

Back Safety and Posture Awareness Workshop

**Health and Employee Wellness
Division**

Jaimin Shah PT, DPT



Objectives:

- Ergonomic awareness
 - Understanding Proper Biomechanics
 - Identify Risk Factors
 - Learn How to Limit these Risk Factors
- 

Ergonomic Awareness?

**To Prevent disorders of the soft-tissues
such as muscles, tendons, nerves,
blood vessels, & joints.**

Common Disorders:

- Carpal Tunnel Syndrome
- Tendonitis
- Back Strain/Sprain
- ...and others



RISK FACTORS

Repetition

Awkward Postures



+



Force



Minimize Risk Factors



The Goal is to help you identify and *reduce, eliminate, or safely manage* potential risk factors in your work environment

CUMULATIVE TRAUMA DISORDERS (CTDs)

- Injuries that occur over a period of time
- Disorders of the muscles, tendons, and peripheral nerves or vascular system
- “Caused, precipitated and/ or aggravated by repeated and sustained exertions or motion of body parts, particularly the hands, wrists, elbows, arms, shoulders, neck and back” -

risk.arizona.edu/sites/risk/files/lab_ergonomics.ppt



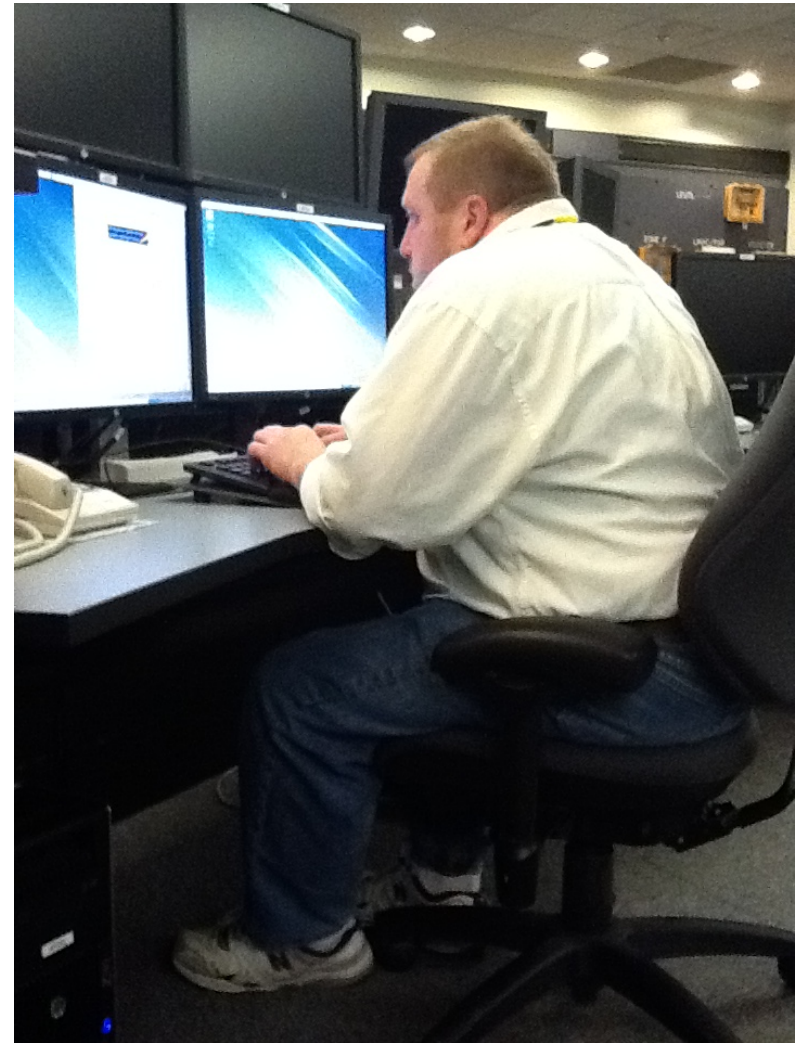
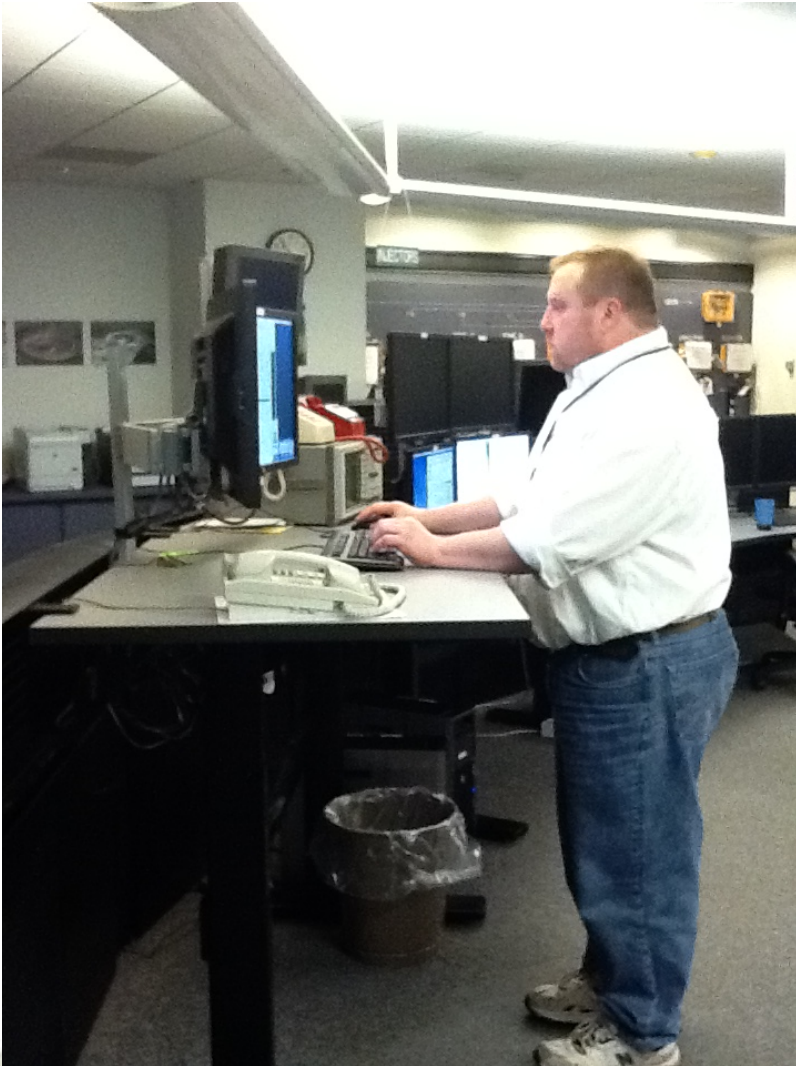
CTD RISK FACTORS

