



Ergonomics and the Prevention of Injury

- **Ergonomics** is the scientific study of human work. It considers the physical and mental capabilities and limits of the worker as he or she interacts with tools, equipment, work methods, tasks and the working environment.
- **Office Ergonomics** is the branch of ergonomics dealing specifically with the office environment. In recent years the main focus of office ergonomics has been on computer work due to the rapid increase in computer use in the modern office and the associated increase in injuries.



The Benefits of Ergonomics

While ergonomic improvements to the work area are primarily used to create a safer and more healthful work environment, your company may experience other benefits, including:

- increased productivity
- increased work quality
- reduced absenteeism
- increased morale
- reduced injury claims



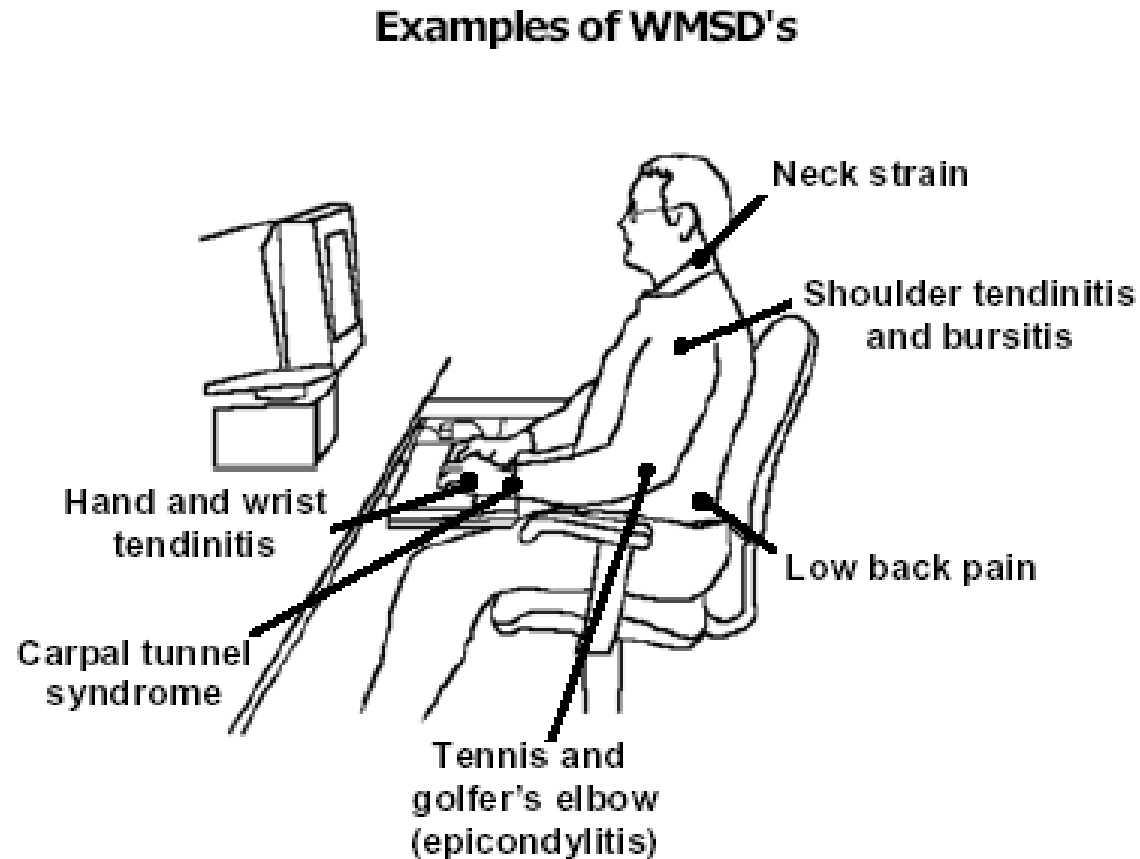
Work-Related Musculoskeletal Disorders

If your workers are required to adapt to a job that exceeds their body's physical limitations, they can become injured. The single largest class of injury claims in the office are **Work-related Musculoskeletal Disorders (WMSD's)**. WMSD's may worsen over extended periods of time.

