General Ergonomics

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Division of Public Safety
Introduction

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Objectives for Today

• Define musculoskeletal disorder (MSD)
• Lets take a look at our world
• Recognize risk factors for MSD's
• Ergonomics and its relationship to MSD's
• Understand some of the mechanics and solutions of MSD's
Musculoskeletal Disorders

• Daily stress to anatomical structures may occur when a person is exposed to certain high risk activities. If the accumulating stress exceeds the body’s normal recuperative ability, inflammation of the tissue can follow. Chronic inflammation may lead to the development of a cumulative trauma disorder (MSD's).
Injury in the making
Also here...
Ergonomics Goals

- Training
- Communications
- Interventions
- System Solutions
Early Intervention is Critical

- Communications
- Pain prevention
- Cost containment
- Education
- Intervention
- Solutions

- Early
- Response
- Gains
- Opportunity
The Bottom Line…

The goal of ergonomics is to make your job safe and easy to perform.
Tendonitis Risk Factors

- Repetition
- Forceful exertion
- Awkward / sustained postures
- Mechanical Stress
Repetition

• Repeated motion
• Technology
  o Speed
  o No built in breaks
• Less variation in work
Awkward/Sustained Postures

• Neutral posture is the goal
• Stay in the comfort zone
• Don’t over reach
Mechanical Stress
Grip Force

- Type of grip
- Object weight
- Object dimension
- Required posture
Pinching/Posting Grips
Lever Arms & Forces
Shoulder Injuries

• Impingement Syndrome
  o bursitis
  o rotator cuff tendonitis / tears

• Risk Factors
  o overhead reaching / lifting
  o sustained overhead positions
  o force and repetition
Anatomy of the Shoulder
Shoulder Impingement
Minimize Overhead Lifting
Bring the load down or lift yourself
Low Back Pain

• **Review of the anatomy**
  - normal curves
  - bony columns
  - function of the disc
  - spinal cord & nerve roots
  - degenerative issues

• **Maintain the balance**
Normal Curves of the Spine
Columns of Support

• Posterior column of support
  o made up of the facet column
  o very stable
  o reflects an upright posture

• Anterior column of support
  o made up of body of vertebra and the disc
  o less stable
  o reflects a flexed posture
The Disc & Nerve Root

- The disc is the shock absorber of spine
- 85% water at the age of 15
- 25% water at the age of 75
A Close-up Look
Forward Bending

- **Too much spinal flexion**
  - loads the anterior column of support
  - places the posterior wall of the disc at risk
  - has the potential for nerve root compromise
Balance the Curves
Safe Lifting

- Up-right neutral posture
- Posterior column of support
- Stable -- less risk of injury
Avoid Twisting
Work smart – not hard
Test Your Loads – Seek Help
Consider Different Choices

Increase height of your work
Safe Lifting is Not an Accident

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

- Avoid spinal flexion
- Avoid twisting
- Avoid increasing disc pressure
- Avoid reaching
The Cervical Spine
Cervical Spine Anatomy
Weight of the Head = 10-12lbs
Muscular support of the Neck
Up-right Neutral Posture
Forward Head Postures
Forward Postures Lead to Trouble

- Muscular Strain
- Tension Headaches
- Ligament Laxity
- Degenerative Arthritis
- Nerve Root Compromise
Question...

So 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”

• Directly related to this issue of vision is “targeting of the work”.

• The process by which an individual brings two or more objects together in concert with one another
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.
Consider Elevation of product
Not Bad, But...
A Better Combination
Exercise Concept

• Take a pause
• Rest from stress not from function
• Reversal of positions
  o flexed wrists
  o flexed elbows
  o forward shoulders
  o forward heads
  o sitting
Upper Extremity Exercises
We’ve Been Here Before...

- Prevention is the key
- Early intervention
- Keep it simple ..... We will get to difficult
- Think neutral postures
- Decrease heights
- Shorten “lever arms”
In Closing…Where do we go?
Slow Down...
Stop and assess the situation
Don’t be afraid to get some help
Listen to your body and pay attention