

# COMPUTER WORKSTATION ERGONOMICS

June 12, 2014

*Wellness Lunch and Learn*

University of Wisconsin-Green Bay

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UNIVERSITY of WISCONSIN  
GREEN BAY

# WHAT IS ERGONOMICS?

**Ergonomics: arranging and adjusting the work environment to fit the employee's body**

- Fitting the job to the person who works in it

## *GOAL OF ERGONOMICS*

- Finding ways to prevent musculoskeletal disorders (muscle & joint injuries) by surveying the workplace and taking preventive actions and/or addressing problems



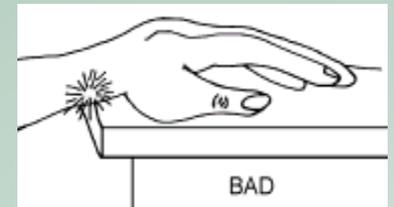
# GOALS OF THIS SESSION

- Identify ergonomic risk factors in the office that can cause musculoskeletal disorders
- Provide information so you can reduce or eliminate risk factors at your workstation that can lead to musculoskeletal disorders:
  - How to arrange your workstation
  - Self-assessment
  - Go over some office exercises



# OCCUPATIONAL RISK FACTORS...

- **Awkward or Sustained Postures** - reaching, twisting, bending, holding fixed positions
  - *Static postures*
- **Forceful Exertions** - amount of physical effort required to complete task
- **Contact Stress** – continuous contact between a hard object and soft tissues
- **Repetition** – task or series of motions performed over & over





# EXAMPLES



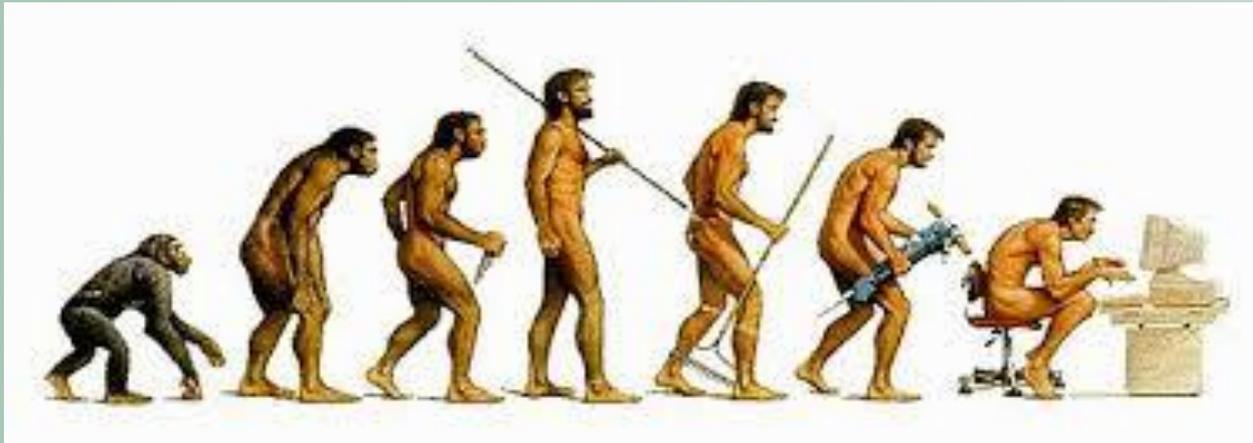
Repetition

- Working in awkward postures like this
- Prolonged sitting and standing
- Working overhead
- Using a computer keyboard for several hours/day
- Driving for extended periods of time
- Heavy lifting
- Improper workstation arrangement
- Lifting in combination with twisting
- Pushing, pulling, carrying
- Resting wrists on desk edges for extended time

Awkward postures



# SITTING DISEASE



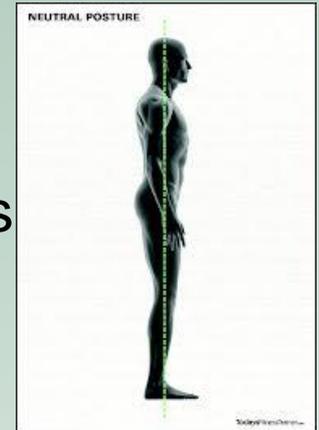
# SITTING VS. STANDING



# A FEW ERGONOMIC GUIDELINES:

## 1. Work in neutral positions

- Maintain s-curve of the spine
- Keep the neck aligned
- Keep elbows at sides & shoulders relaxed
- Keep wrists neutral - keep hand in same plane as forearm

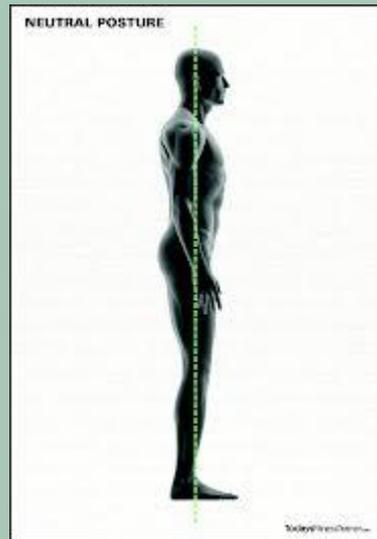


2. Work activities should permit worker to adopt several different healthy and safe postures

3. Avoid static positions for prolonged time



# NEUTRAL POSTURE



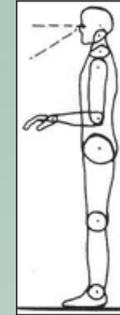
- Fingers: curved
- Wrists: neutral
- Forearm: not rotated
- Elbows: at sides @  $\sim 90^{\circ}$
- Upper arm: relaxed at sides
- Shoulders: relaxed
- Neck: aligned
- Back: S-curve of spine
- Lower body



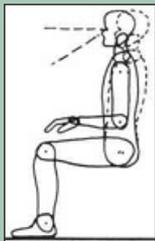
# GOOD WORKING POSITIONS



**Reclined sitting posture:** torso and neck are straight and recline between 105 and 120 degrees from the thighs



**Standing posture:** legs, torso, neck and head are approximately in-line and vertical



**Upright sitting posture:** torso and neck are approximately vertical and in-line, thighs are approximately horizontal and lower legs are vertical.

