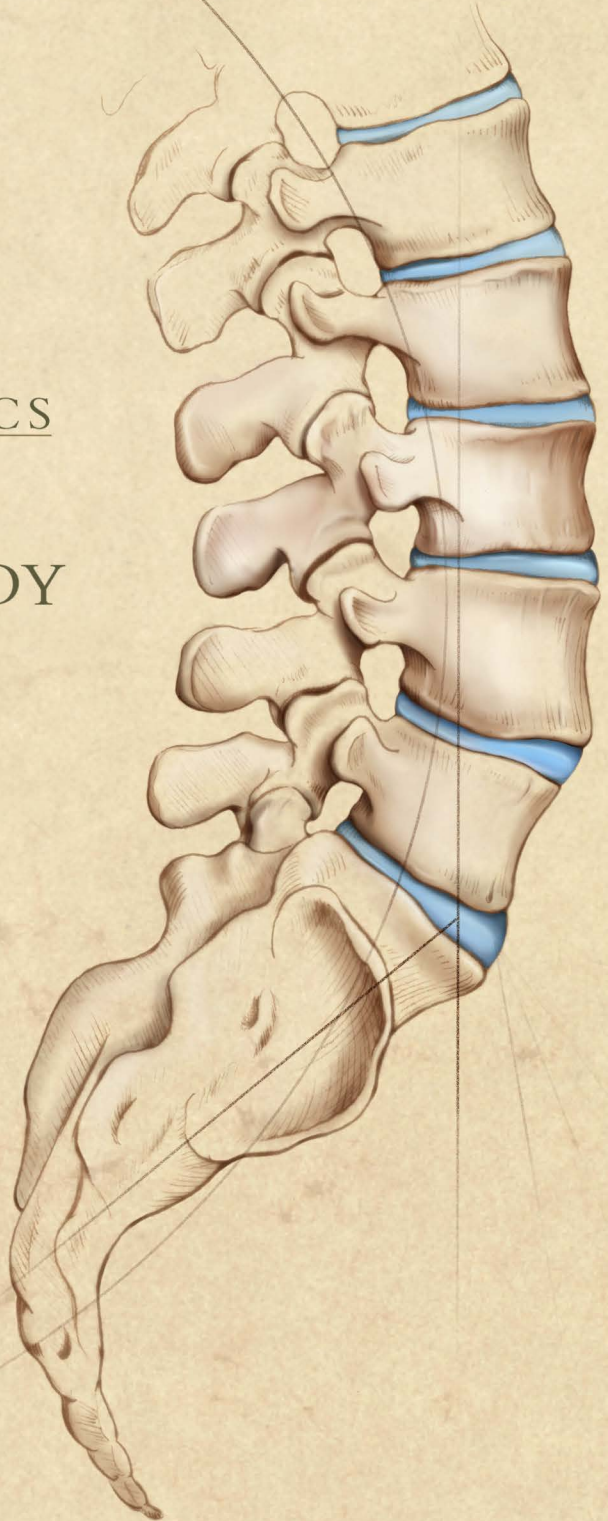


ERGONOMICS

*Good for*  
**EVERYBODY**

Department of Health  
and Human Services  
National Institutes of Health



*Division of Occupational Health and Safety, OHS*

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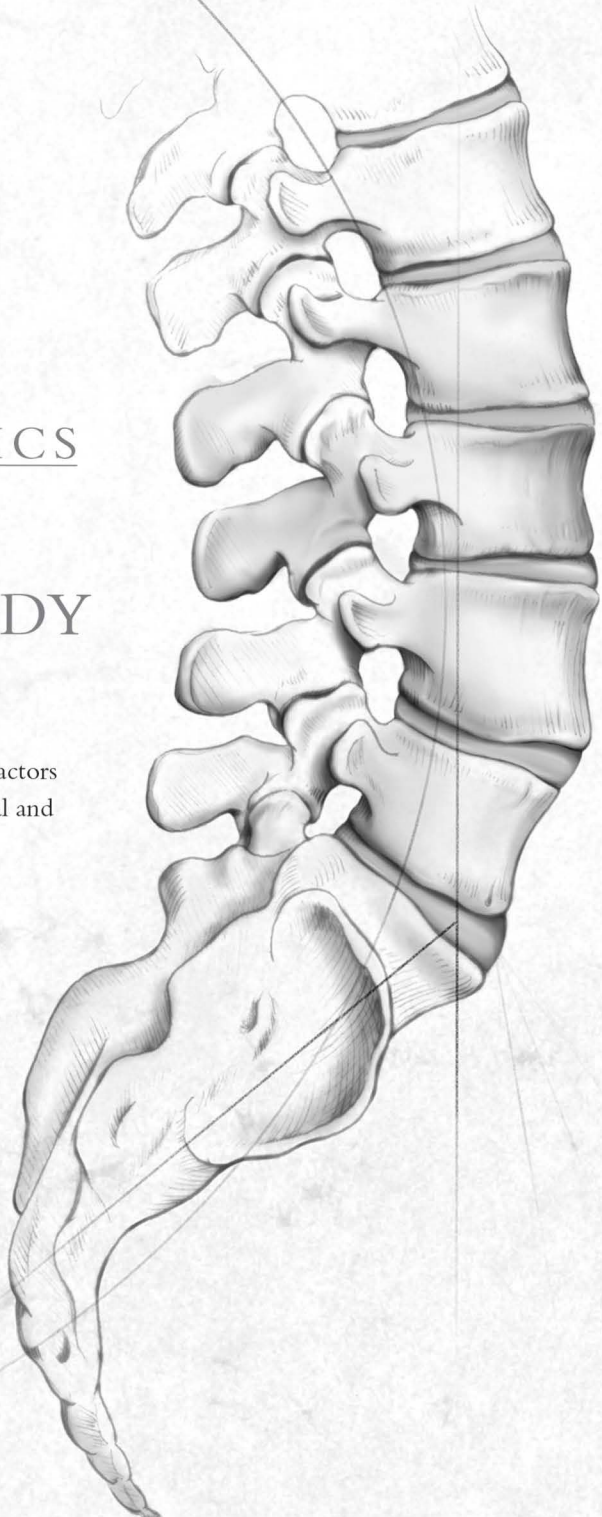
# ERGONOMICS

## *Good for* EVERYBODY

Preventing Ergonomic Risk Factors  
in Office, Laboratory, Industrial and  
Healthcare Settings.

- Tips For Correcting
- Common Laboratory
  - Computer Workstation
  - Lifting Issues

May 2015



## Laboratory Workstation

*Laboratory researchers are at risk for repetitive stress injuries during routine laboratory procedures such as pipetting or working at microscopes. Research has shown that appropriate posture at your workstation can help prevent a variety of ergonomic type conditions such as tendonitis and carpal tunnel syndrome.*