Symptoms of WMSDs can include:

- discomfort
- fatigue
- stiffness
- pain
- swelling
- numbness & tingling

Examples of WMSD's





Work-Related Musculoskeletal Disorders

Work-related musculoskeletal disorders typically develop over a long period of time. The earlier that employees report symptoms and have them attended to, the better the chance of preventing a serious injury.

However, it will not be possible to prevent all WMSD's, and you may even have employees who currently have symptoms of an injury but do not understand the cause or the need to get medical treatment



Work-Related Musculoskeletal Disorders

When an employee reports occasional discomfort due to work activities, it does not necessarily mean that they will eventually develop a WMSD, but it is a sign that problems exist that will need to be addressed.

Often, making simple changes to their job, work practices or workstation will reduce the symptoms to a level where injury is no longer a concern; this process will be the focus of the rest of this document.



Benefits of Proactive Ergonomics

The application of ergonomics principles is most effective when used *before* problems result in serious injury.

Injuries that are addressed early on through an ergonomics process will often be less severe, have little or no time loss, and will allow the employee to continue on as a productive member of the company. Employers also benefit through reduced workers' compensation costs.



Risk Factors for WMSD's

Common Risk Factors

- #1 Repetition
- #2 Static Loading or Sustained Exertions
- #3 Awkward Postures
- #4 Mechanical Contact Stress
- #5 Force

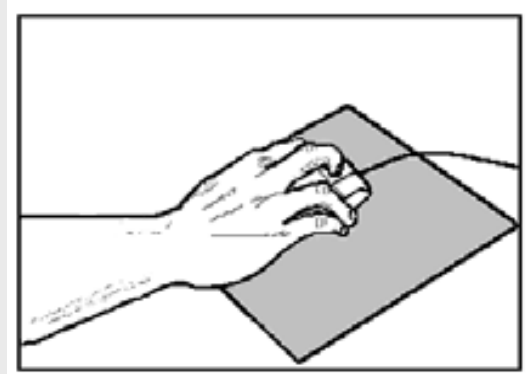
#1 Repetition

- Performing the same or similar motions repeatedly can result in trauma to the joints and surrounding tissues. Without time for rest and recovery, repetition can lead to injury.

Examples of work:

- typing at the keyboard
- flipping through files and paperwork
- moving and clicking the mouse
- using a calculator
- looking back and forth between the monitor and source documents
- writing by hand
- stapling and three-hole punching by hand

**Repetitive mouse use
has been associated
with WMSD's ↓**



#2 Static Loading or Sustained Exertions

Static loading, where the muscles must hold the body in a single position for a long period of time. This lack of movement reduces circulation and causes muscle tension, which can contribute to or aggravate an injury.

Sustained exertions are a type of static loading where force is applied continuously for long periods of time.

Examples:

- sitting still for long periods of time
- holding the hands in place above the keyboard or mouse
- holding the handset while talking on the telephone

-sitting upright without back support ▼



#3 Awkward Postures

Postures that bend the joints into positions where they are more likely to become injured are termed awkward postures.

Examples:

- reaching up and over the keyboard to use the mouse
- elevating the arms when writing on a work surface that is too high
- leaning over to type in data from papers laying flat on the desktop
- slouching or leaning forward in the chair

Hunching one shoulder to cradle the phone ↓

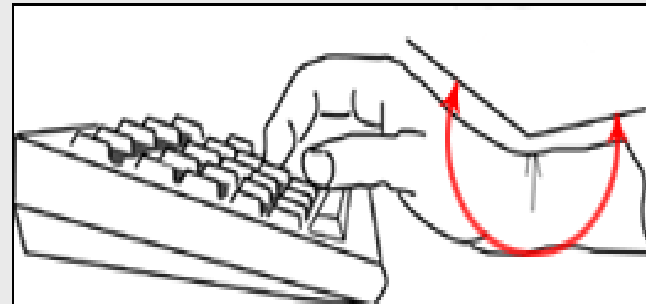


#4 Mechanical Contact Stress

A hard or sharp surface or object pressing into the soft tissues - the tendons, nerves and blood vessels - can cause damage that over time can result in serious injury. This damage is termed *mechanical contact stress*.

