

General Ergonomics

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Division of Public Safety

Introduction



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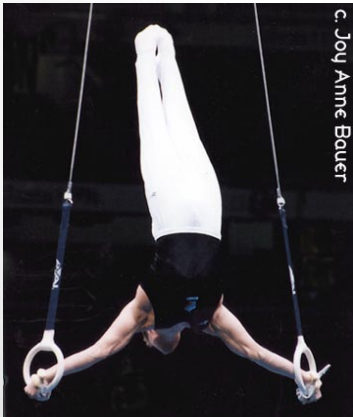
Objectives for Today

- 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

- **E**arly
- **R**esponse
- **G**ains
- **O**ppportunity

The Bottom Line...

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

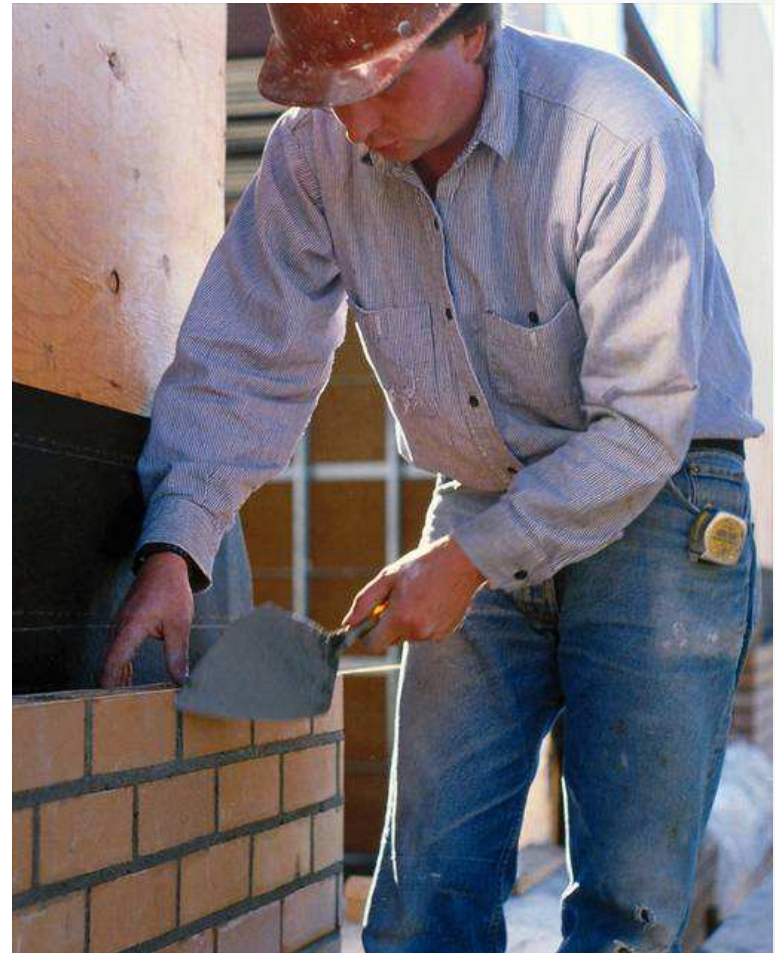
Tendonitis Risk Factors

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



Repetition

- Repeated motion
- Technology
 - Speed
 - No built in breaks
- Less variation in work