### *Using a Microscope*

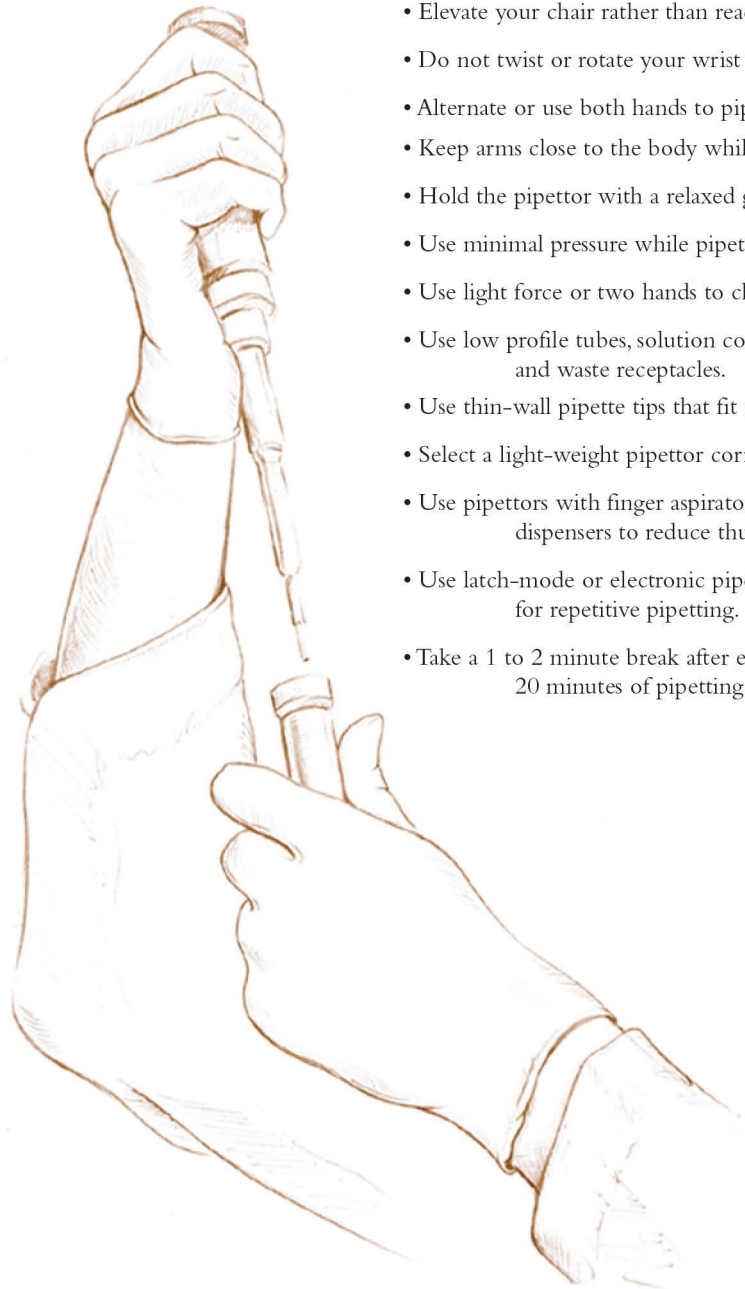
- Use a non-porous, easy to clean chair that provides good back support.
- Sit close to your work surface.
- Remove false fronts and supplies from under the bench work area.
- Avoid leaning on hard edges.
- Pad forearms and edges of tables and workstations.
- Keep elbows close by the side of your body.
- Work with wrists in straight, neutral positions.
- Adjust your chair, workbench, or microscope as needed to maintain an upright head position.
- Elevate, tilt or move the microscope close to the edge of the counter to avoid bending your neck.
- Use adjustable eye-pieces or mount your microscope on a 30 degree angle stand for easier viewing.
- Keep microscopes repaired and clean.
- Spread microscope work throughout the day and between several people, if possible.
- Take breaks. Every 30 minutes, close your eyes or focus on something in the distance.

### *Biological Safety Cabinets, Chemical Fume Hoods and Workbenches*

- Remove drawers and supplies from under the work area.
- Use anti-fatigue floor mats if standing for long periods.
- Use a chair that provides adequate back support, adjustable seat angle, and height adjustability between 28 inches to 33 inches. Use footrests and foot rings for leg support.
- Avoid resting your forearms on hard edges.
- Pad forearms, elbows or hard edges of the work benches and cabinets. (Avoid interference with air flow.)
- Position work supplies as close to you as possible.
- Place equipment on approved turntables designed for laboratory use, for easy retrieval.
- Take short breaks to stretch muscles and relieve forearm and wrist pressure.