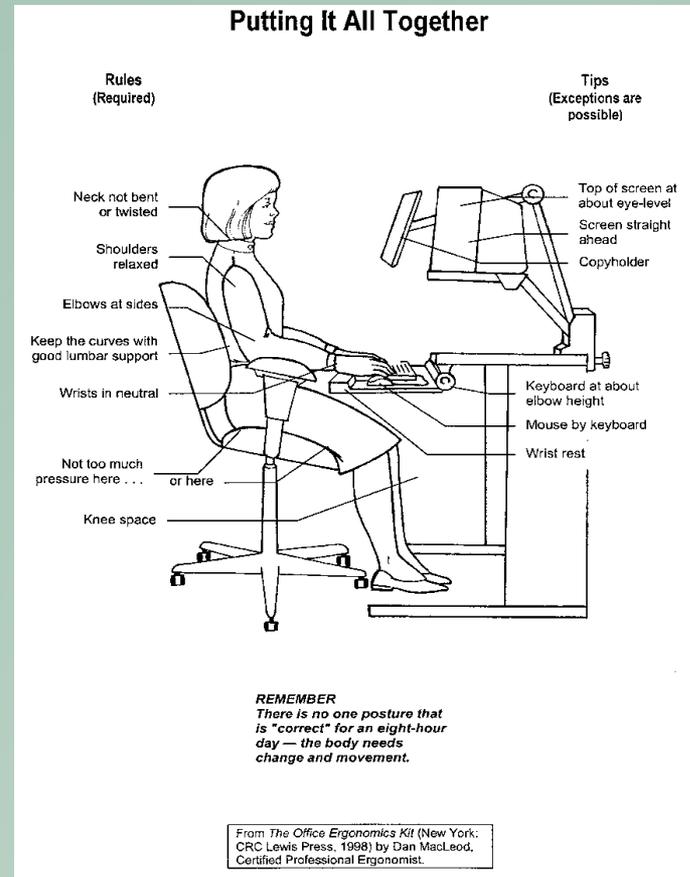


**Declined sitting posture:** thighs are inclined with the buttocks higher than the knee and the angle between thighs and torso is greater than 90 degrees; torso is vertical or slightly reclined and legs are vertical



# COMPONENTS OF A WORK STATION

- Chair
- Monitor
- Keyboard/Mouse
- Work surface
- Phone/Accessories



# USE A GOOD CHAIR

Backrest provides good lower back support

Arms adjustable  
or no armrests

Lumbar support

Padded arms,  
adjustable and  
removable

Front edge of seat pan  
curves down

Height and tilt  
adjustable back  
and seat

Waterfall  
front edge

Seat pan adjustable  
horizontally and  
tilts

Height adjustable

Easy to reach  
controls

On rollers



5-caster base

Five feet for base-most stable



# MY CHAIR

Backrest not  
fully adjustable



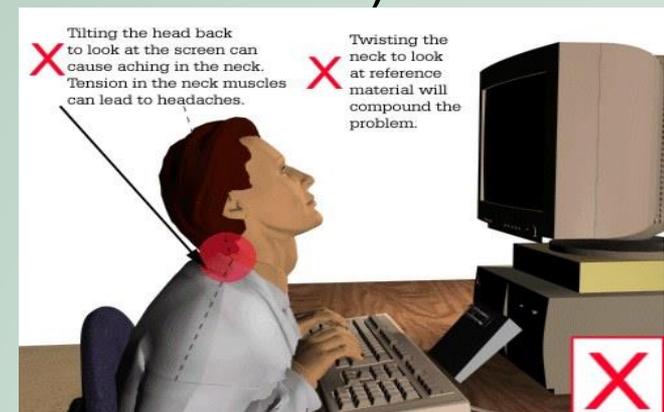
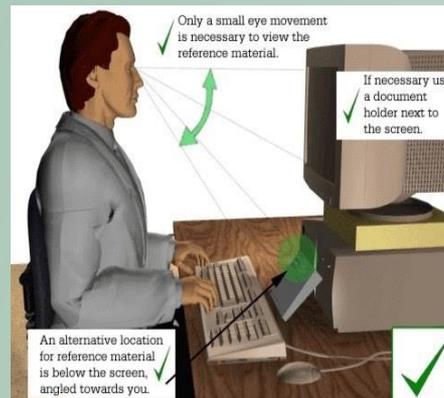
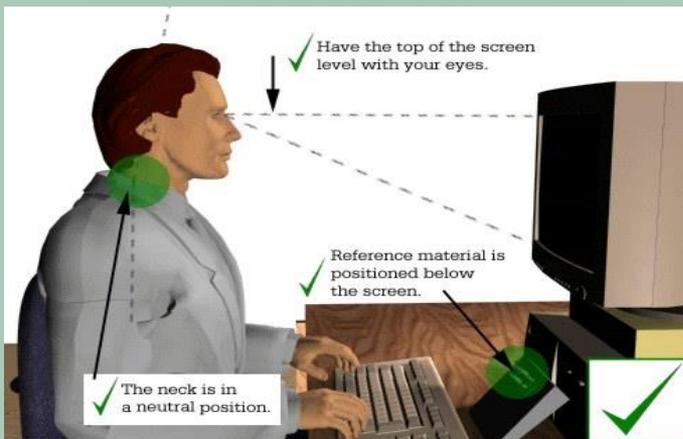
Armrests not  
fully adjustable



# WORKSTATION ADJUSTMENTS

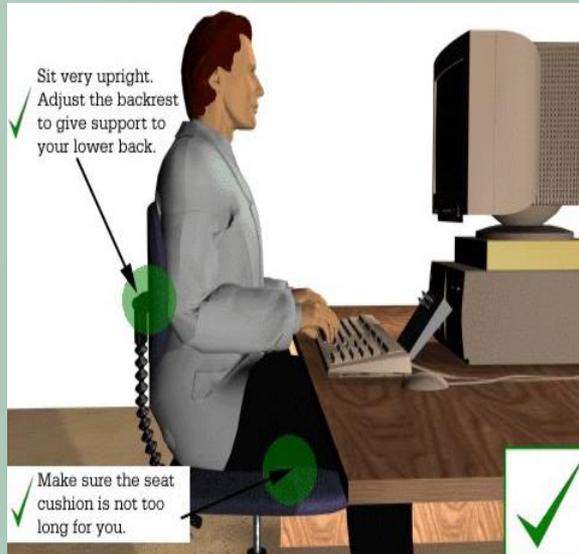
## Neck and Head

- Eye level should be at top 1/3 of the **monitor**
- Monitor should be approximately arm's length away
- Head & neck should be upright, relaxed and balanced between the shoulders
- If you use a **document holder**, it should be as close to the monitor as possible (beside or below)