- **Improper Equipment** - Furniture and tools not suited to the task or the individual. Examples:
 - ☐ Poor condition
 - ☐ Improper placement
 - ☐ Incorrect use
 - ☐ Incorrectly installed/sized/adjusted
 - ☐ Manual rather than powered equipment for large tasks

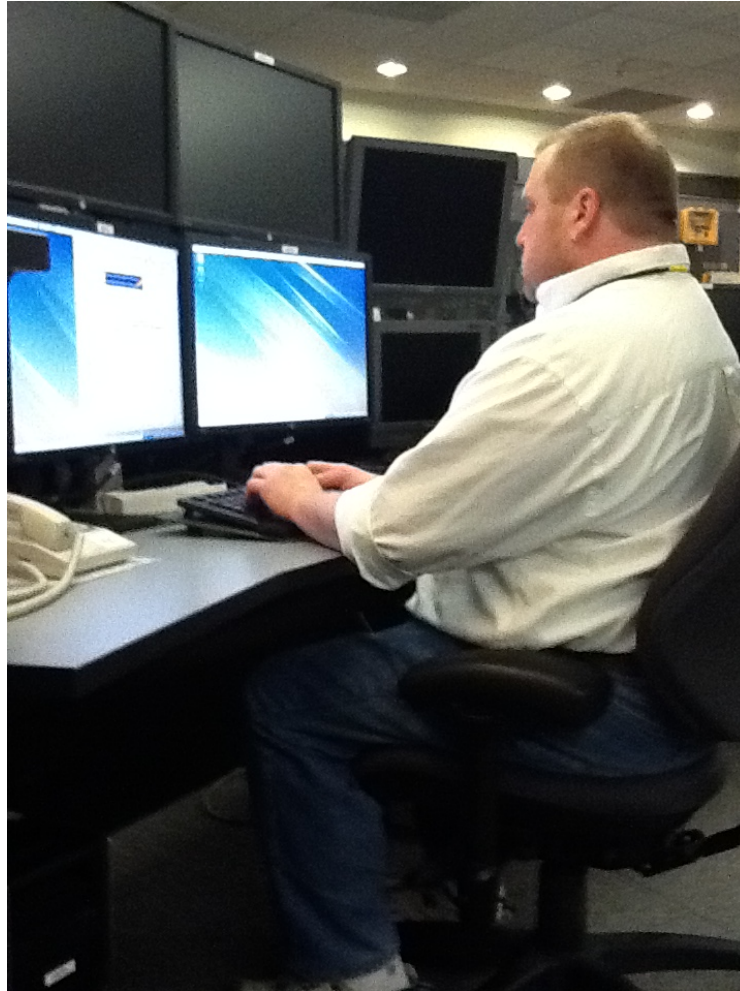
- **Repetition** - Repeated performance of tasks in a time period that not allowing for full physical recovery. Examples:
 - ☐ Repetitive lifting
 - ☐ Repetitive bending



Identify Stresses and Strains



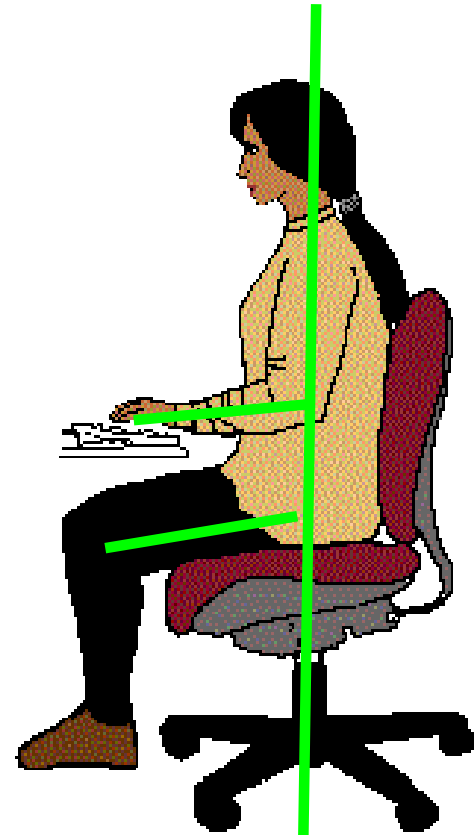
Identify Stresses and Strains



Sitting Posture

Neutral posture:

