Objectives

- Define musculoskeletal disorders (MSDs)
- Learn how ergonomics relates
- Recognize Cumulative Trauma Disorders (CTDs) risk factors
- Identify Risk Factors as they relate to Hand & Wrist
Musculoskeletal Disorders (MSDS)

- Stress to the body may occur when a person is exposed to certain high risk activities.
- If the stress is greater than the body’s normal recovery period, inflammation of the tissue can follow.
- Chronic inflammation leads to development of a musculoskeletal disorder (MSD).
The Goal of Ergonomics

- ...is to make an activity easy and safe to perform
Early Intervention is Critical

- Early
- Response
- Gains
- Opportunity

- Communications
- Pain prevention
- Cost containment
- Education
- Intervention
- Solutions
Wrist and Hand Issues
Tendonitis

- Tendons transmit force from muscle to bone
- Micro tears of tendon occur daily
- Tears typically repair themselves
- Repeated loading prevent adequate repair
- Causes inflammation and pain
Primary Risk Factors...

- Repetition
- Force
- Prolonged or awkward positions
- Compression
Grip Force

- Affected by:
  - Type of grip
  - Object weight
  - Object dimension
  - Required posture
Causes of Repetition

- 50,000 to 200,000 key strokes per day
- Technology
  - Speed
  - No built in breaks
- Less variation in work
Posture: Orientation to Work

- Elbows should be at 90° to 105°
- Whenever possible, unload your upper extremity
From the Top...

- Position keyboard relative to major functions
- Minimize wrist deviation
Adjust to meet your needs...
The Downside of Laptops...
Compression

Avoid reaching up and over

No

Consider wrist rest as a transitional landing pad

Yes
Carpal Tunnel

[Image of the carpal tunnel with labels: Ulnar Nerve, Median Nerve, Transverse Carpal Ligament]
Carpal Tunnel (Cont.)

- Best known musculoskeletal disorder (MSD)
- Compression of the median nerve at the wrist
- Tunnel made up of nine flexor tendons and one peripheral nerve
- Numbness and tingling on the thumb side of the hand
Carpal Tunnel
Surgical Release of Tunnel

The ligament is released and the tunnel springs open, easing pressure on the nerve.
Wrist Positioning for Mousing...
The Cervical Spine
Weight of the Head = 11 LBS.
Up-right Neutral Posture
Forward Head Postures
Telephone Comfort

- Keep neck straight
- Use a headset or speaker phone
- Use shoulder rests if no other option is available
Forward Postures = Trouble

- It can cause:
- Muscular Strain
- Tension Headaches
- Ligament Laxity
- Degenerative Arthritis
- Nerve Root Compromise
Question…

- If forward head postures are so bad, why do we do it?
“The Need to See”

- As components and associated circuits have continued to shrink, operators have found ways to enhance their individual focal lengths for vision.

- This has led to a variety of very predictable postural accommodations.
Targeting the Work

- Targeting of large objects can be performed at a distance > 15 inches

- Targeting of small objects need to be performed at 6-10 inches, i.e., needle and thread
Targeting Your Computer...
Targeting Your Computer...
Glare...
Lighting Options...
Proper Seating
Upper Extremity Unloading
Low Back Pain

- Review of the anatomy
- normal curves
- bony columns
- function of the disc
- spinal cord & nerve roots
- degenerative issues
- Maintain the balance
Safe Lifting is Not an Accident

- Avoid spinal flexion
- Avoid twisting
- Avoid increasing disc pressure
- Avoid reaching

- Maintain up-right neutral postures
- Hips = shoulders
- Elbows at your sides
- Keep the load close to your body
Exercise Concept

- Take a pause
- Rest from stress, not from function
- Use reversal of positions
  - flexed wrists
  - flexed elbows
  - forward shoulders
  - forward heads
- sitting
Slow down...
Stop and assess the situation...
Don’t be afraid to get help