Examples:

- Resting wrists on the desk edge while typing or using the mouse
- Leaning the elbows on hard chair armrests or work surfaces
- Typing with palms resting on the hard lip of a keyboard tray



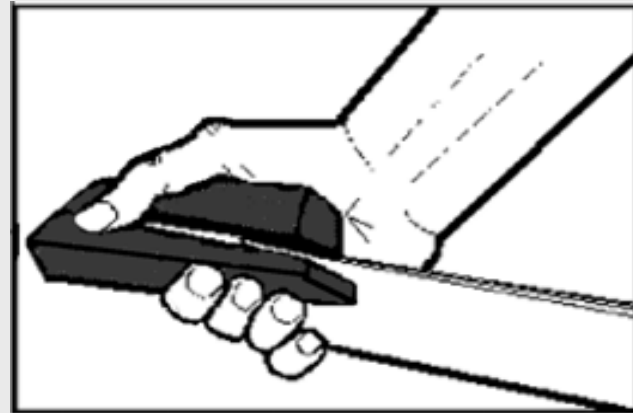
#5 Force

- Many office tasks require a moderate amount of force to be applied by very small muscles, which may cause fatigue, swelling, muscle strains and ligament strains.

Examples:

- "dragging and dropping" with the mouse
- grasping thick file folders or manuals
- gripping the sides of the mouse tightly
- "pounding" on the keyboard
- opening 3-ring binders
- lifting heavy manuals with one hand

Stapling or stamping by hand ↓



Factors That Increase Risk of Injury

For each of the risk factors, a longer duration of exposure results in a greater potential for injury. Complaints of discomfort and reports of injury are higher for workers who spend six or more hours a day doing repetitive data entry compared to those who only spend an average of two hours per day repetitively keying. Also note that combinations of more than one risk factor associated with one task further increase the likelihood of an WMSD injury.

Factors that increase risk of injury:

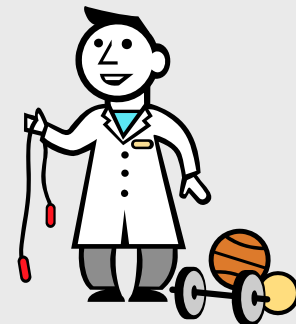
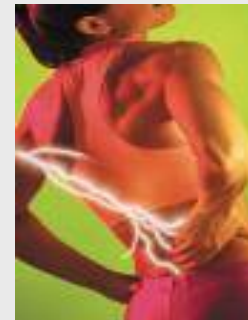
- Duration of exposure to risk factors
- Combinations of risk factors
- Environmental factors
[Lighting/Temperature/Noise]
- Organizational factors Job
[Design/Work Schedule]



Factors Outside of Work

The phrase "work-related" in *work-related musculoskeletal disorders* implies that workplace factors may not always be the sole or primary cause of the injury. Other factors which have been associated, in part, with WMSD's include:

- Poor physical condition
- Lack of flexibility
- Recreational activities which involve the risk factors described previously
- Computer use at home
- Predisposing medical conditions