- Back supported by the chair back
- Ears, Shoulders, Elbows, Hips vertically aligned
- Elbows, hips, knees bent at near-right angles ($90^{\circ} - 105^{\circ}$)
- Feet flat on the floor or footrest



Workstation setup

Normal 8-12" in front of the body
Maximum: 16-20" in front of the body

Safe reach zone

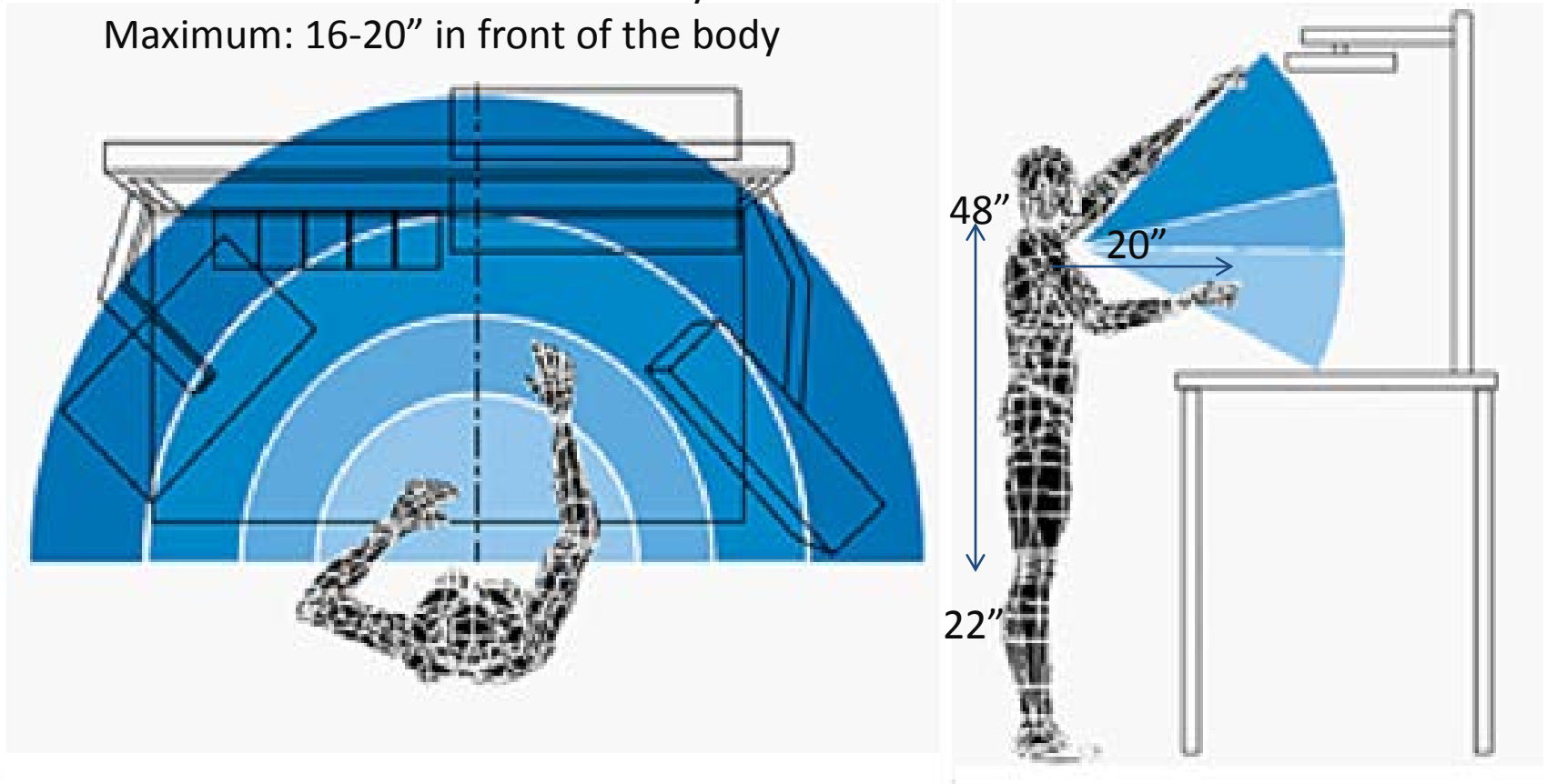


Figure 3 – Reach Zones

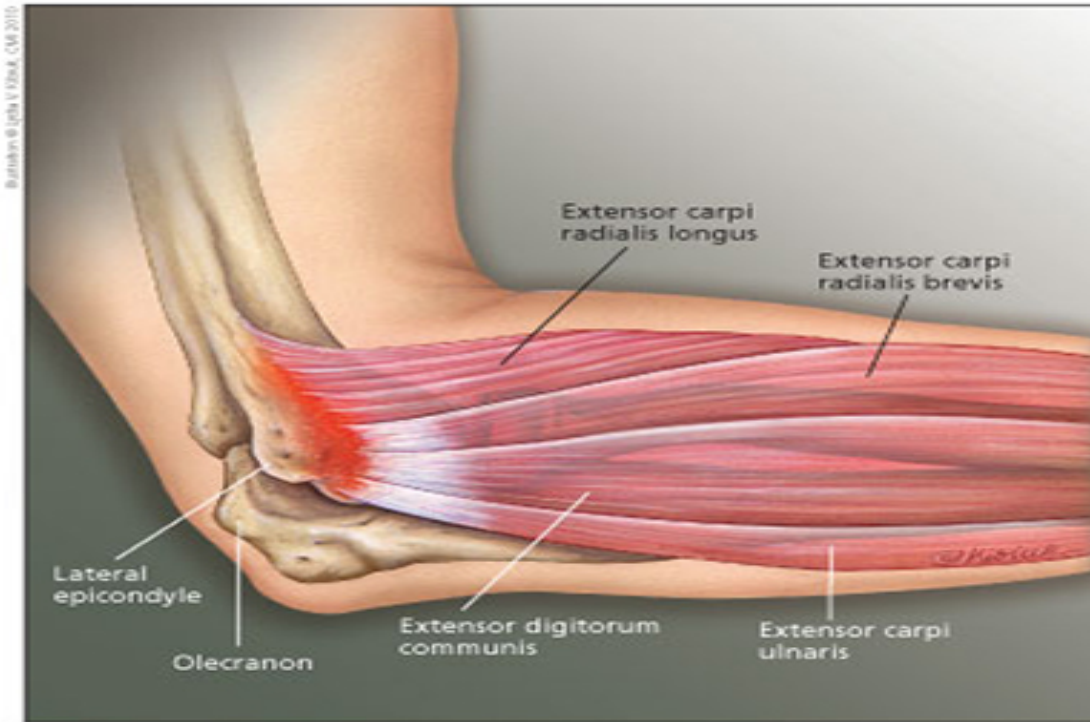
SYMPTOMS OF CTDs

- **Tingling sensation in fingers/ hands or legs.**