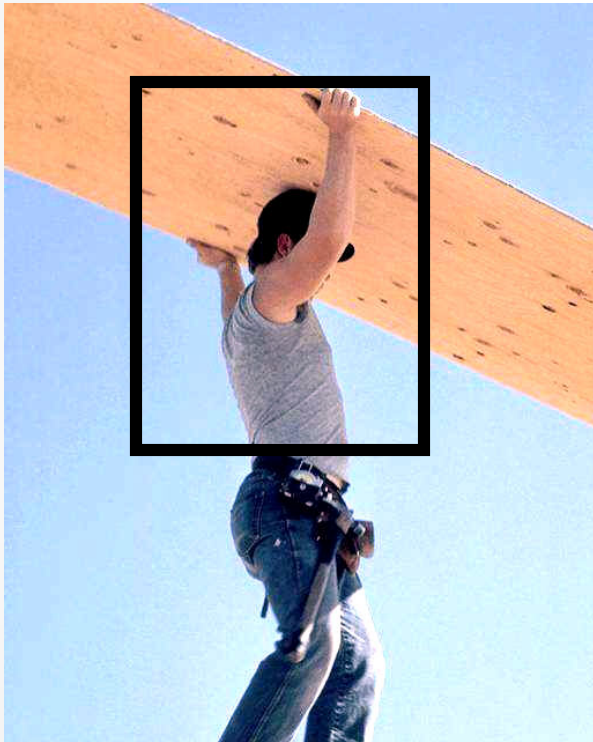


Awkward/Sustained Postures

- 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

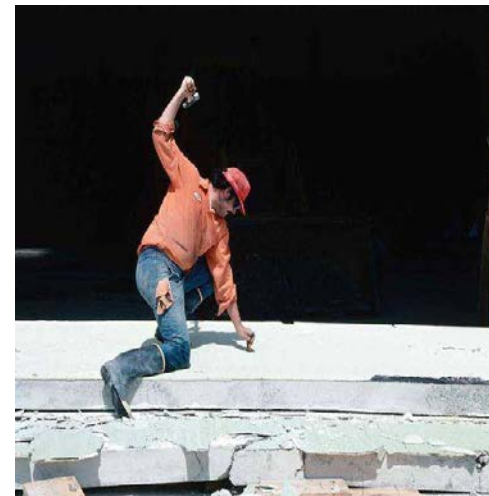


Lever Arms & Forces

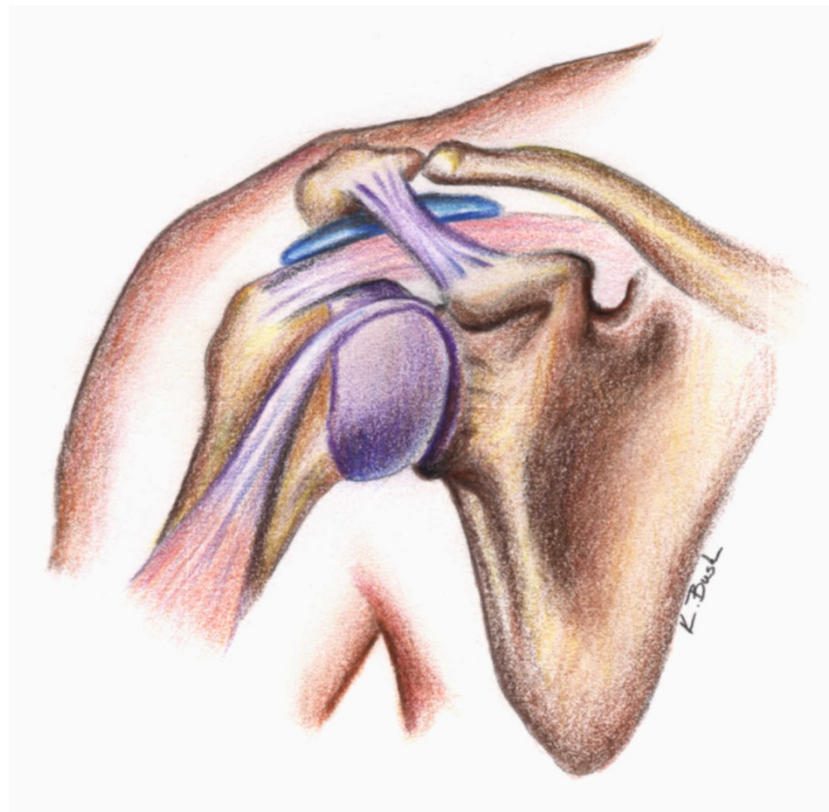


