

# Office Ergonomics

Kansas State University  
Division of Public Safety

# 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



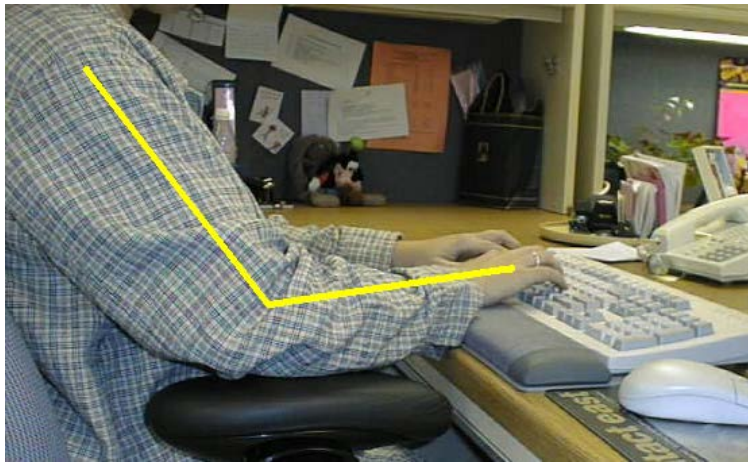
- Affected by:
  - Type of grip
  - Object weight
  - Object dimension
  - Required posture

# 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  $90^{\circ}$  to  $105^{\circ}$
- Whenever possible, unload your upper extremity

# From the Top...

- Position keyboard relative to major functions
- Minimize wrist deviation

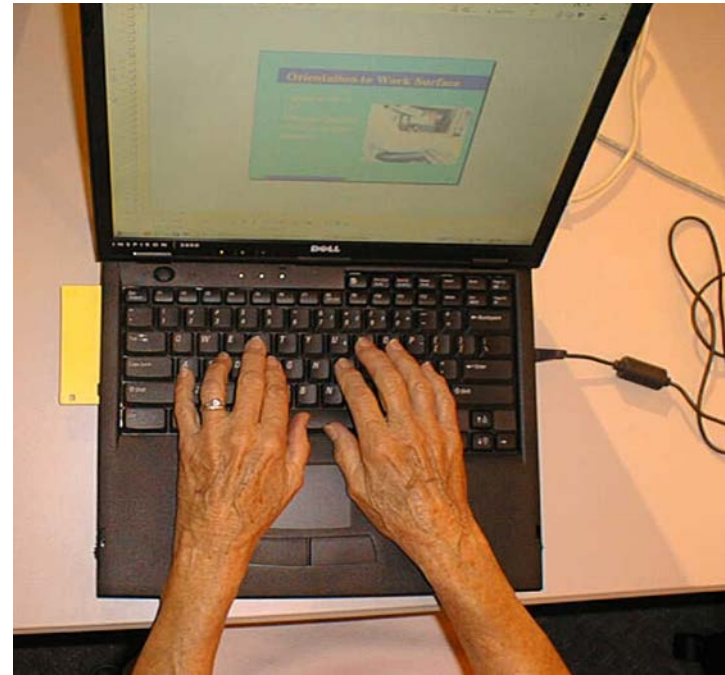


Adjust to meet your needs...