- **Decreased mobility of the fingers, hands, elbows, shoulders, hip and knee.**
- **Dull, aching discomfort or pain**
- **Decreased hand strength**
- **Numbness**
- **Pain at night/ sleep disruption**
- **Twitching, cysts in the hands and arms**



INJURIES

Tendonitis – Inflammation and pain in the tissue that connects muscle to bone.



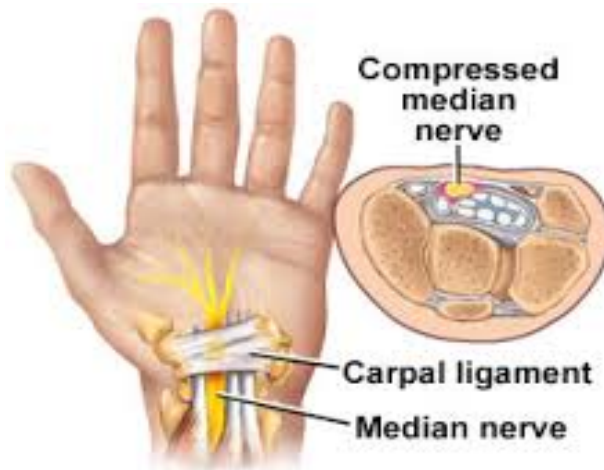
De Quervain's Tenosynovitis



MendMeShop™ © 2011

INJURIES

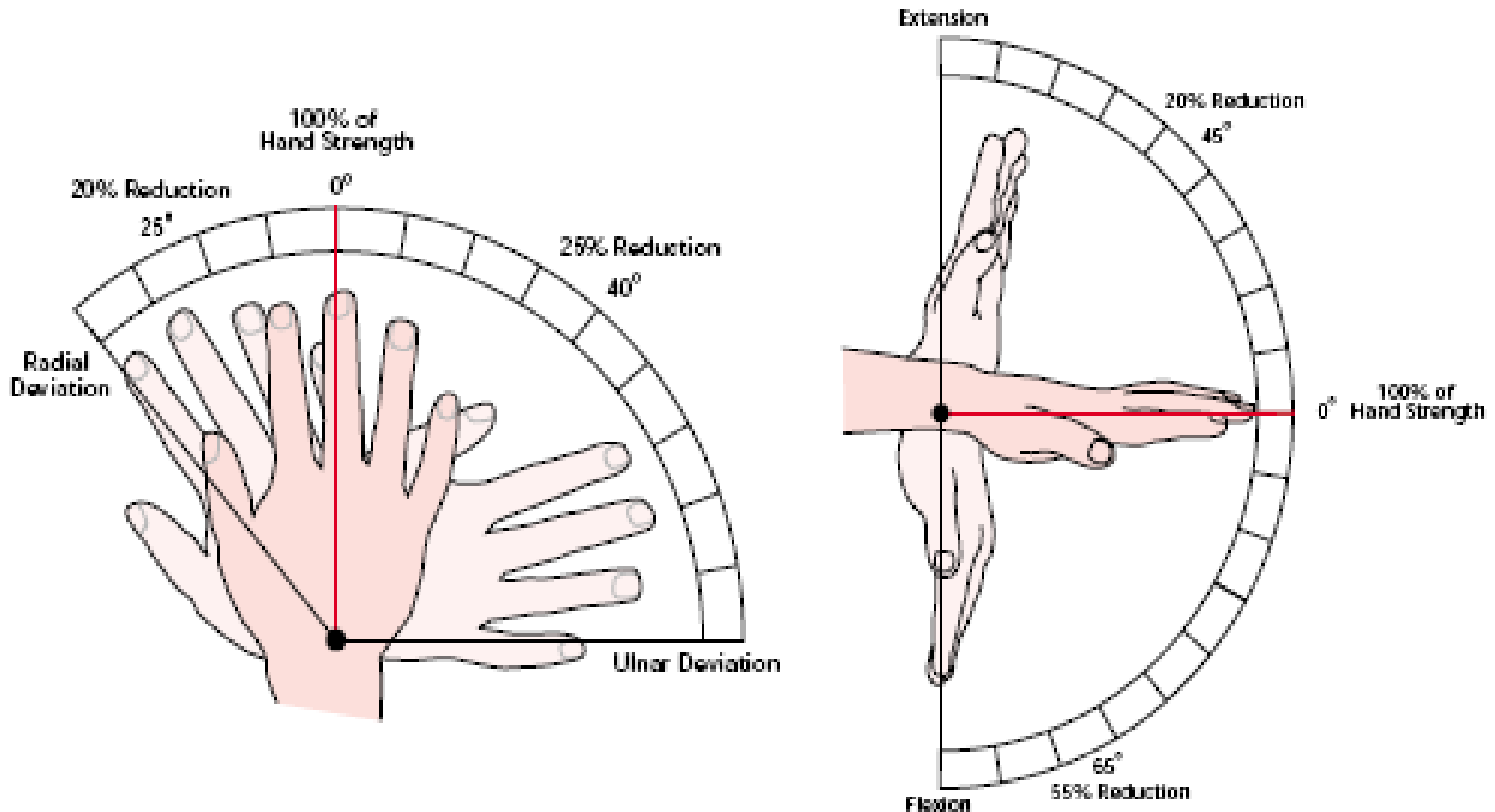
- ❖ Carpal tunnel syndrome (wrist)