# WORKSTATION ADJUSTMENTS

## Back



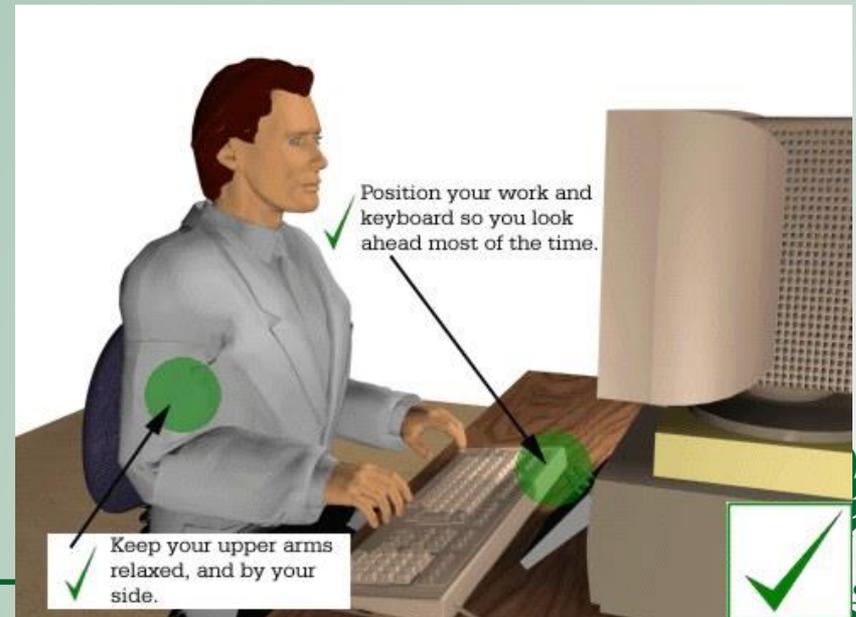
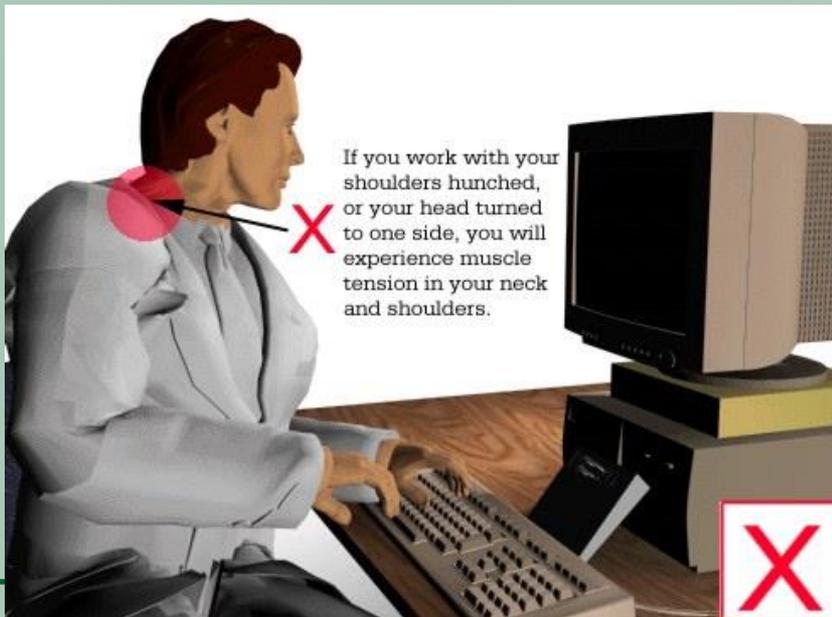
- Arrange your work so that you are looking straight ahead most of the time
  - Make sure **keyboard** & **monitor** are aligned and parallel with front of desk
- Sit back in your chair and rest your upper body against the backrest
- Change sitting positions often by leaning slightly forward and then slightly backward



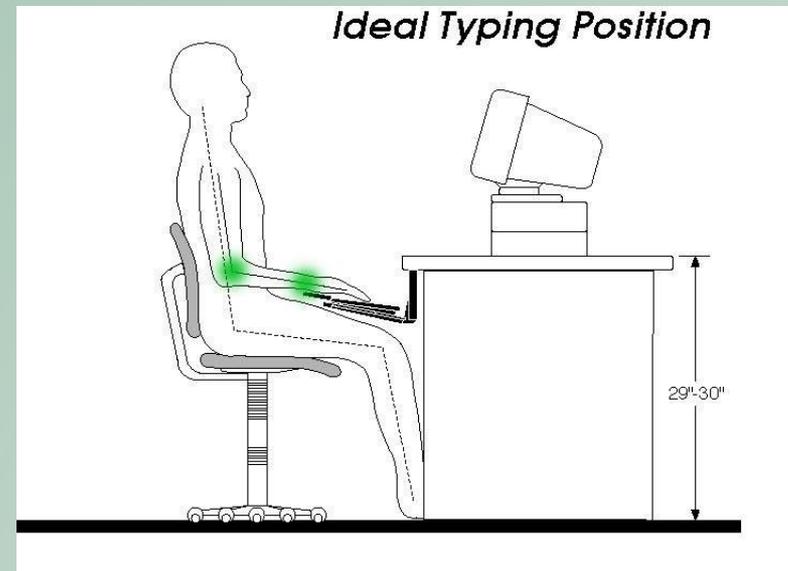
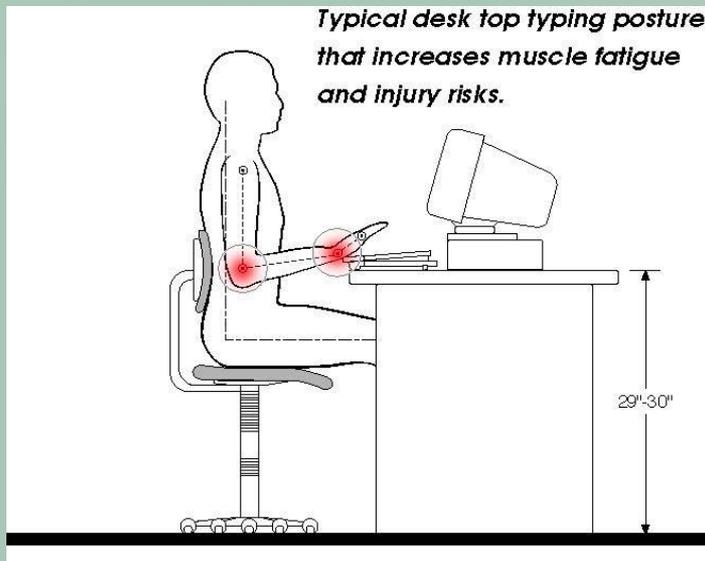
# WORKSTATION ADJUSTMENTS

## Shoulders and Elbows

- Adjust your **chair** height or **keyboard** height so that your shoulders are relaxed and your elbows hang comfortably at your sides



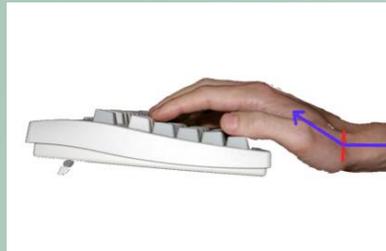
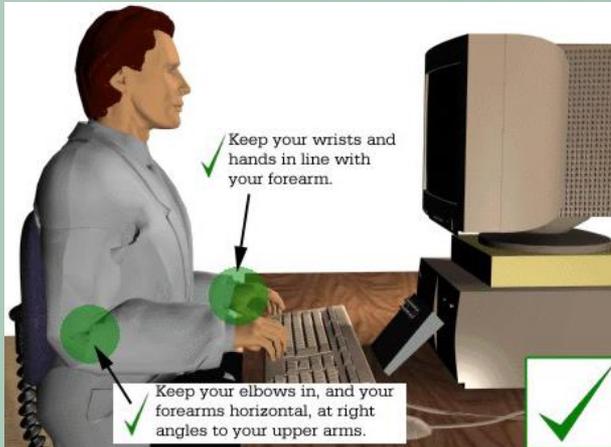
# ELBOW & WRIST POSTURE