Shoulder Injuries

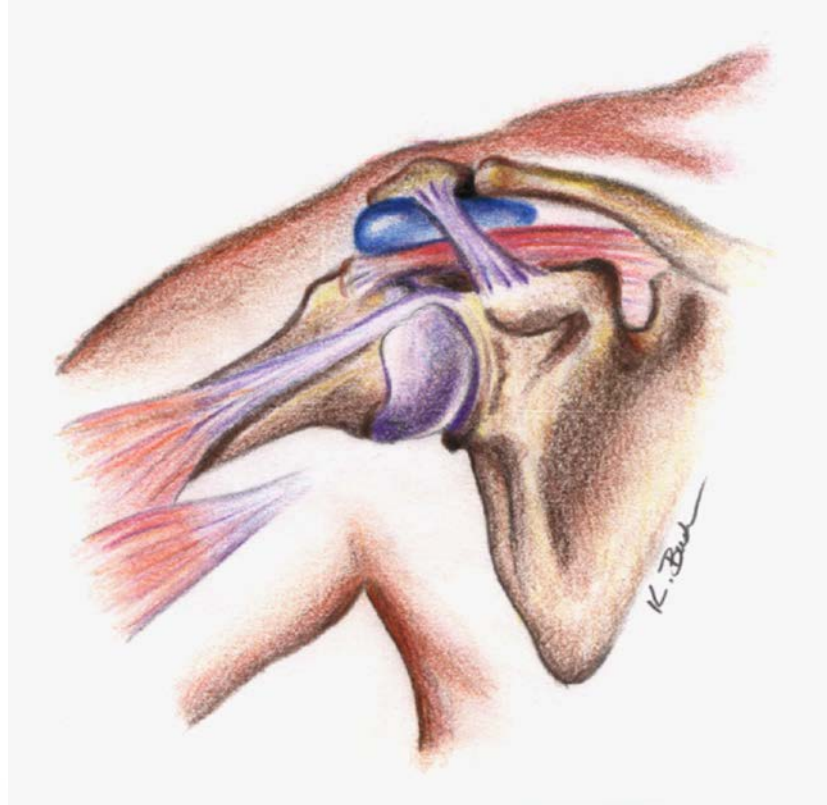
- **Impingement Syndrome**
 - bursitis
 - rotator cuff tendonitis / tears
- **Risk Factors**
 - overhead reaching / lifting
 - sustained overhead positions
 - force and repetition