Applying Ergonomics to the Office Environment

THE ORGANIZATION

Job design
Staffing
Work schedules

OFFICE ENVIRONMENT

Lighting
Noise
Temperature
Office design

INDIVIDUAL WORKSTATION

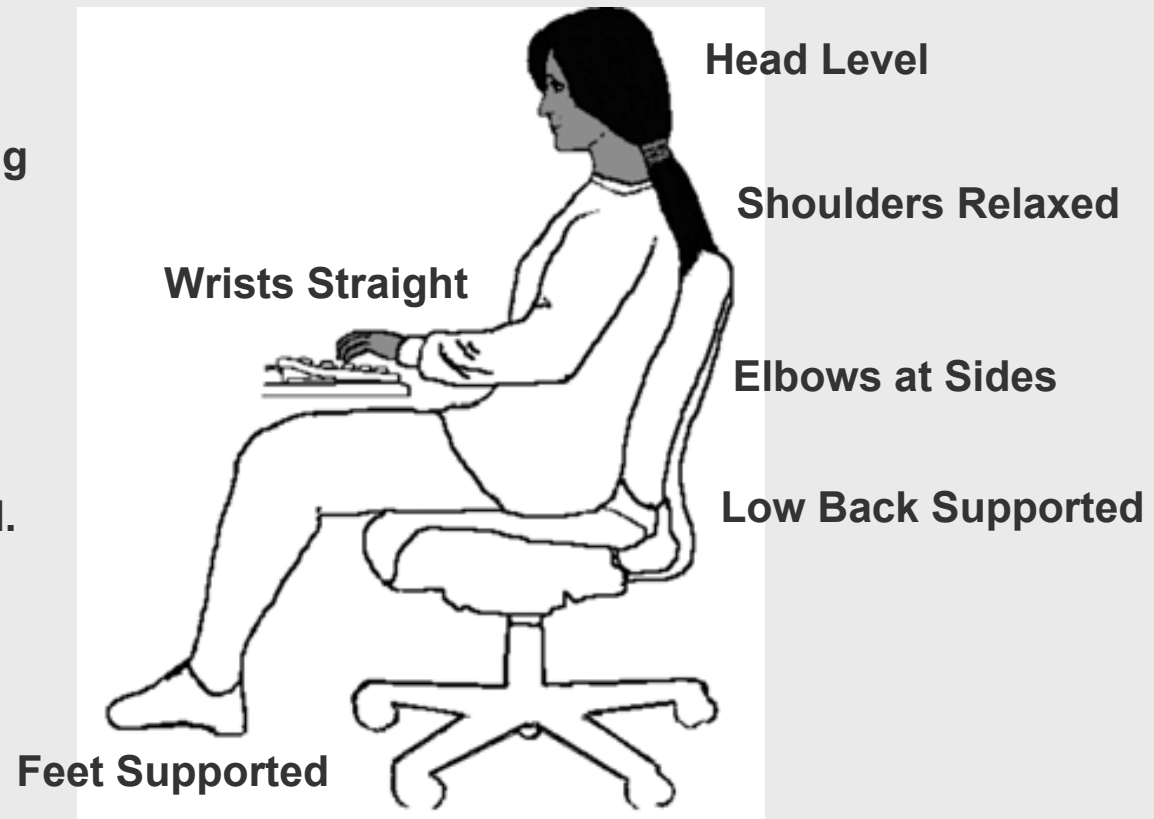
Furniture
Chairs
Accessories
Hardware
Software

INDIVIDUAL WORKER

Unique characteristics

Neutral Posture at Your Workstation

Neutral Posture is a comfortable working posture in which your joints are naturally aligned and your risk of developing a musculoskeletal disorder is reduced.