# WORKSTATION ADJUSTMENTS

## Forearms, Wrists, and Hands

- Don't deploy rear **keyboard** feet
- Make sure that your hands are in line with your forearms



versus



# WORKSTATION ADJUSTMENTS

## Forearms, Wrists, and Hands

- Use your whole arm and shoulder to move the **mouse**, not just your wrist
  - Don't rest or anchor your wrist while using your mouse
  - Keep your wrist, arm and shoulder free to move



**RIGHT**  
Keep your wrist in a  
straight neutral position  
when using your mouse



**WRONG**  
Don't angle your wrist  
when using your mouse



# WORKSTATION ADJUSTMENTS

## Forearms, Wrists, and Hands

- Move or exercise your hands often to relieve tension in the fingers, hands, wrists and forearms
- Sit close to the desk
- Do not put things between you and the **keyboard** except a gel wrist rest



# WORKSTATION ADJUSTMENTS

## Feet, Knees and Legs



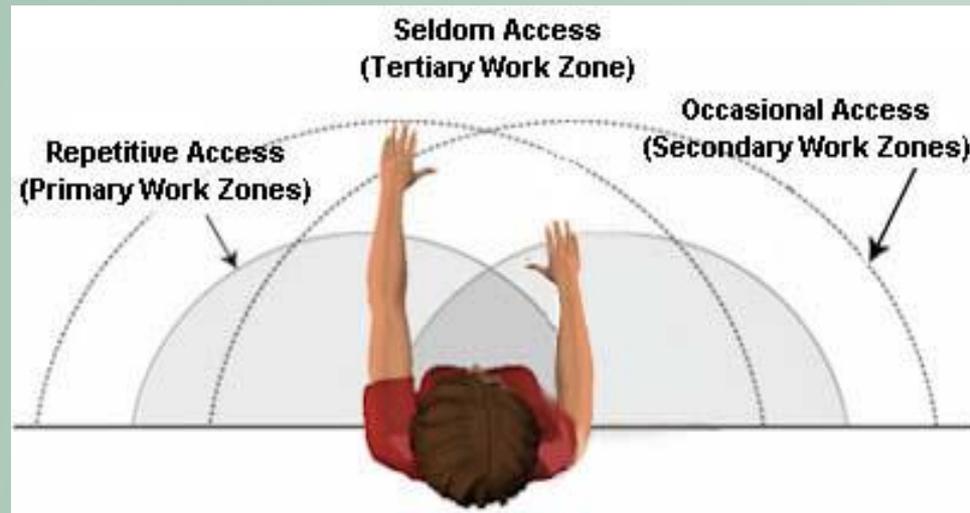
- Knees should be about hip level and form a 90° angle between the thighs and lower leg
- Adjust chair or workstation height so that your feet rest firmly on the floor, or use a footrest
- If you use a footrest, be sure it is wide enough to accommodate different leg positions



# WORKSTATION ADJUSTMENTS

## Desks

- Work surface depth
- Location of frequently used items should be located in repetitive access zone



Recommended Zones for Workplace Components



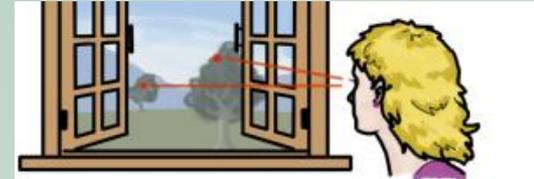
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# WORKSTATION ADJUSTMENTS



## Eyes

- Your eyes should be at a comfortable viewing distance from the monitor (about arms' length)
- Clean your monitor and glasses
- Use blinds or curtains to reduce the glare from windows
- Rest your eyes
- Look away from the screen every few minutes at a distant object



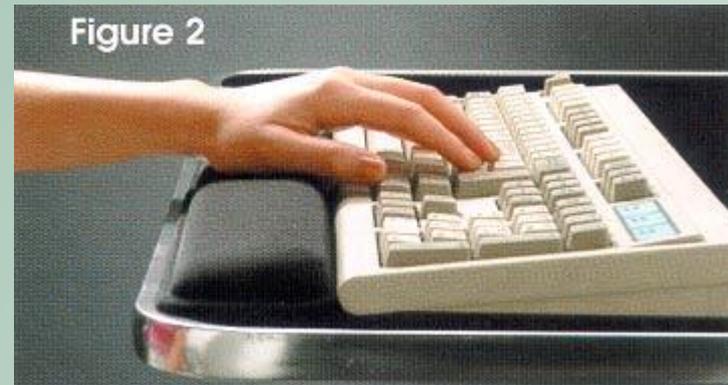
# “ERGONOMIC” EQUIPMENT

## Wrist Rests

- Pros
  - Maintain neutral wrist positioning
  - Reduce weight throughout shoulders
  - Softens the surface under the wrists
- Cons
  - Promotes anchoring at the wrist
  - Contact point on the wrist



# WRIST RESTS VS. PALM SUPPORTS



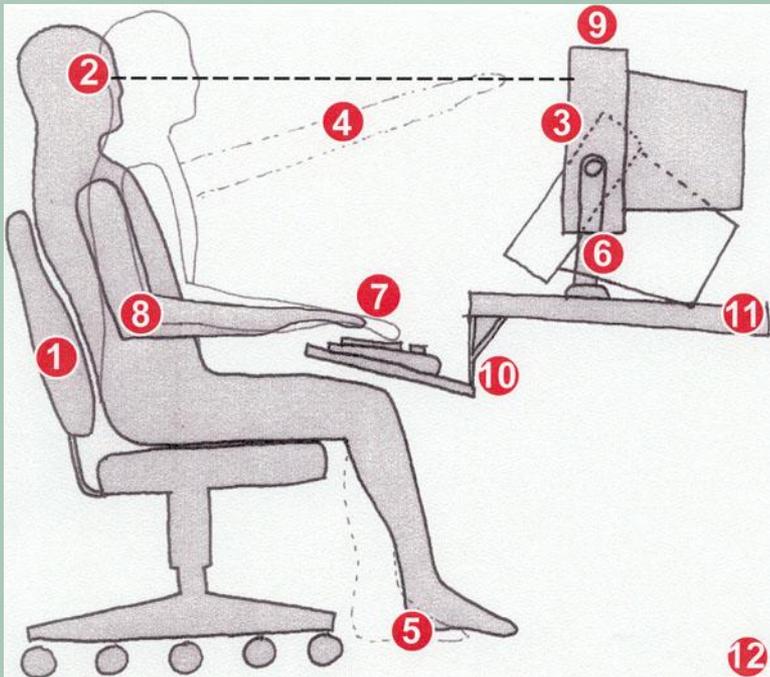
# “ERGONOMIC” EQUIPMENT

## Keyboard Trays

- Pros
  - May adjust the keyboard height and angle to custom fit the users needs
  - Allows for more posture changes
- Cons
  - May decrease knee clearance
  - May force longer reaches for other things