## *Pipetting*

- Use anti-fatigue floor mats or shoe insoles if standing for long periods.
- Sit supported against the backrest of your chair.
- Sit or stand close to your work at bench cut outs.
- Adjust your chair to proper work height rather than jutting out your chin or bending your neck down when working.
- Elevate your chair rather than reaching up to pipette.
- Do not twist or rotate your wrist while pipetting.
- Alternate or use both hands to pipette.
- Keep arms close to the body while pipetting.
- Hold the pipettor with a relaxed grip.
- Use minimal pressure while pipetting.
- Use light force or two hands to change tips
- Use low profile tubes, solution containers and waste receptacles.
- Use thin-wall pipette tips that fit correctly and are easy to eject.
- Select a light-weight pipettor correctly sized for your hand.
- Use pipettors with finger aspirators and thumb dispensers to reduce thumb strain.
- Use latch-mode or electronic pipettors for repetitive pipetting.
- Take a 1 to 2 minute break after every 20 minutes of pipetting.



# Computer Workstation

*Ergonomic injuries are rapidly increasing as people spend more time at the computer. Research has shown that appropriate posture at your workstation can help prevent a variety of conditions such as back pain and carpal tunnel syndrome*

## *Seating*

### **Adjust the Chair Height**

Start with your seat at the highest setting and then adjust downward until your legs and feet feel comfortable.

### **Sit Back in the Chair**

Use as much of the chair back as possible for support. Adjust lumbar support to provide comfortable lower back support.

### **Adjust the Seat Pan**

Adjust the seat pan to reach a comfortable position. The seat pan should extend about an inch on both sides of your legs, and should not apply pressure to the back of your knees.

### **Adjust the Armrests**

Adjust the height, width, and position of your armrests to one most comfortable for how you work. Consider lowering or swinging the armrests out of the way when not in use so as to not inhibit your movement.

### **Clear Obstacles**

Make sure that the chair's casters (wheels) move smoothly, and that nothing obstructs your ability to position the chair in front of your desk and computer.

- \* If you are purchasing a new office chair, consider only those with full adjustability. Refer to the Ergonomic Equipment list on the DOHS website

<http://go.usa.gov/3BwmA>

## *Keyboard and Mouse*

The following adjustments should be made to your workstation to help prevent the development of an ergonomic problem in the upper extremities:

- Adjust keyboard height so shoulders can relax and arms are allowed to rest at sides (an adjustable keyboard tray is often necessary to accommodate proper height and distance).
- Keyboard should be close to the user to avoid excessive extended reaching.
- Forearms should be parallel to the floor (approximately 90 degree angle at elbow).
- The mouse should be placed adjacent to keyboard and at the same height as the keyboard (use articulating keyboard tray if necessary).

## *Monitor/ Document Holder/Telephone*

### **Center the Monitor**

The monitor should be placed directly in front of you to eliminate twisting your neck.

### **Position the Monitor at Eye Height**

Position the top of the monitor approximately at seated eye level. (If you wear bifocals, lower the monitor to a comfortable reading level.)

### **Sit at a Proper Distance**

Position the monitor so that it is at an arm's length away from the body.

### **Reduce Glare by Careful Positioning of the Computer Screen**

Place screen at right angles to windows and adjust curtains or blinds as needed  
Use a glare screen when necessary.

### **Position reading documents directly in front of you**

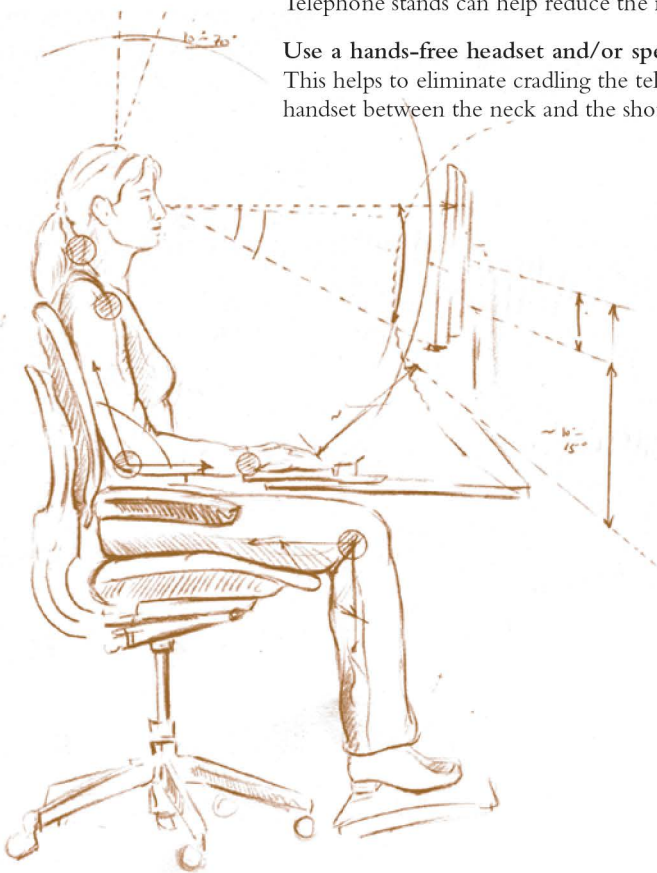
Documents should be placed between the monitor and the keyboard, using an in-line copy stand.