Anatomy of the Shoulder



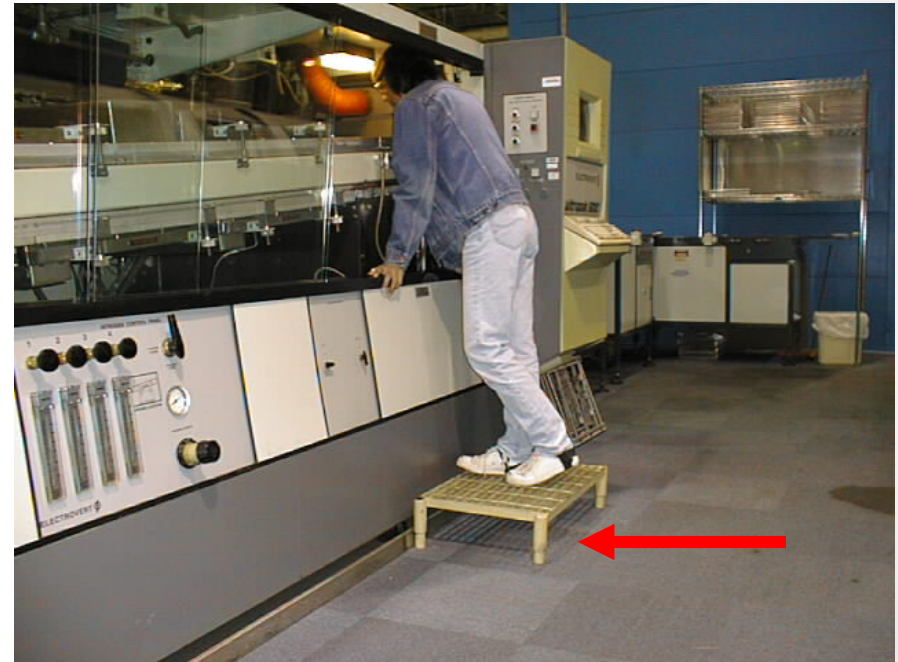
Shoulder Impingement



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

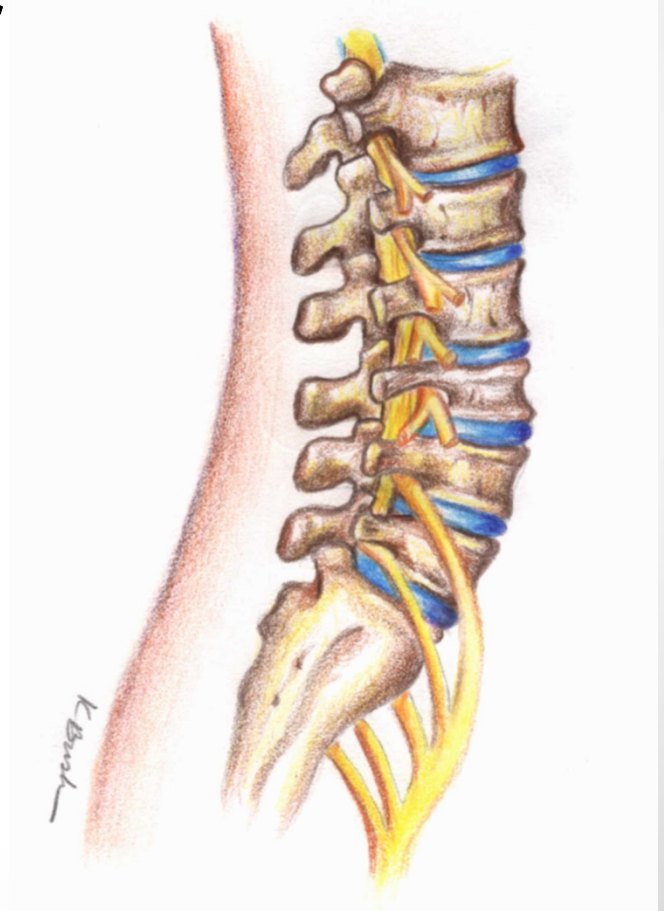


Columns of Support

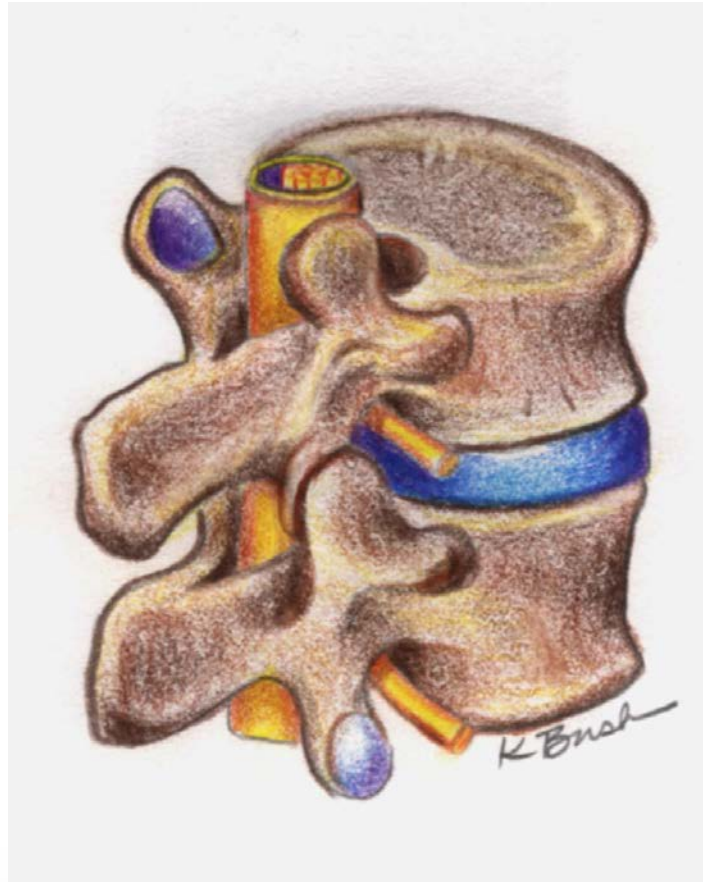
- **Posterior column of support**
 - made up of the facet column
 - very stable
 - reflects an upright posture
- **Anterior column of support**
 - made up of body of vertebra and the disc
 - less stable
 - reflects a flexed posture