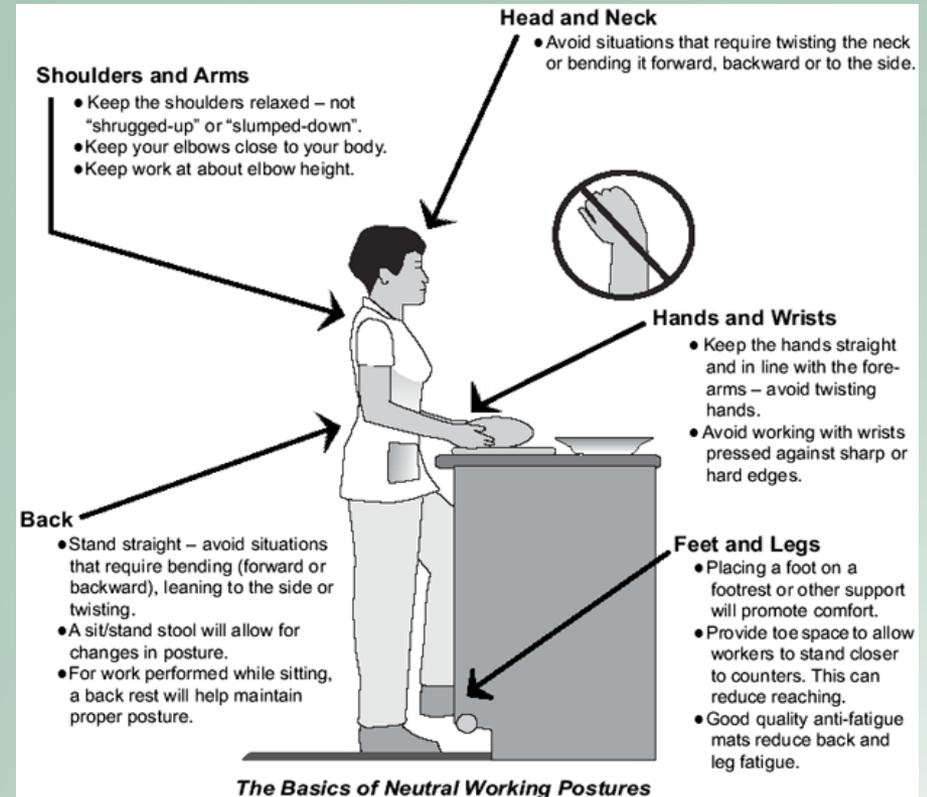
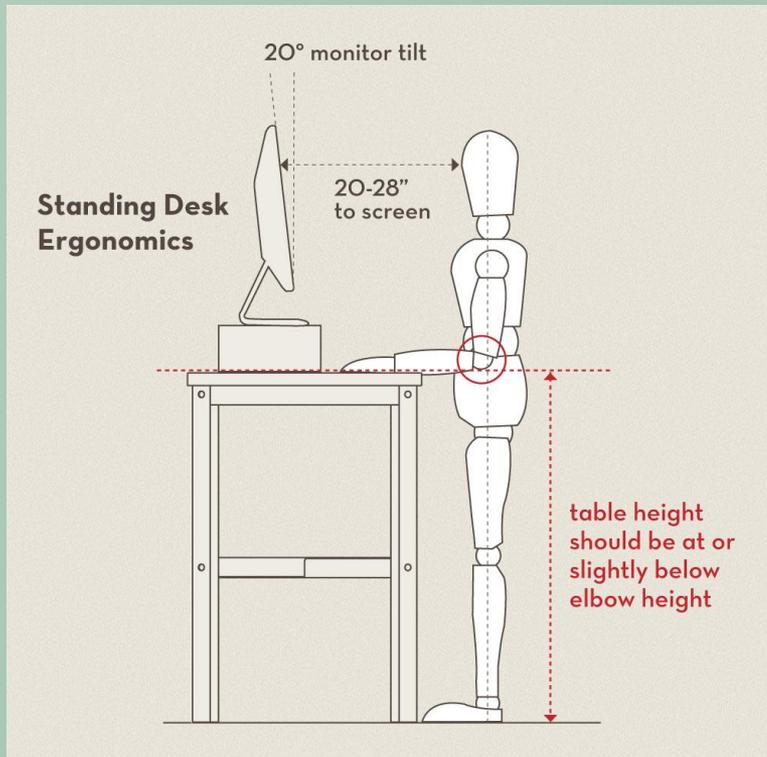
# SITTING COMPUTER WORK STATION



- Use a good chair with a dynamic chair back; sit back in this
- Top of monitor casing 2-3" above eye level
- No glare on screen, use anti-glare filter where needed
- Sit at arms length from monitor
- Feet on floor or stable footrest
- Use a document holder, preferably in line with computer screen
- Wrists flat and straight in relation to forearms
- Arms and elbows relaxed and close to body
- Center monitor and keyboard in front of you
- Use a flat or negative tilt keyboard tray
- Use a stable work surface and stable (no bounce) keyboard tray
- Take frequent short breaks (micro-breaks)



# STANDING WORKSTATION



# Laptop Computers

Good ergonomic postures are difficult with a laptop



## Full-time users:

- Use separate keyboard and mouse
- Position screen for optimal viewing



## Occasional users:

- Position laptop for neutral wrist position
- Angle screen to minimize bending at the back & neck
- Modify your position regularly, especially if feeling discomfort
- Limit time spent on a laptop computer if you can't relieve awkward postures



# WHAT TO DO ??

## PREVENT, PREVENT, PREVENT !!!

- Take *frequent breaks* from ANY sustained posture every 20-30 minutes = “micro-breaks”
  - *Move*
  - *Stretch*
- Change positions frequently
- Respect discomfort: change positions or stop painful activity
- Take a look at your workstation set-up



# TAKE A BREAK!



## ***What is a micro-break?***

- lasts from 30 seconds to a few minutes
- any activity that involves moving or walking; can do stretches too

## ***Why take a micro-break?***

- even with ergonomic workstation & proper work techniques, you cannot work 8-10 hours per day on your computer without exposing yourself to ergonomic risk and potential injury

## ***What are the benefits of micro-breaks?***

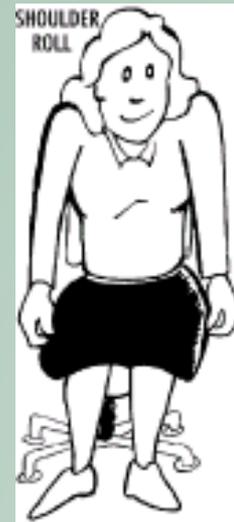
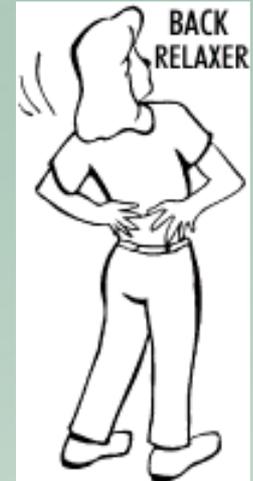
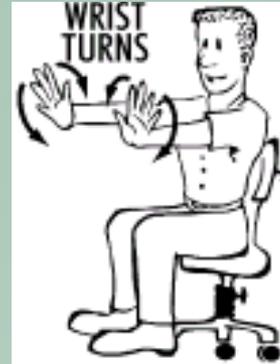
- releases built up tension and stress & helps combat fatigue and discomfort
- have a positive effect on productivity, problem solving and creativity
- several short breaks throughout the day are much more effective in reducing tension and stress than taking a few long breaks
- research has shown that frequent micro-breaks improves levels of comfort, work performance, and reduces the risks of musculoskeletal injuries
  - increases blood circulation
  - lowers blood sugars
  - stimulates metabolism



