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What is Ergonomics?

- Ergonomics is the scientific study of human work-designing work spaces and tasks.
- Office ergonomics specifically addresses the office environment.

Help the worker fit the job!

Research

- Research supports the use of workstation adjustment and design (including appropriate equipment), rest breaks, and ergonomic education, in order to reduce the risk of musculoskeletal disorders (Kennedy et al. 2010), thus...decreasing injuries and helping to prevent and control pain!

- Research also indicates that injury prevention programs cut overall costs and have a positive impact on workers (Robson et al. 2010), which means...happier and more productive employees!
Bureau of Labor Statistics-2012

Nonfatal occupational injuries in all sectors (government, public and private) requiring time away from work:
“Musculoskeletal disorder (MSD) cases (388,060) accounted for 34 percent of all occupational injury and illness cases in 2012. Both the incidence rate and case count remained statistically unchanged from the previous year; however the median days away from work increased by 1 day to a median of 12 days.”


Benefits of Applying Ergonomic Principles

- ↓ Injuries and severity of injuries
- ↓ Fatigue and soreness at work
- ↑ Productivity and work environment morale
- ↑ Ability to enjoy out of work activities

Basic Principles of Body Mechanics/Posture

Use these principles with every activity you do:
- Keep a wide base of support – stand with feet shoulder width apart
- Keep close to your work – keep the equipment and tools most frequently used close to you
- Move your feet and pivot when reaching toward your sides – don’t twist
- Neutral spine-maintain a slight inward curve in your low back at all times when sitting – Use a small pillow, rolled up jacket or lumbar roll to support your low back
- Maintain a slight inward curve in your low back when lifting
- When possible, push objects – don’t pull
- Use step stool, ladders or reaching devices when reaching above shoulder level
- Ask for help when lifting heavy or awkward objects
- Don’t rush; pace activity and change position frequently
- Carry objects close to your body

Remember – Make these body mechanics part of your daily routine at work and at home. Repetition of these principles is the key to success!
Ergonomics is an Ongoing Process

- **Everything** we do effects joints, tendons, nerves, blood vessels and muscles.

- We recognize it as "being tired"
  - It’s normal at the end of the day
  - However, at the beginning of the day it may be an early warning sign

Without ergonomics... we are at risk for cumulative trauma injuries
(These include the "itis"es, CTS, etc.)

What are cumulative trauma disorders (CTDs)?

May also be called: repetitive trauma disorders, repetitive strain injuries, repeated motion disorders, overuse syndromes.

A group of syndromes that affects joints, muscles and soft tissue due to:
- Repetitive motion
- Prolonged or sustained positioning
- Forceful movement
- Awkward positioning/posture

Contributing Factors To Cumulative Trauma Disorders

- Awkward posture
- Static loading or sustained exertion
- Force
- Contact stress
- Repetition
- Vibration
- Cold
- Stress/fatigue/exhaustion
Other Factors…
- Poor physical condition
- Limited or lack of flexibility
- Medical conditions
- Leisure activities

Leisure or Recreational Activities
- What you do all day
- What you choose to do with your free time
  - May need to be modified
  - May need to be adapted
  - May need to be placed “on hold” during the acute phase

The Model
Person + Environment + Occupation = PEO Model
PEO Model = our approach to assessment!
The Person

We may be able to make assumptions, but it is best to be client specific:
- Size
- Shape
- Age
- Gender
- Fitness level
- Symptoms
- Using or in need of eye glasses
- Additional activities outside of this workplace

The Environment

- Lighting/Glare
- Ventilation
- Noise
- Temperature
- Workstation Flow
  - Commonly used items within easy reach
  - Writing surface on the dominant side
  - Phone on non-dominant side
  - Central location for commonly used supplies and tools (i.e. printers, copiers etc)
  - Do not store under the desk, leave adequate room for legs

The Occupation

- What are the essential job duties?
  - DOT/Job description
  - Employee
  - Employer
- What are the marginal job functions?
- What percentage of time do these require?
Getting Started