- ❖ Ulnar neuritis (elbow/wrist)
- ❖ Pronator syndrome (forearm)

Recommendations:

Minimize awkward positions (hand is strongest in neutral position)





Incidence of Low Back Pain

- Most expensive and common work related injury
- 50% of the working population will experience back pain
 - 80% report reoccurring low back pain (LBP)



Risk Factors

- Improper biomechanics/lifting
 - Twisting pushing and pulling
- Poor conditioning
- Obesity
- Smoking
- Age
- Improper nutrition
- Genetics – osteoarthritis

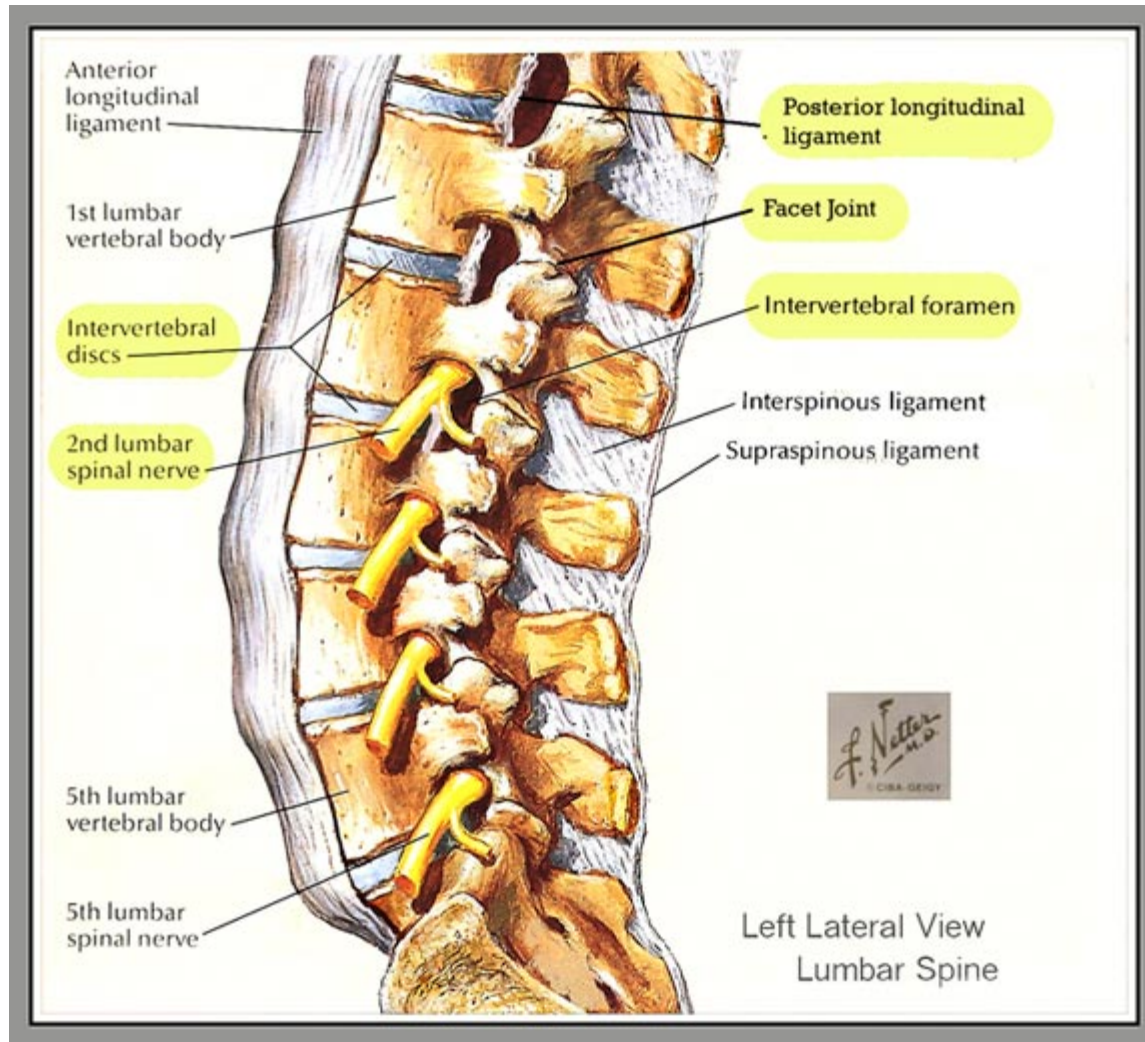


SPINE