# The Downside of Laptops...



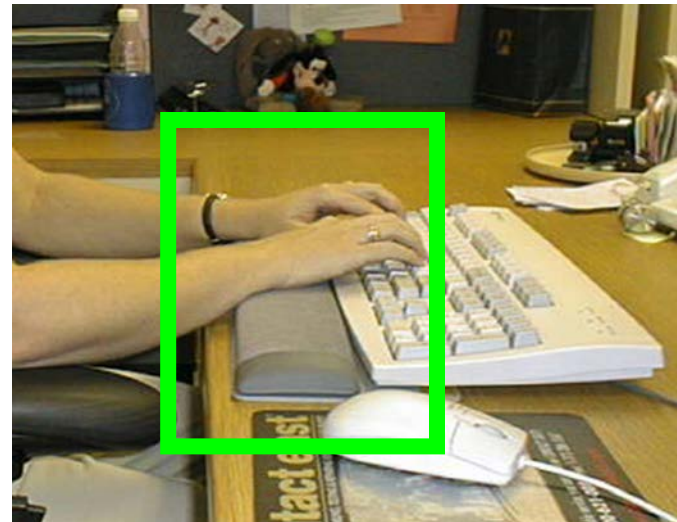
# Compression

Avoid reaching up and over



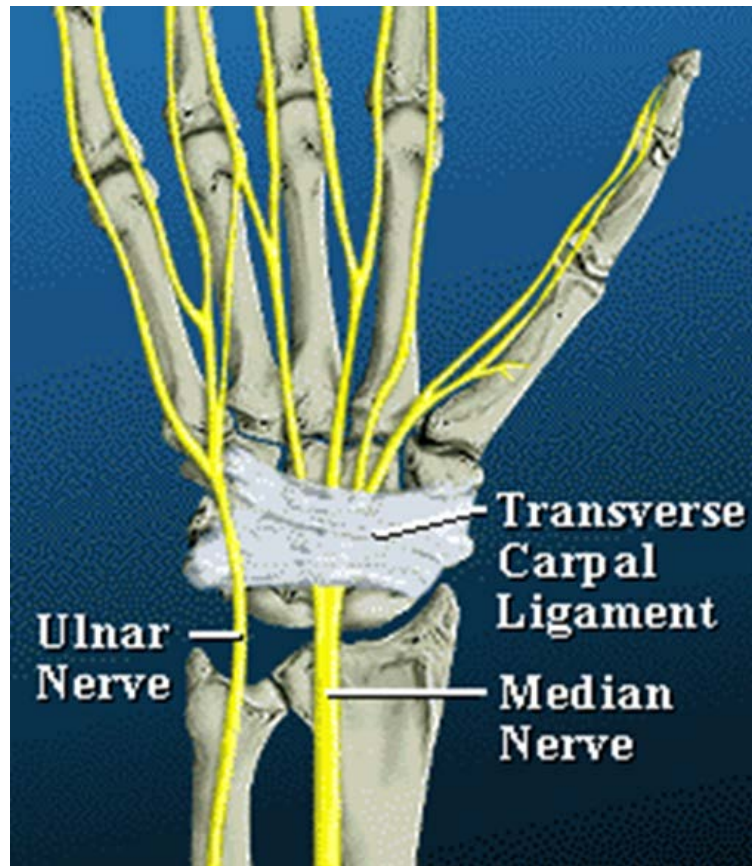
No

Consider wrist rest as a transitional landing pad



Yes

# Carpal Tunnel

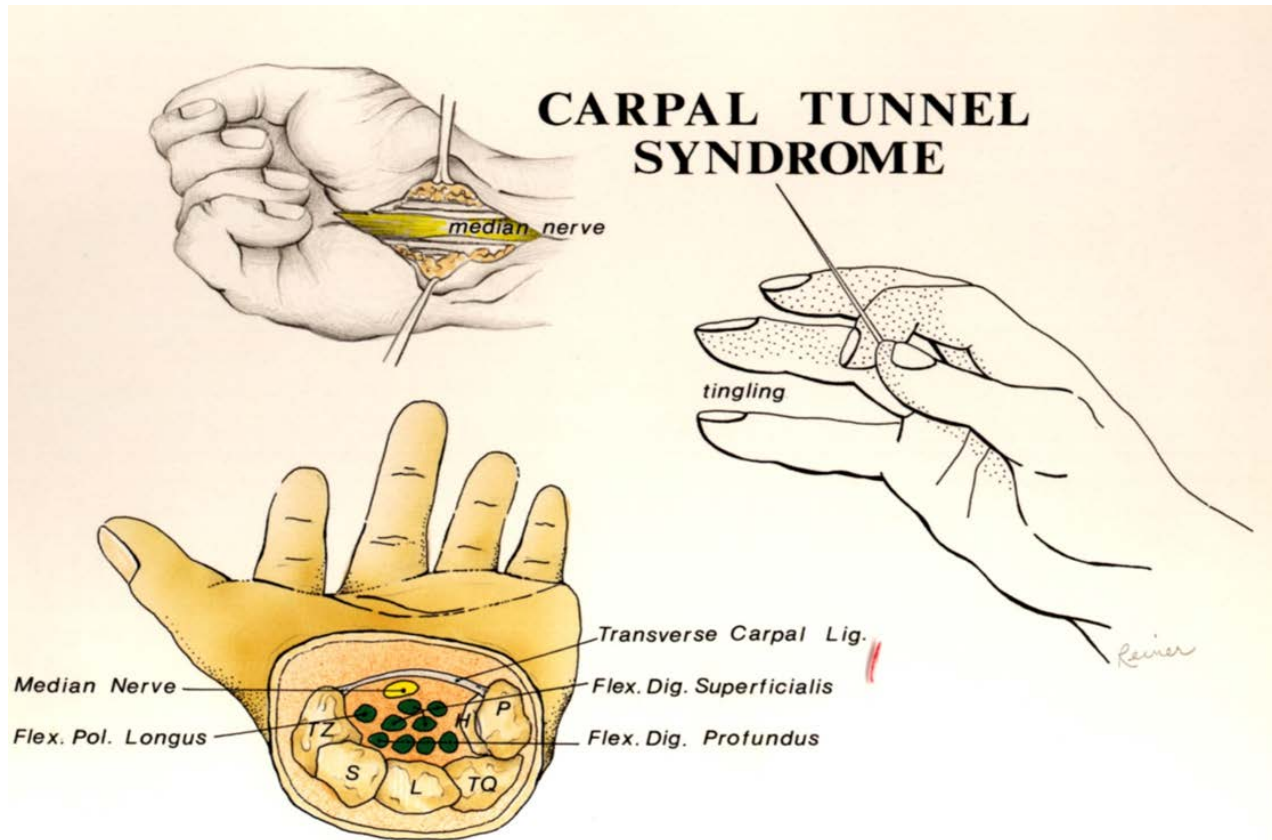




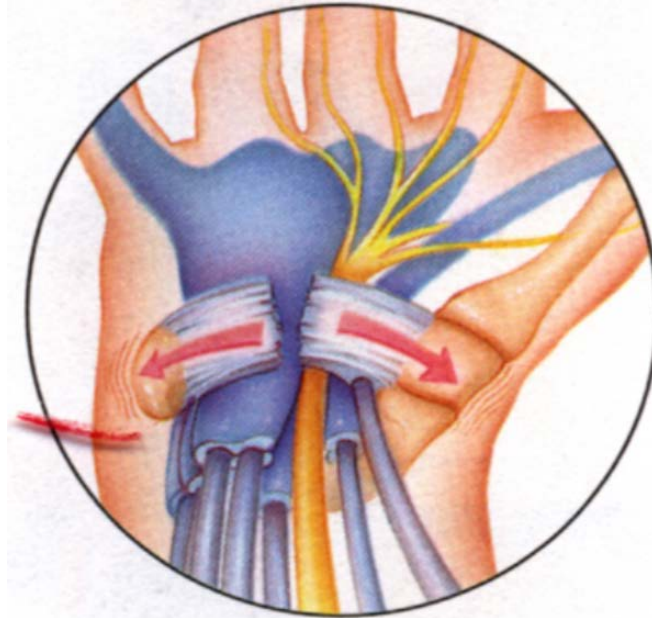
## Carpal Tunnel (Cont.)

- 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

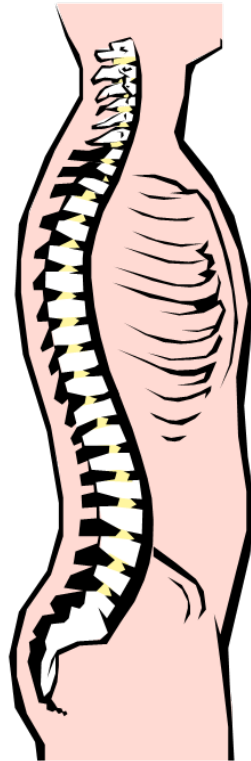


The ligament is released and the tunnel springs open, easing pressure on the nerve.

# Wrist Positioning for Mousing...



# The Cervical Spine



Weight of the Head = 11 LBS.