- Gather the necessary information (per PEO)
- "P" and "E"-View the client AT the workstation
  - On site
  - Via photo/video
- Review the basic ergonomic principals with client
- Provide a checklist for client use
- Identify what changes can be made easily and immediately-and do it!
  - Easy to change the flow, rearrange an area, adjust a chair or monitor appropriately
- Identify what needs to be "problem solved"
  - New equipment
  - Job duties modified

Posture and Position-Neutral

- Adjust height of chair so elbows are positioned at 90 degrees.
- Feet should be flat on the floor or use a foot rest to fully support feet with hips back in the chair.
- Neck and torso should be in line and supported by chair.
- Top of monitor screen should be just below eye level allowing for approximately 15 degrees of scanning ability, and directly in front of you, about arms length away.
- Knees should be at 90 degrees or slightly greater.
- Wrists should be positioned in neutral without stress contact.

Computer Workstation Facts

- Working at the computer discourages position changes, as most of what is needed to complete the job is available on the computer.
- A primary cause of back pain is poor sitting posture.
- Getting up periodically from the workstation to change position throughout the workday decreases aches and pains.
- When sitting, remember good posture is crucial, no matter what type of chair is used.
- Work habits and organization are important factors to consider with jobs involving computer use.
- Many office workers have undetected, uncorrected or under-corrected vision problems.
- Eyestrain and eye irritation are among the most frequently reported complaints of employees working on computers.
### Workstation Equipment
- Desk
- Chair
- Monitor
- Keyboard
- Keyboard trays
- Pointer/Mouse
- Document Holder
- Telephone
- Headsets

### Desk
- A well-designed and appropriately-adjusted desk will:
  - Provide adequate clearance for your legs
  - Provide enough space to allow proper placement of computer components and accessories
  - Minimize awkward postures and exertions

### Desks: Desktop Space
- Work surface depth should allow you to:
  - View the monitor at a distance of at least 20 inches (arms length away)
  - Position the monitor directly in front of you

- Using a corner rather than a straight desk may provide additional space and depth to accommodate large monitors or multiple items.
- The location of frequently-used devices (keyboard, phone, and mouse) should remain within easy reach so as not to adversely affect posture.
**Desk-Height**

- Raise work surfaces: insert stable risers such as boards or concrete blocks under the desk legs.
- Remove center drawers of conventional desks to create additional thigh clearance or space for keyboard tray/platform, if necessary.
- Lower work surfaces by cutting off desk legs (if possible).
- If the work surface cannot be lowered, raise the chair to accommodate the user.
  
  If needed, use a foot rest for proper support.
- Sit→stand or adjustable work station options

**Chairs- the center of the workstation**

- A chair that is well-designed and appropriately adjusted is a key element of a safe and productive computer workstation.
- A good chair provides necessary support to the back, legs, buttocks, and arms, while reducing exposures to awkward postures, contact stress, and forceful exertions.

**Chair**

- Use a chair that is easily adjustable
- Possible components:
  - Lumbar support and depth (towel roll)
  - Upright recline options
  - Height adjustable
  - Seat pan depth adjustable
  - Pelvic tilt (forward, back)
  - Arm rest height adjustable
  - Arm rest angle or swing-away adjustable
Chairs: Seat
- Use a chair with a seat pan that is adjustable and large enough to provide support (about 2 fingers from edge of chair to backs of knees)
- Components:
  - Height adjustable
  - Depth adjustable
  - Padded and has a rounded, waterfall edge
  - Wide enough to accommodate the majority of hip sizes

Monitor
- Position your computer monitor directly in front of you so your head, neck and torso face forward when viewing the screen.
  - If using multiple monitors: monitors should be same approximate height, slight angle (like a book), and placed on dominant eye side.
  - The top of the monitor should be at or slightly below eye level.
    - Bifocals, trifocals, and progressive lenses will need further height adjustments based on the prescription of the glasses
  - The monitor should be approximately arms length away