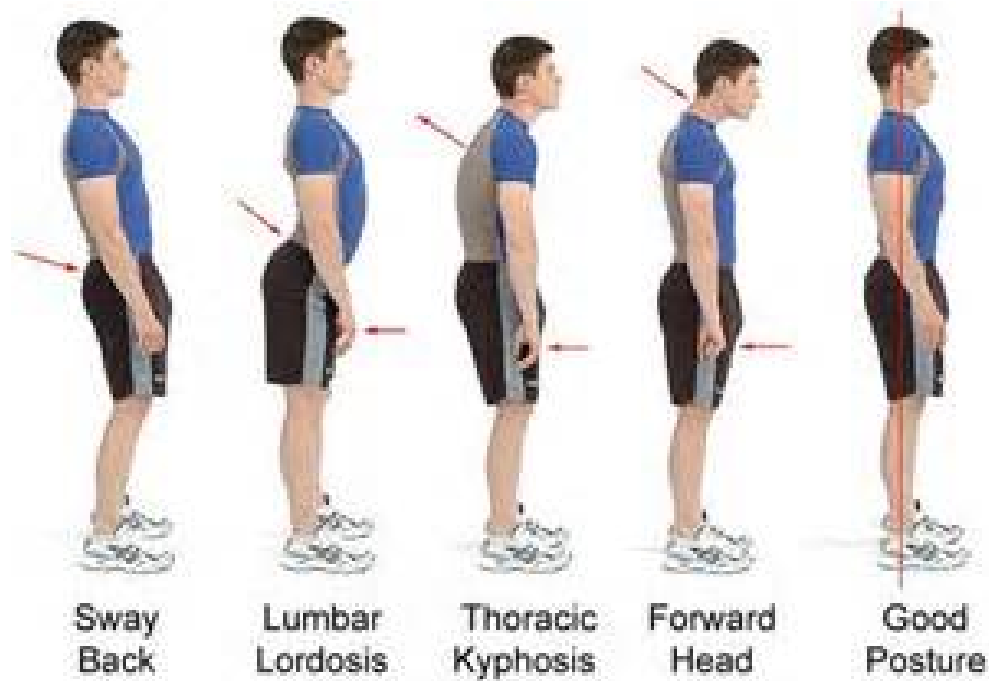
Lateral (Side) Spinal Column



Anatomy of Lumbar Spine



Posture

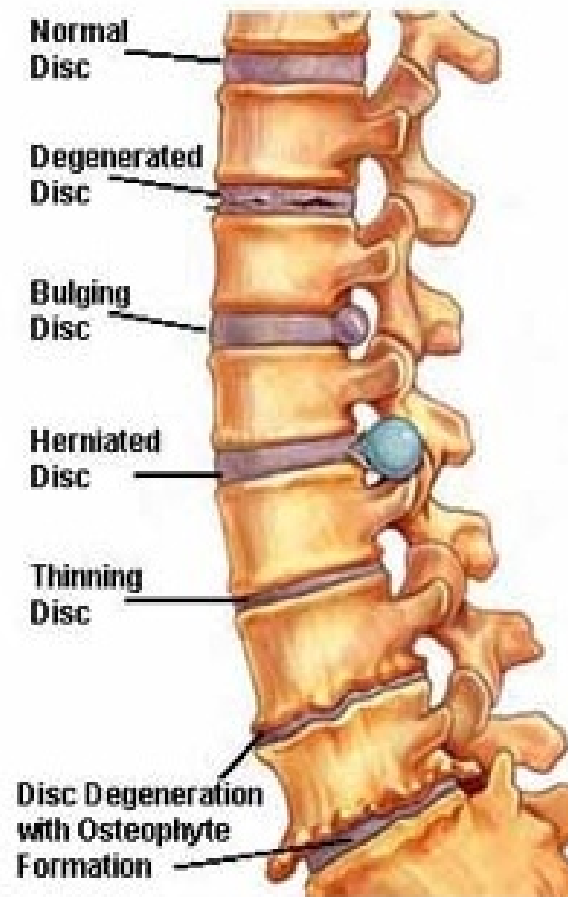


Statistics

- 80-90% of attacks of LBP recover in about 6 weeks regardless of treatment (Waddell 1994)
- Relapse rates: 58% based on average from a review of 14 separate studies (McKenzie, R., May, S. (2003)
- Strongest risk factor for LBP is a previous episode (Croft et al. 1997, Shekelle 1997, Smedley et al 1997)
- Someone with a previous episode is 3-4x more likely to have LBP again than someone who never had it (Frank et al. 1996)