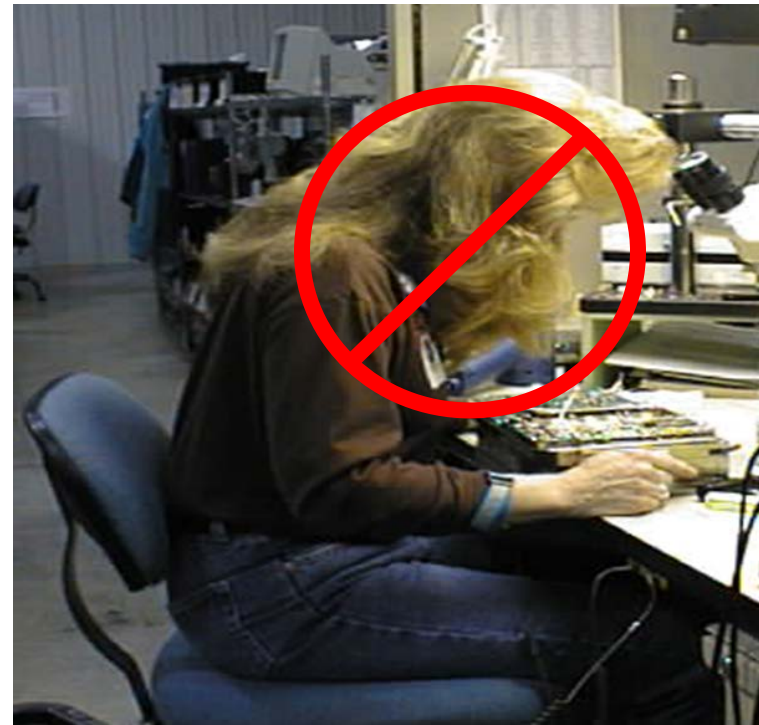


# Up-right Neutral Posture





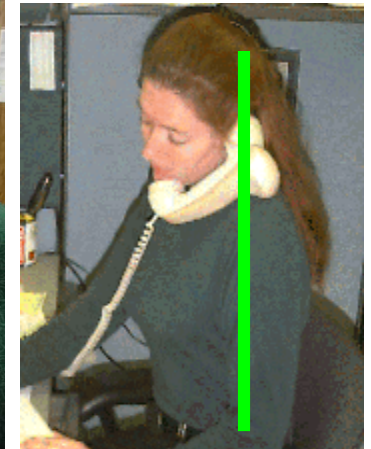
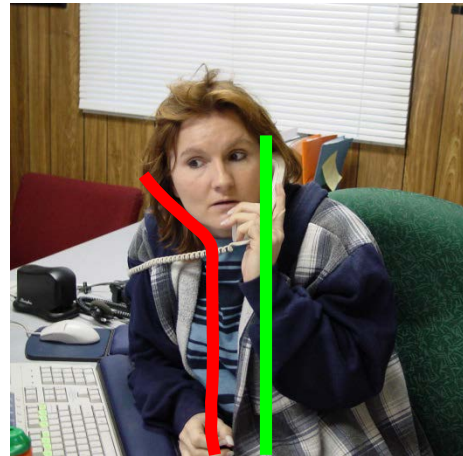
# Forward Head Postures





# 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...

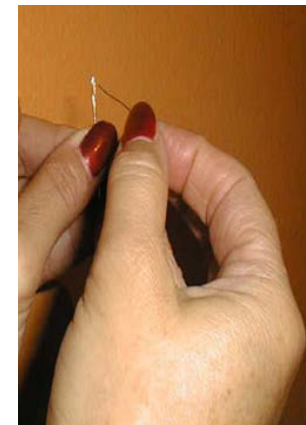
- If forward head postures are so bad, why do we do it?

## “The Need to See”

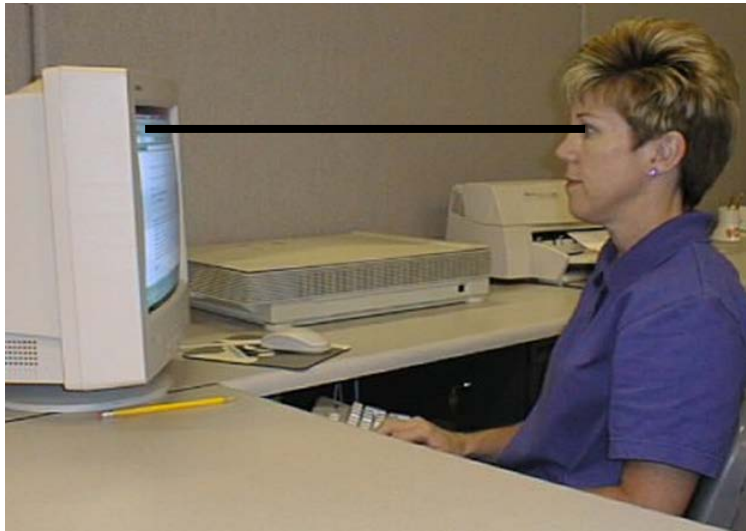
- As components and associated circuits have continued to shrink, operators have found ways to enhance their individual focal lengths for vision
- This has led to a variety of very predictable postural accommodations

# 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...

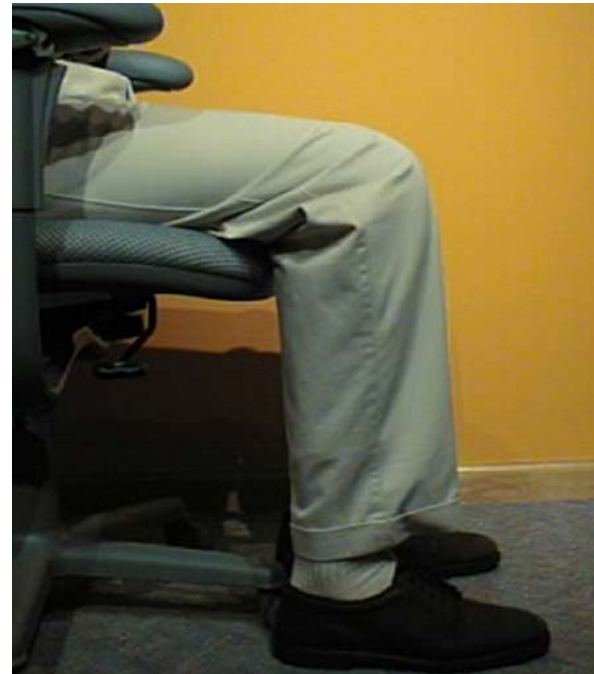




# Lighting Options...



# 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