# HELP YOURSELF

IT'S UP TO YOU

- Micro-Breaks
  - Every 20 - 30 minutes
- Walk/move
- Also important to stretch
  - Hip flexors
  - Hamstrings
  - Shoulders
  - Neck
  - Lower back

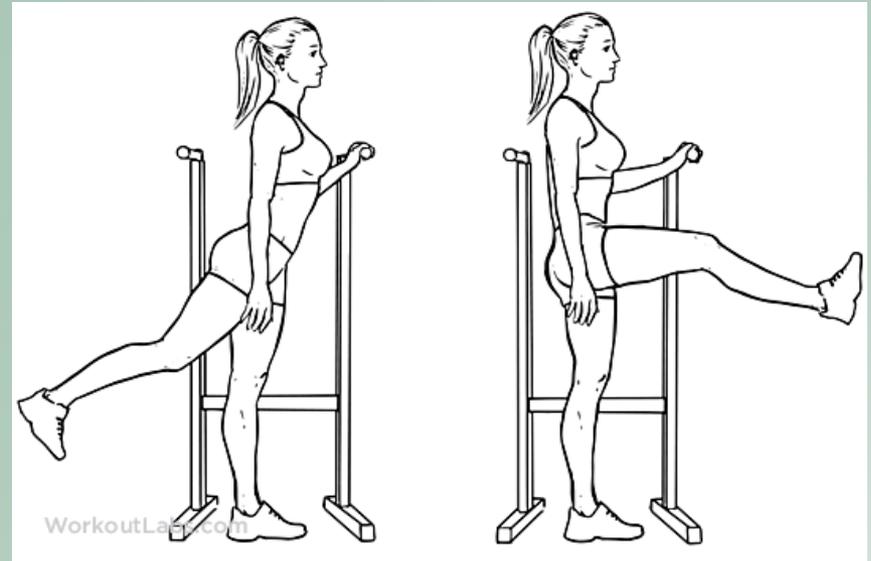


# TIGHT HIP FLEXORS

Kneeling hip flexor stretch



Leg swings



# TIGHT LOWER BACK

Opposite knee– opposite elbow



Sitting lower back stretch



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Torso rotation



## DESK STRETCHES

These are stretches to do at your desk.  
This program will take 2 1/2 - 3 min.

- Breathe easily
- No bouncing or forcing
- No pain!
- Feel the stretch
- Relax
- See Stretching Instructions, pp. 77-84

1  
5 sec, 3 times  
p. 82



2  
5 sec, 3 times  
p. 82



3  
5 sec, 2 times  
p. 81



4  
5 sec, 2 times  
p. 84



5  
3 sec  
p. 84



6  
3 sec  
each side  
p. 84



7  
3 sec  
p. 84



8  
10 sec  
each arm  
p. 81



9  
10 sec  
p. 82



10  
10 sec  
p. 81



11  
9 sec,  
each side  
p. 82



12  
10 sec  
p. 79



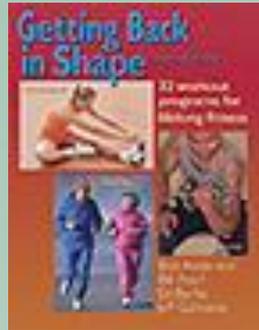
- Prolonged sitting at a desk or computer terminal can cause muscular tension and pain.
- Taking a few minutes to do a series of stretches can make your whole body feel better.
- Learn to stretch spontaneously throughout the day whenever you feel tense.
- Don't just do seated stretches, but do some standing stretches too. Good for circulation.

From the book:

34 *Getting in Shape* © 1991 Golden Publications, Inc.

[www.shelterpub.com](http://www.shelterpub.com)

Photocopy this page and keep it in your desk drawer.



This program is for people who either sit or stand every day at work.  
This program will take 5-15 min.

## ON THE JOB

### Stretch

3 min

- Always stretch and warm up before you exercise
- Do not bounce
- No pain!
- Feel each stretch
- See Stretching Instructions, pp. 77-84

1  
15 sec  
p. 81



2  
10 sec  
p. 82



3  
15 sec  
each leg  
p. 79



4  
15 sec  
each leg  
p. 79



5  
15 sec  
p. 81



6  
5 sec, 3 times  
p. 82



7  
5 sec, 2 times  
p. 81



8  
15 sec  
p. 81



9  
5 sec  
each side  
p. 84



10  
10 sec  
p. 79



### Lift

12 min

- Set = a fixed number of repetitions
- Rep = a repetition
- See Lifting Instructions, pp. 85-108

1  
1 set  
10-20 reps  
p. 85



2  
1 set  
15-20 reps  
p. 98



3  
1 set  
8-12 reps  
p. 91



4  
1 set  
2-12 reps  
p. 98



5  
1 set  
10-25 reps  
p. 87



### Move

10-20 min

- Do anything that gets your heart rate up
- See Moving Instructions, pp. 64-76

#### RUN IN PLACE

10 min

#### OR

WALK

10 min

#### WALK DURING LUNCH

20 min

#### OR

WALK WITH WEIGHTS

15 min

#### OR

CLIMB STAIRS

3 times a day

Photocopy this page and keep it at your workplace

*Getting in Shape* ©1991 Golden Publications, Inc. 35

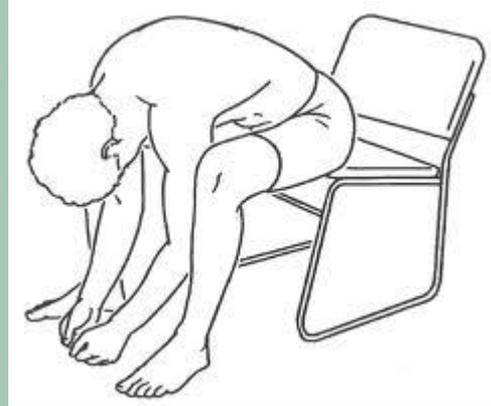


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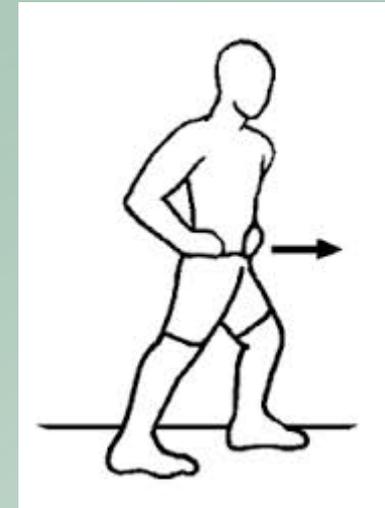
# MY WORK STRETCHES