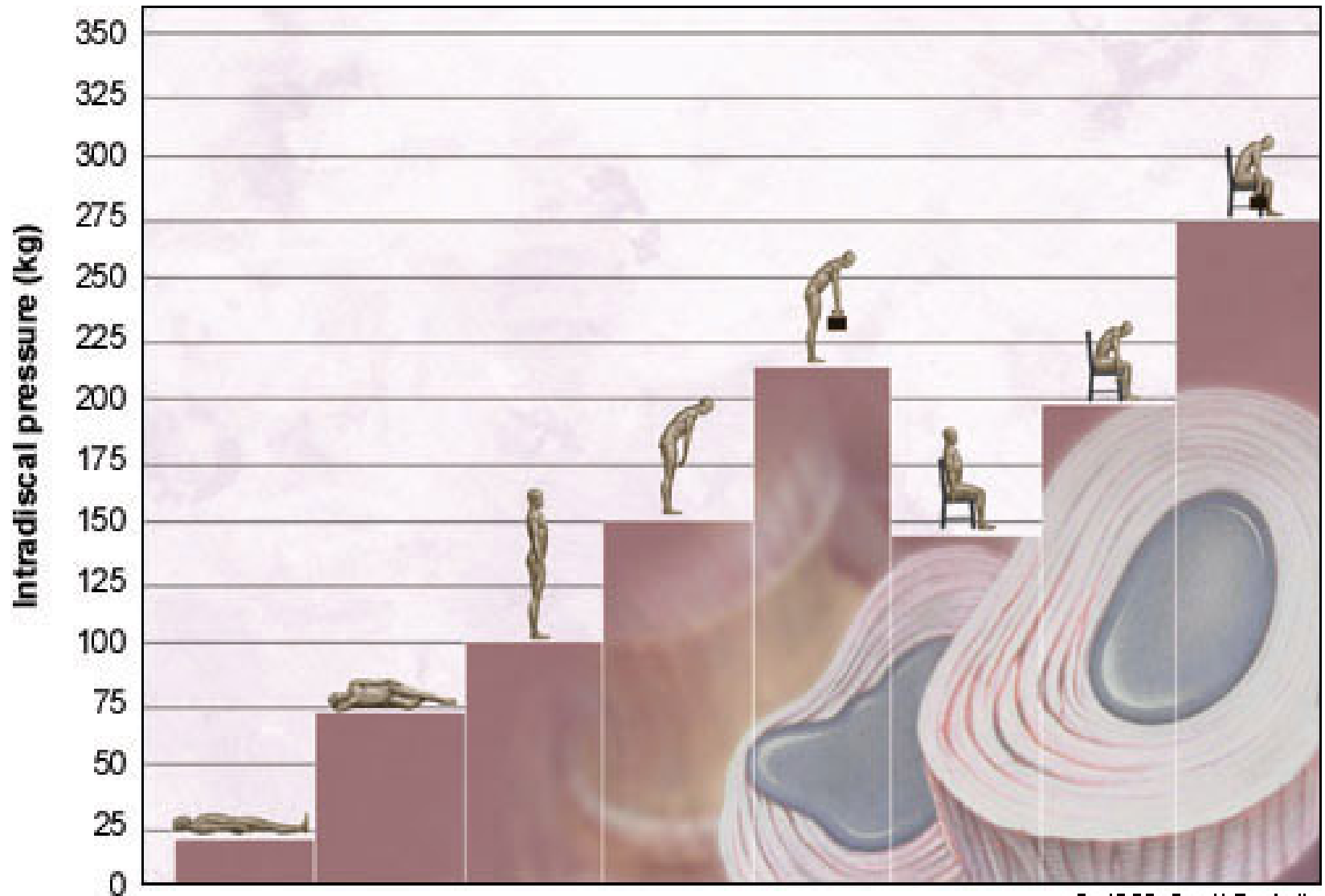
Examples of Disc Problems



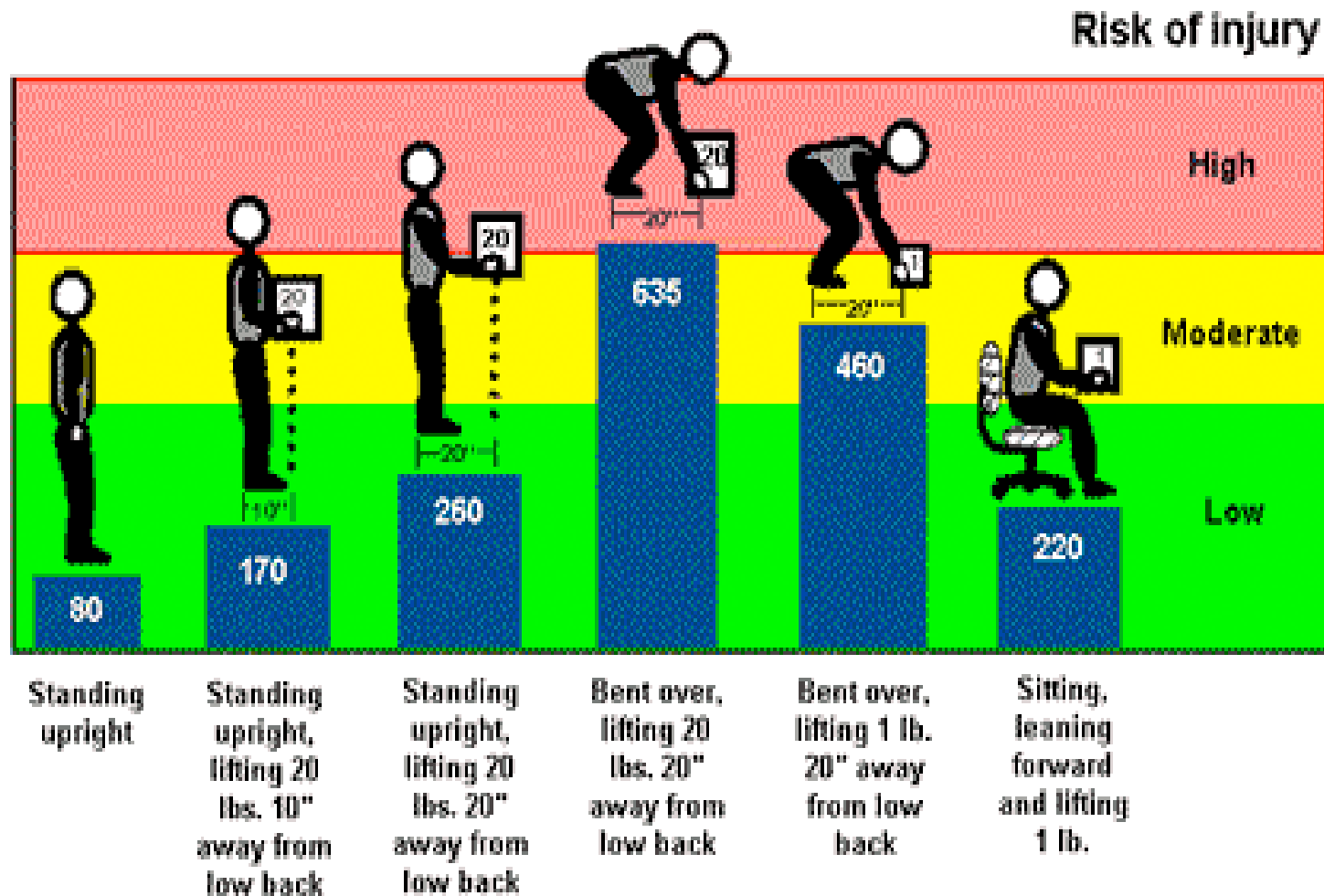
Identify Stresses and Strains



Intradiscal Pressure



Pounds of compressive force on lower back



Identify Stresses and Strains



Identify Stresses and Strains



Proper Lifting Technique