Adjustable Task Chairs



Elements of A Chair

- Backrest
- Seat
- Base
- Armrests



Adjustable Chair & Backrest ▶



▲ Five Leg Base

Shoulders in various positions ▼



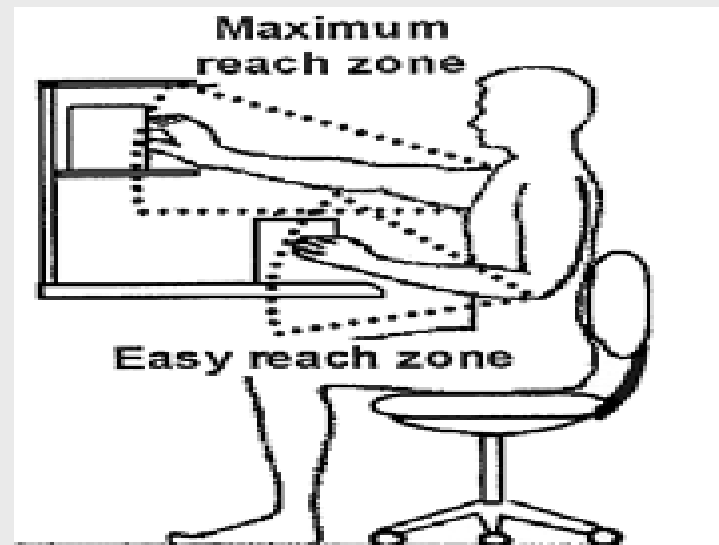
Relaxed

Armrest
too High

Armrest too
High & Wide

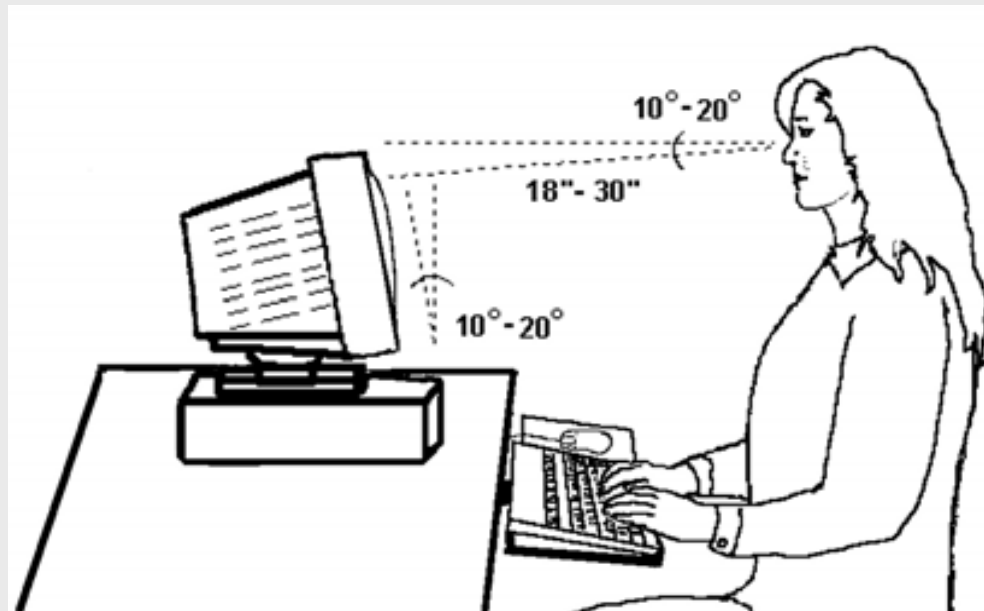
Organizing Your Work Area

The way you organize your work affects your body's position and the amount of reaching that you have to do. Reaching puts your body in an awkward position and stretches your muscles beyond their normal limits, making them vulnerable to pulls and strains.



Monitor Location

Proper monitor distance and height is important to help reduce eye strain and avoid awkward postures such as leaning forward.





Environmental Factors

The environment surrounding an employee's workstation can be just as important as the workstation itself in determining their comfort and performance.

Environmental factors consist of:

- Appropriate lighting
- Prevention of glare
- Comfortable temperature and humidity
- Noise level



Recovery Pauses

Rest breaks

Breaks at mid-morning, lunch and mid-afternoon have long been a part of work schedules and are an important part of allowing employees time to recover from the demands, both mental and physical, of their jobs. You should encourage your employees to take these breaks away from their computers and use the opportunity to walk around and give their hands and eyes a rest and increase circulation to all parts of the body.



Ergonomics is a Process

Ergonomics shouldn't be approached as just a one time evaluation and things are better forever. Ergonomics is an on-going process, and as such it needs to be monitored and occasionally readjusted and/or corrected.



Ergonomics is a Process

Since this presentation is a workplace guideline, it focused on factors at work. However, an important part of any ergonomic program is providing information and training to the employees in order to increase their awareness of WMSD's and their causes.

This presentation and accompanied handouts should supply all of you here today with the tools and information you need to apply the principles of ergonomics to those work areas under your control at work and at home.