Keyboards and trays/platforms
- Proper arrangement of the computer keyboard helps reduce exposure to awkward postures, repetition, and contact stress.
- Consider the keyboard placement in conjunction with other components of the computer workstation
  - Mouse, monitor, desktop or tray
  - Place the keyboard directly in front of you at a distance that allows your elbows to stay close to your body with your forearms approximately parallel with the floor at 90 degrees
  - A keyboard tray or platform may be useful if you have limited desk space or if your chair has armrests that interfere with adequate positioning.
Mouse
Proper selection and arrangement of the mouse helps reduce exposure to awkward postures and repetitive movement (neutral wrist posture)
· Select a pointing device designed to fit the hand that will normally operate it.
· R vs. L hand models
· Size
· Select a pointing device that requires minimal force to generate movement (this is adjustable)
· Avoid tightly gripping the mouse to maintain control.

Telephone
· Non-dominant side
· Neck cradle/Head neck rest
· Headset options
· Speaker phone options (confidentiality issues)

Other considerations
· Document holders (center: center left or center right)
· Testing for eye dominance-Video
What is wrong with this picture???

Eye Exercises

- "Change focus"—Frequently during the workday, look away from the computer screen. Focus on an object at least 20 feet away. Look back at the screen, then look away and focus again. Repeat three times.
- A slightly lower monitor will increase blinking which is done only 1/5 of the normal frequency when doing computer work!
- Cup your hands and place them lightly over your closed eyes. Hold for a minute while breathing deeply in and out. Slowly uncover your eyes.
- Without moving your head, look straight ahead. Slowly look up to the right, down to the right, down to the left and up to the left. Repeat three times.

Benefits of Exercise

- If you are in good shape, your body works more efficiently
- Circulation is better → helps with healing
- Muscles that are healthy and strong → better support for the joints and risk of strain is decreased
- Jobs / activities involving repetition → better to stretch before beginning the job task / activity
Facts About Stretching

Why is **stretching** important?
- Improves flexibility
- Reduces muscle soreness
- Helps with injury prevention

It is more difficult for muscles to go through their normal range of motion when they are tight.

Facts About Stretching (cont.)

How do you **stretch**?
- Slow and steady
- Be relaxed. Do not bounce or force the stretch.
- Breathe normally

What should **stretching** feel like?
- Mild pulling of muscle tension.

Do not stretch to the point of pain. The muscle being stretched can actually shorten and tighten increasing the risk of injury.

Hydration

Drink lots of water
- Less likely to get a headache when hydrated
- Improved cognitive functioning
- Supports soft tissues and the spinal discs
- Helps prevent obesity
- Increases energy levels
- And it makes you get up and move!
Other considerations when assessing
• When possible, video
• Clients to avoid loose fitting clothing for accurate observation
• Be certain that light is adequate for evaluation
• Camera use- stability, position, multiple angles
• Anticipate longer observation times for variable jobs
• Educate the employee and supervisor when possible

What can you do to prevent ergonomic injuries?
• Make body mechanics part of your routine
• Apply ergonomic practices at work

Remember:
Good Work Practices Take Practice!

To help avoid repetitive stress and strain injuries remember:
• Maintain a proper, neutral posture for the back, neck, arms, hands and legs by addressing improper work designs, environmental risks and equipment use-prevention is ideal!
• Make a conscious decision to alter positions during breaks
• Incorporate stretches into the work day-head/neck, wrist, shoulder, legs, ankles
• Vary work routine, change poor work habits
• Maintain overall good health-get involved in a regular exercise program, eat a balanced diet, get proper rest and drink lots of water
• Exercise your eyes
Changes in the Workplace and Home

Tablets

How I got started

• Mentoring with another therapist
• Continuing education
• Within an existing infrastructure
• Initial outside contact
• Partnering with others via HR

References


Thank You!