### **Place your telephone within easy reach**

Telephone stands can help reduce the need to reach.

### **Use a hands-free headset and/or speaker phone**

This helps to eliminate cradling the telephone handset between the neck and the shoulders.



## Ergonomic Lifting

*Back pain, such as from heavy lifting, is one of the most common work-related injuries. Applying ergonomic principals - the study of the workplace as it relates to the worker - can help prevent work-related back pain and back injury and help to maintain a healthy back*

### *Know How to Protect Your Back When Lifting Anything*

#### **Maintain the Natural Curves in Your Back.**

These curves provide strength and support for your back. This is especially important when lifting or when sitting for long periods.

#### **Tighten Your Stomach Muscles Before You Lift.**

They help support and stabilize your back when you lift.

#### **Plan Ahead Before Lifting.**

Test the weight first. Many injuries result from poor planning and overexertion.

#### **Keep Objects Close.**

A 10 pound bag of groceries can put 100 pounds of pressure on your lower back. Holding things away from your body greatly increases this pressure.

#### **Pivot with Your Feet When Lifting and Moving Objects.**

Turn your whole body instead of twisting your back - especially if you are holding something heavy. Your nose should always be in-line with your toes.

#### **Stay in Good Shape.**

Exercise. Do daily stretches and watch your weight. Extra weight, muscle weakness, or muscle imbalances due to tightness, can affect your posture and result in back discomfort or pain.

### *Patient Care Ergonomics*

Assisting another individual in a change of position requires proper body mechanics on your part. Proper body mechanics (positioning) will make your job easier to perform and reduce the risk of injury. Proper body mechanics requires that the natural curves of the spine are maintained in proper alignment.

To do this successfully...

- Bend your knees to get up and down.
- Keep the object close to the body in order to minimize forces on your body.
- Pivot don't twist.
- Don't try to do more than you can handle. Respect your limits.
- Use patient lifting equipment as much as possible.
- Use the buddy system when lifting



## *Industrial and Shop Ergonomics*

Lifting is strenuous - it requires proper training and technique. By lifting with your large, strong leg muscles instead of the small muscles of the back, you can prevent back injuries and reduce low back pain. There are five steps to follow when lifting an object:

- **Get Close To The Load**

Get as close to the load as possible - as if you're hugging the object. Having the object close to your body put less stress on your low back.