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

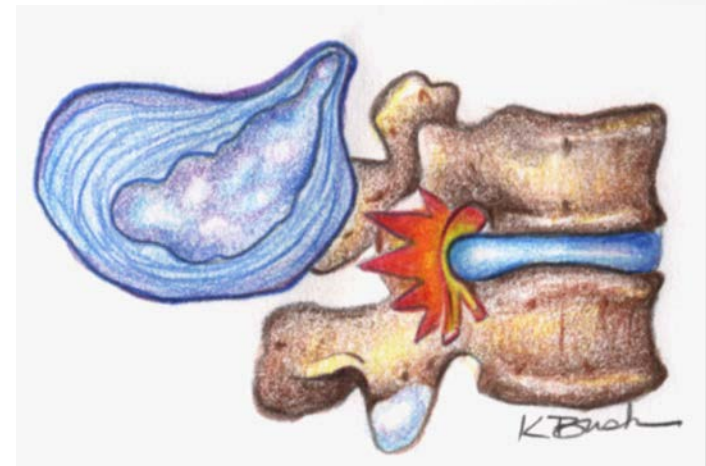


A Close-up Look

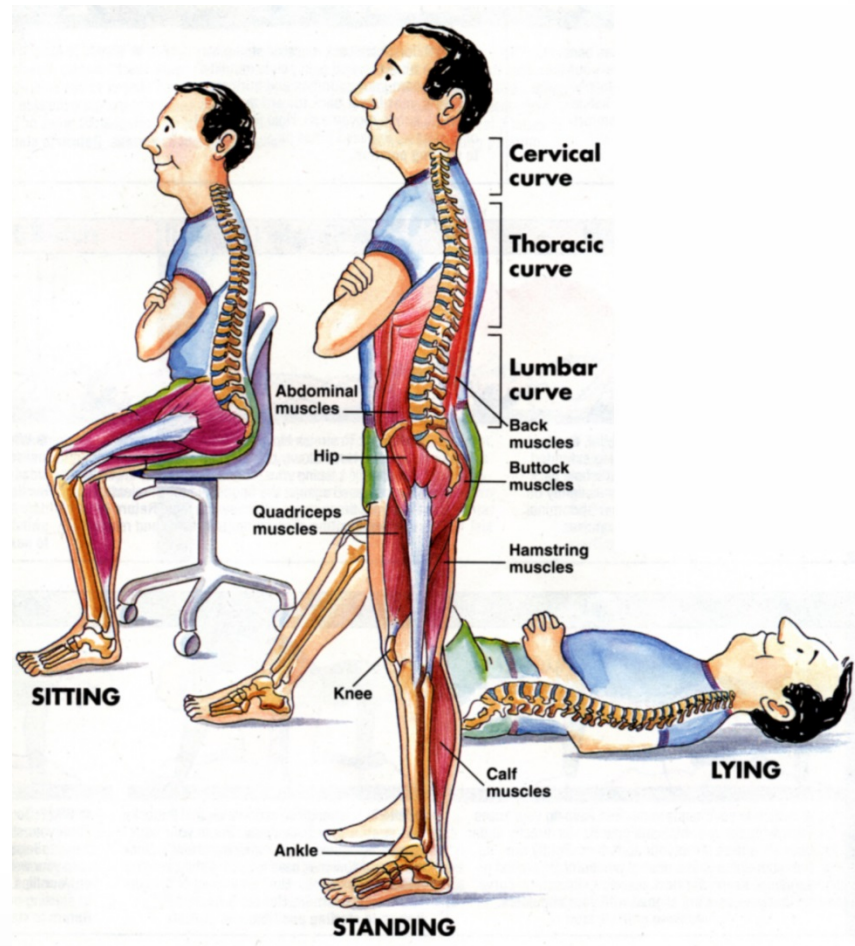


Forward Bending

- **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

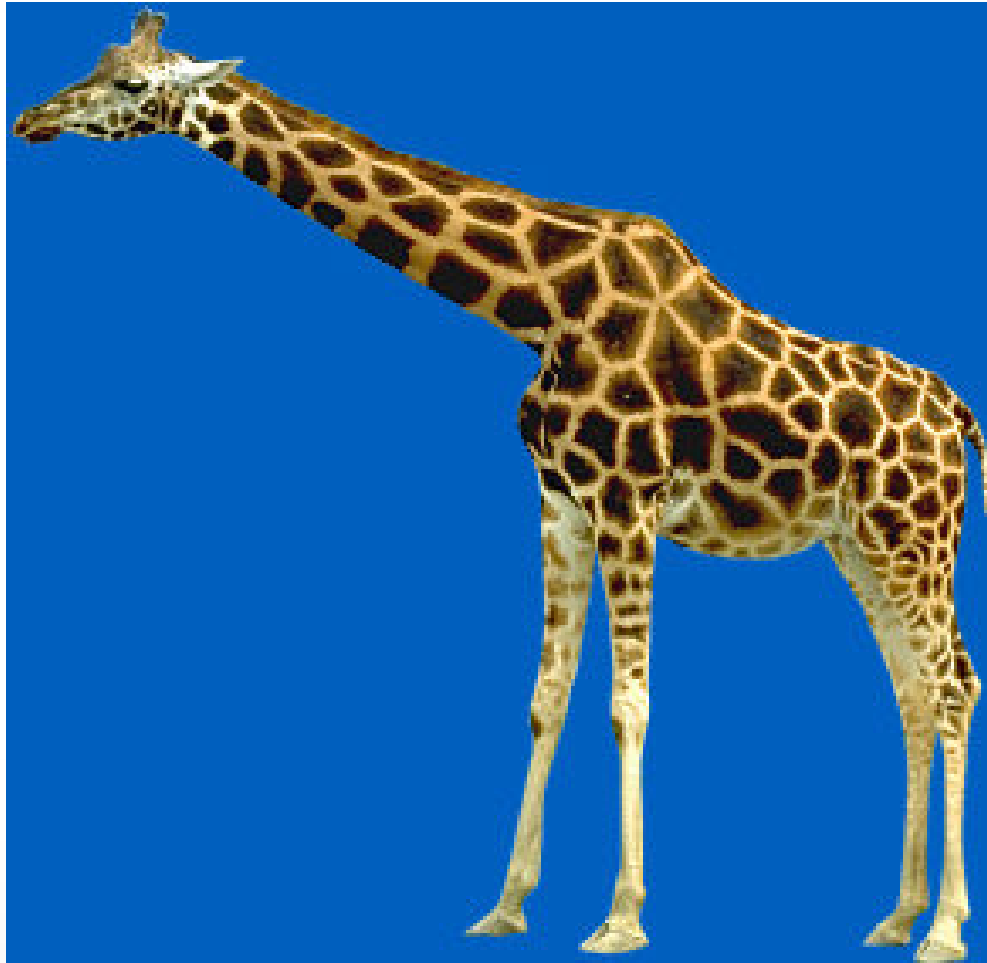


Increase height of your work

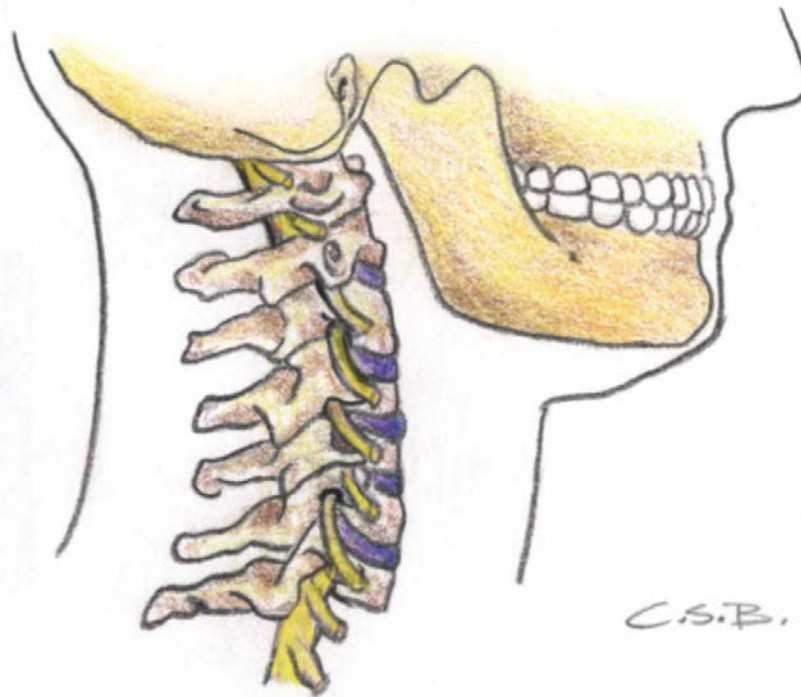