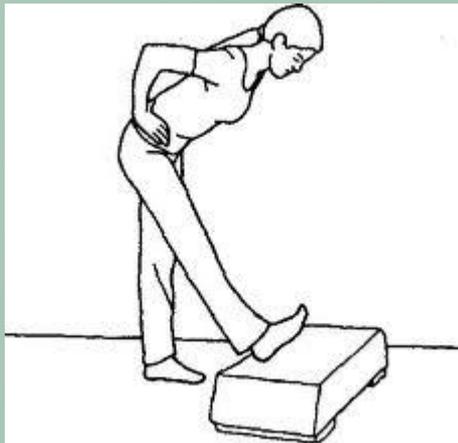
Quad stretch



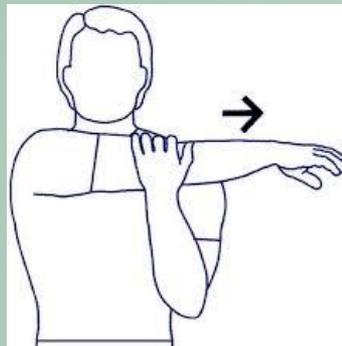
Lower back stretch



Hip flexor stretch



Hamstring stretch



Shoulder stretch



Chest stretch



# WORKSTATION SELF-ASSESSMENT



## Computer Workstation Ergonomic Self-Assessment

Take a few minutes to look at your workstation. By answering a few questions, you can self-assess your workstation and help to improve your working posture. If you indicate any adjustments or concerns that cannot be self-corrected with the information provided below, contact the UW-Green Bay Safety Manager.

To understand the best way to set up a computer workstation, it is helpful to understand the concept of neutral body positioning. This is a comfortable working position in which your joints are naturally aligned. Working with the body in a neutral position reduces stress and strain on the muscles, tendons, and skeletal system and reduces your risk of developing a musculoskeletal disorder.

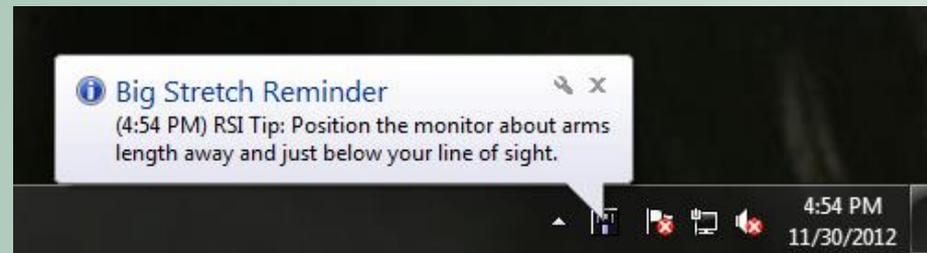
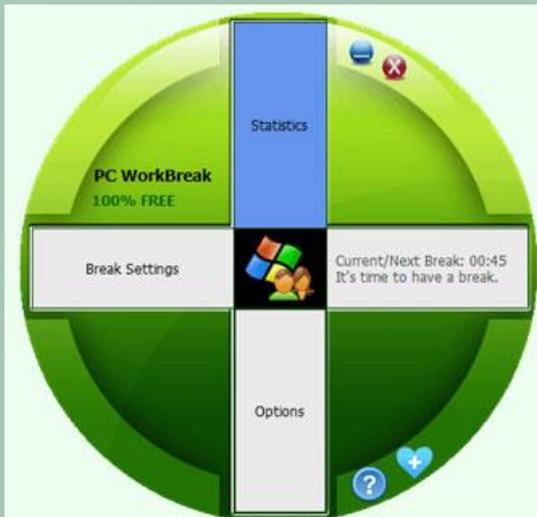
- Hands, wrists, and forearms are straight, in line and roughly parallel to the floor
- Head is level, or bent slightly forward, forward facing, and in line with the torso
- Elbows stay in close to the body and are bent between 90 – 120°
- Back is fully supported with appropriate lumbar support when sitting upright or leaning back slightly

| Item | Chair   | Yes | No | N/A | Suggested Actions  |
|------|---|-----|----|-----|--|
| 1    | Can the height, seat and back of the chair be adjusted to achieve the posture outlined below?   |     |    |     | <ul style="list-style-type: none"> <li>• Obtain a fully adjustable chair</li> </ul>  |
| 2    | Are your feet fully supported by the floor when you are seated?   |     |    |     | <ul style="list-style-type: none"> <li>• Lower the chair</li> <li>• Use a footrest</li> </ul>                                      |
| 3    | Does your chair provide lumbar support for your lower back?   |     |    |     | <ul style="list-style-type: none"> <li>• Adjust chair back</li> <li>• Obtain proper chair</li> <li>• Obtain lumbar roll</li> </ul> |
| 4    | When seated, are your knees bent at an approximately 90° angle?   |     |    |     | <ul style="list-style-type: none"> <li>• Raise/lower chair</li> </ul>  |
| 5    | Is there about 2-3" between front of seat pan and back of knees (are you able to sit without feeling pressure from the chair seat on the back of your knees)? |     |    |     | <ul style="list-style-type: none"> <li>• Adjust seat pan</li> <li>• Add a back support</li> </ul>                                  |
| 6    | Do your armrests allow you to get close to your workstation?  |     |    |     | <ul style="list-style-type: none"> <li>• Adjust armrests</li> <li>• Remove armrests</li> </ul>                                     |
| 7    | Are your arms & shoulders relaxed at your sides without interference from chair armrests?   |     |    |     | <ul style="list-style-type: none"> <li>• Remove armrests</li> </ul>  |

| Item | Keyboard and Mouse   | Yes | No | N/A | Suggested Actions  |
|------|--|-----|----|-----|--|
| 8    | Are your keyboard, mouse and work surface at your elbow height?  |     |    |     | <ul style="list-style-type: none"> <li>• Raise / lower workstation</li> <li>• Raise or lower keyboard</li> <li>• Raise or lower chair</li> </ul>                 |
| 9    | Is the keyboard close to the front edge of the desk (allowing space for wrist rest, if used) and aligned with your monitor?  |     |    |     | <ul style="list-style-type: none"> <li>• Move keyboard to correct position</li> </ul>  |
| 10   | When using your keyboard and mouse, are your wrists straight and your upper arms relaxed? The keyboard should be flat and not propped up on keyboard legs. An angled keyboard may place the wrist in an awkward posture when typing. |     |    |     | <ul style="list-style-type: none"> <li>• Re-check chair, raise or lower as needed</li> <li>• Check posture</li> <li>• Check keyboard and mouse height</li> </ul> |



# Ergonomic Break REMINDERS



# TAKE HOME MESSAGE

- Maintain neutral positions as much as possible
- Minimize extreme (awkward) postures
- Avoid contact stress
- Movement is critical; change positions
- Take breaks... ***MOVE and STRETCH!!!***

*Jill Fermanich*

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*Ext. 2273*



# MOVE

**Ergo Reminder™**

Take a walk to deliver a message in person.