- **Maintain the Curves in Your Back.**

Keep yourself in an upright position while squatting to pick up

- **Tighten Your Stomach Muscles**

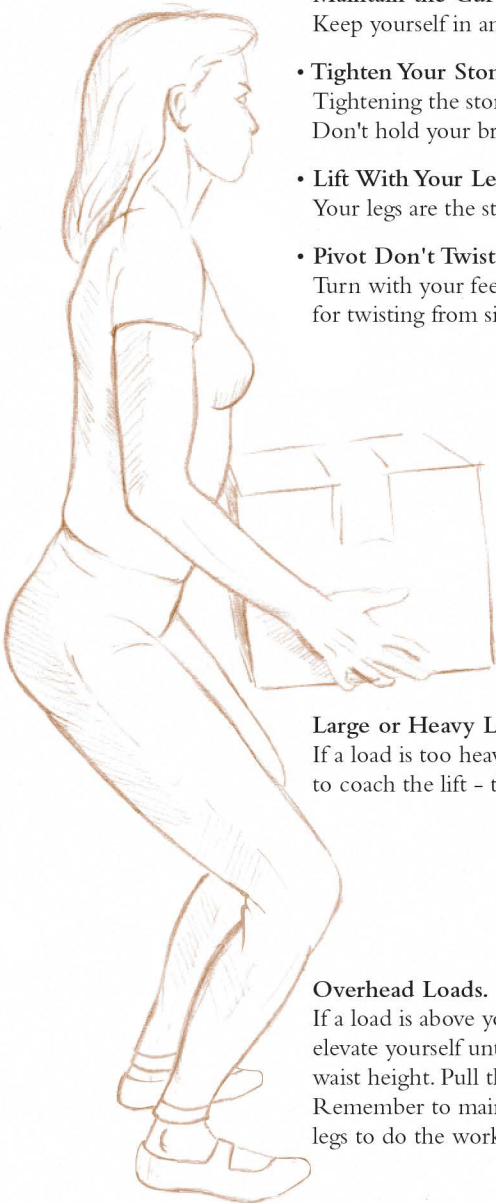
Tightening the stomach helps support the spine. Don't hold your breath while tightening the muscles.

- **Lift With Your Legs**

Your legs are the strongest muscles in your body - so use them.

- **Pivot Don't Twist**

Turn with your feet, not your back. It isn't built for twisting from side to side.



### **Large or Heavy Loads.**

If a load is too heavy to lift alone, ask for help. Pick one person to coach the lift - this way you lift and lower at the same time.

### **Overhead Loads.**

If a load is above your shoulders, use a step stool to elevate yourself until the load is at least chest level - preferably waist height. Pull the object close to your body and then lift. Remember to maintain your curves - use your arms and legs to do the work.

## Rest Breaks/ Exercise Tips

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Take short 1–2 minute stretch breaks every 20–30 minutes. Use these rest breaks to perform a few office exercises.

### Eye Exercises

- Blinking (produces tears to help moisten and lubricate the eyes)
- Expose eyes to natural light
- Follow the 20-20-20 Rule. Refocus eyes on an object that is 20 feet away, for 20 seconds, every 20 minutes.

### Neck Exercises

Tilt head to one side (ear towards shoulder) hold for 15 seconds, and repeat 3 times on each side.

### Shoulder Exercises

Slowly bring shoulders up to the ears and hold for approximately 3 seconds, rotate shoulders back and down repeat 10 times

### Hand/Forearm Exercises

Massage the inside and outside of the hand using the thumb and fingers; repeat frequently (including before beginning work). Hold arm straight out in front of you, pull the hand backwards with the other hand, then pull downward, hold for 20 seconds, 3 times each.

### Back Exercise

Sit in a chair. Reach across body and grab the back of the chair. Pull gently to increase the stretch in the middle of your back. Hold 5-10 seconds. Repeat reaching to opposite side.



**To Learn More**

To learn more about the NIH Ergonomics Program, visit the website at:

**<http://go.usa.gov/3BwmA>**

**Reporting Ergonomic Injuries**

As with any injury, it is important that you report your symptoms at the first sign of discomfort to your supervisor and Occupational Medical Service. Failure to get medical assistance can lead to even further discomfort, lost work days, or even permanent disability. Contact Occupational Medical Service at Building 10, Room 6C306 at 301 496-4411

**DOHS Provides at No Cost the Following Services:**

- An ergonomic evaluation of the employee's workstation or work area
- On-site Ergonomic Training Classes

To schedule an ergonomic evaluation or presentation, call 301 496-3353 or 301.496.3457.



**National Institutes of Health**  
Division of Occupational Health and Safety