Safe Lifting is Not an Accident

- 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



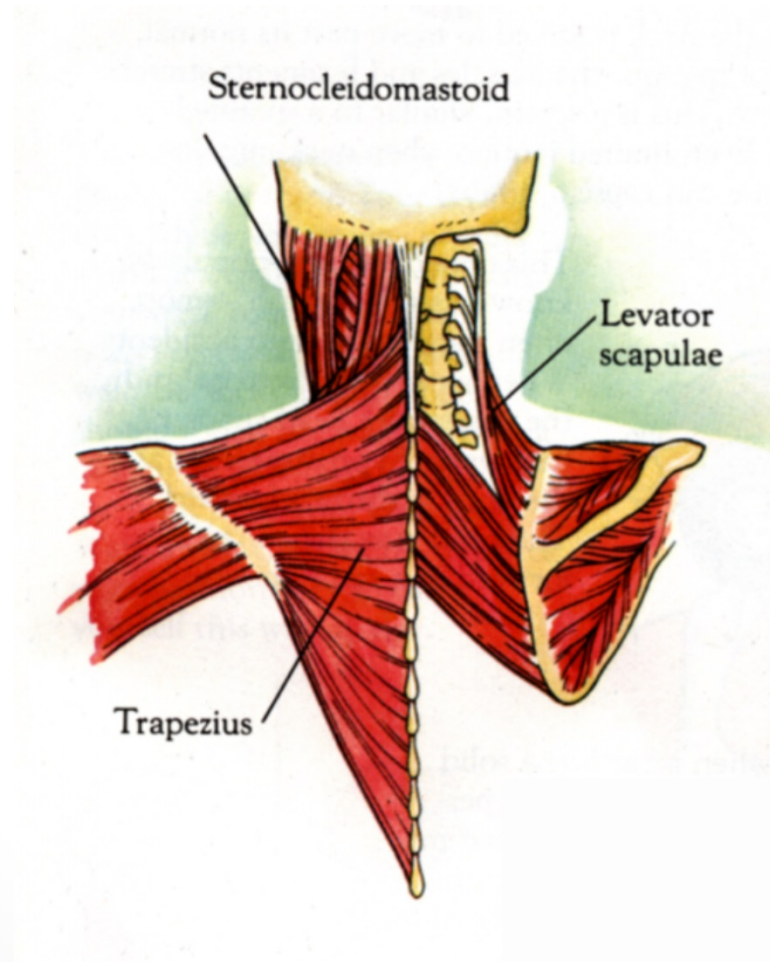
Cervical Spine Anatomy



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”

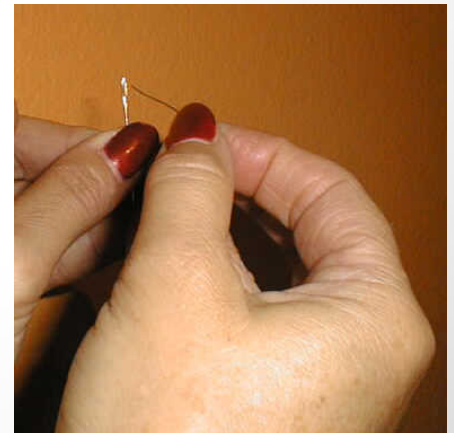
- As components and associated circuits have continued to shrink, operators have found ways to enhance their individual focal lengths for vision
- This has led to a variety of very predictable postural accommodations

“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, ie., 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
 - flexed wrists
 - flexed elbows
 - forward shoulders
 - forward heads
 - 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