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# STRETCH

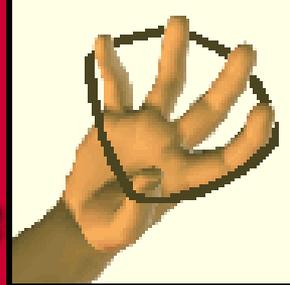
Stress Tips from the Field...

**Don't Forget to Breathe**



**Ergo Reminder™**

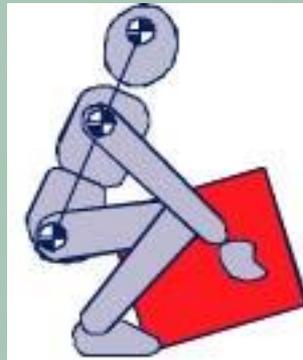
Strengthen your fingers with a rubber band.



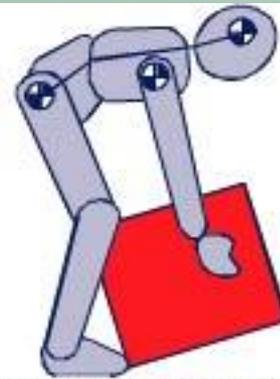
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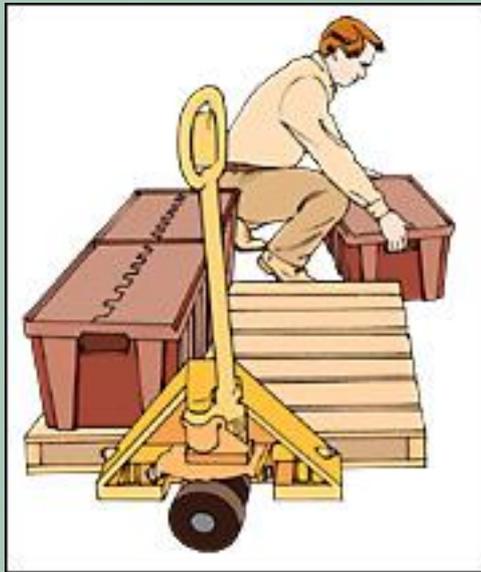
# CORRECT & INCORRECT TECHNIQUES



*Correct lifting technique*



*Incorrect lifting technique*



**The wrong way!**



**The right way!**

Avoid reaching out for the mouse or keyboard.



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Green Bay, WI 54903

# Body Mechanics



- Use the largest joints & muscles to do the job
- Use 2 hands to lift rather than one, even with light objects and tasks.
- Avoid lifting w/ the forearm in full pronation (palm down) or supination (palm up)
- Slide or push & pull objects instead of lifting
- Keep reaching to a minimum
- Carry objects close to body at waist level



# NATIONAL INSTITUTE OF NEUROLOGICAL DISORDERS (NIH)

- **Quick tips to a healthier back**

- Following any period of prolonged inactivity, begin a program of regular low-impact exercises. Speed walking, swimming, or stationary bike riding 30 minutes a day can increase muscle strength and flexibility. Yoga can also help stretch and strengthen muscles and improve posture. Ask your physician or orthopedist for a list of low-impact exercises appropriate for your age and designed to strengthen lower back and abdominal muscles.
- Always stretch before exercise or other strenuous physical activity.
- Don't slouch when standing or sitting. When standing, keep your weight balanced on your feet. Your back supports weight most easily when curvature is reduced.
- At home or work, make sure your work surface is at a comfortable height for you.
- Sit in a chair with good lumbar support and proper position and height for the task. Keep your shoulders back. Switch sitting positions often and periodically walk around the office or gently stretch muscles to relieve tension. A pillow or rolled-up towel placed behind the small of your back can provide some lumbar support. If you must sit for a long period of time, rest your feet on a low stool or a stack of books.
- Wear comfortable, low-heeled shoes.
- Sleep on your side to reduce any curve in your spine. Always sleep on a firm surface.
- Ask for help when transferring an ill or injured family member from a reclining to a sitting position or when moving the patient from a chair to a bed.
- Don't try to lift objects too heavy for you. Lift with your knees, pull in your stomach muscles, and keep your head down and in line with your straight back. Keep the object close to your body. Do not twist when lifting.
- Maintain proper nutrition and diet to reduce and prevent excessive weight, especially weight around the waistline that taxes lower back muscles. A diet with sufficient daily intake of calcium, phosphorus, and vitamin D helps to promote new bone growth.
- If you smoke, quit. Smoking reduces blood flow to the lower spine and causes the spinal discs to degenerate.



# MAYO CLINIC

- Use proper body mechanics:
- **Stand smart.** Maintain a neutral pelvic position. If you must stand for long periods of time, alternate placing your feet on a low footstool to take some of the load off your lower back. Good posture can reduce the amount of stress placed on back muscles.
- **Sit smart.** Choose a seat with good lower back support, arm rests and a swivel base. Consider placing a pillow or rolled towel in the small of your back to maintain its normal curve. Keep your knees and hips level. Change your position frequently, ideally at least once every half hour.
- **Lift smart.** Let your legs do the work. Move straight up and down. Keep your back straight and bend only at the knees. Hold the load close to your body. Avoid lifting and twisting simultaneously. Find a lifting partner if the object is heavy or awkward. Learning to lift properly may be more effective at preventing a recurrence of back pain than a first episode

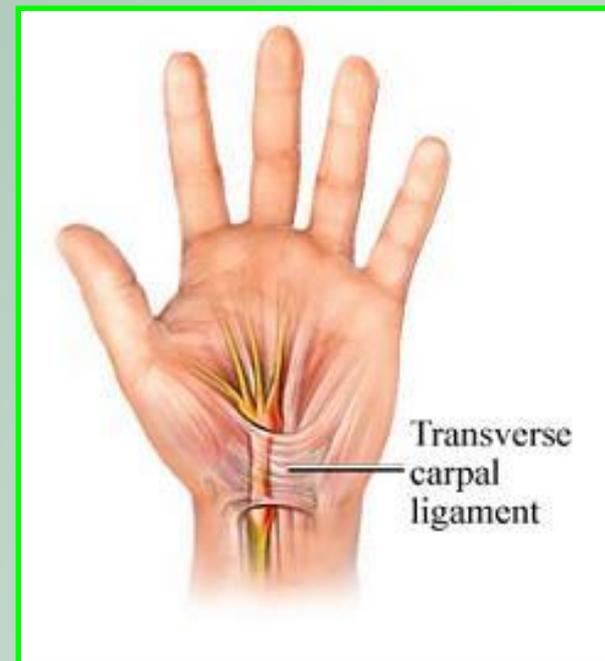


# Why Ergonomics ?

To Prevent disorders of the soft-tissues such as muscles, tendons, nerves, blood vessels, & joints.

## Common Office Environment Disorders:

- Carpal Tunnel Syndrome
- Tendonitis
- Back Strain/Sprain
- ...and others



Click for Next

# Practice Wellness at Work and Home !

**Exercise**



Body

**Nutrition**



Mind

**Relaxation**



Spirit

