.
  - b. cold.
  - c. bad lighting.
  - d. all of the above.
13. Neutral position is:
- a. the position that places the least amount of stress on the body.
  - b. the most difficult position for the body to hold.
  - c. a safe position that protects only the back.
  - d. the only position you can work in.
14. You're at risk for an MSD if you:
- a. keep repeating a forceful task.
  - b. use hand tools once a year.
  - c. rest between repetitive tasks.
  - d. none of the above.



# Make Ergonomics Part of Your Life

Reducing your risk of MSDs is a 24-hour-a-day job. You've got to watch what you do and how you do it all day long. If possible, vary your tasks to use different muscle groups throughout the day. Alternating among different types of activities gives stressed areas of your body time to recover. For example, if you do fine precision work for hours, don't switch directly to letter writing or model building. Bike, walk, or relax with family or friends instead. Varying tasks is simple and smart, and it's just one of the many ways you can make ergonomics part of your life.



## Quiz Answers

1. True. 2. False—Ergonomics relates to everything you do, both at work and at home. 3. True. 4. True.  
5. False—Most people at risk for developing MSDs never have a problem. 6. False—You may have a personal risk factor, such as pregnancy or a health condition. 7. False—Many risk factors can be reduced just by correcting posture or rearranging materials. 8. True. 9. False—Frequent overreaching in any direction is a risk in itself. 10. True.  
11. D. 12. D. 13. A. 14. A.

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