- Get close to the object (approximate COGs)
- Widen your base of Support
- Contract Transverse Abdominis & Multifidus muscles
- Keep your back straight and squat with the legs
- Use arms to lift object to waist level
- Rise to an upright position using the legs



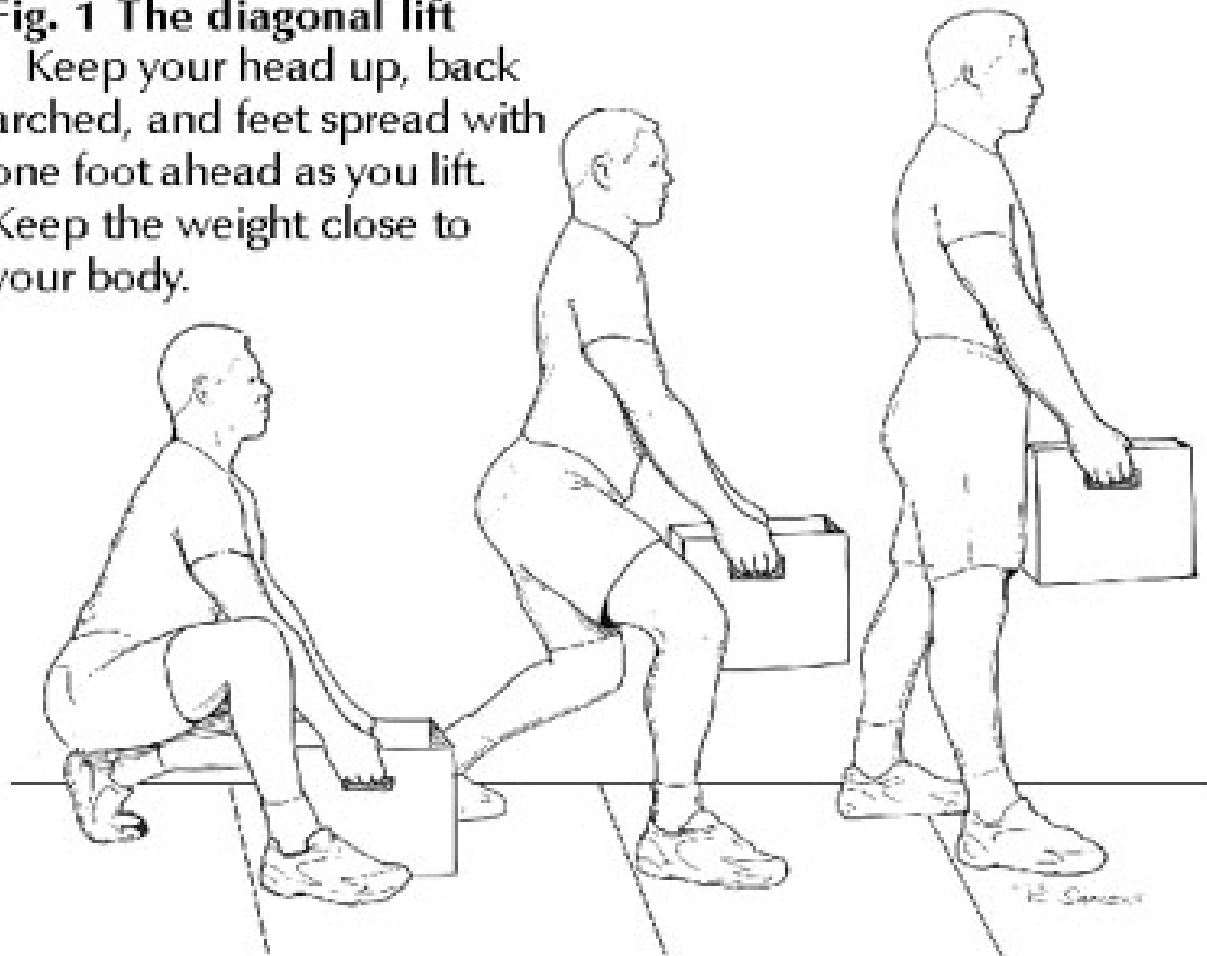
Power Lift



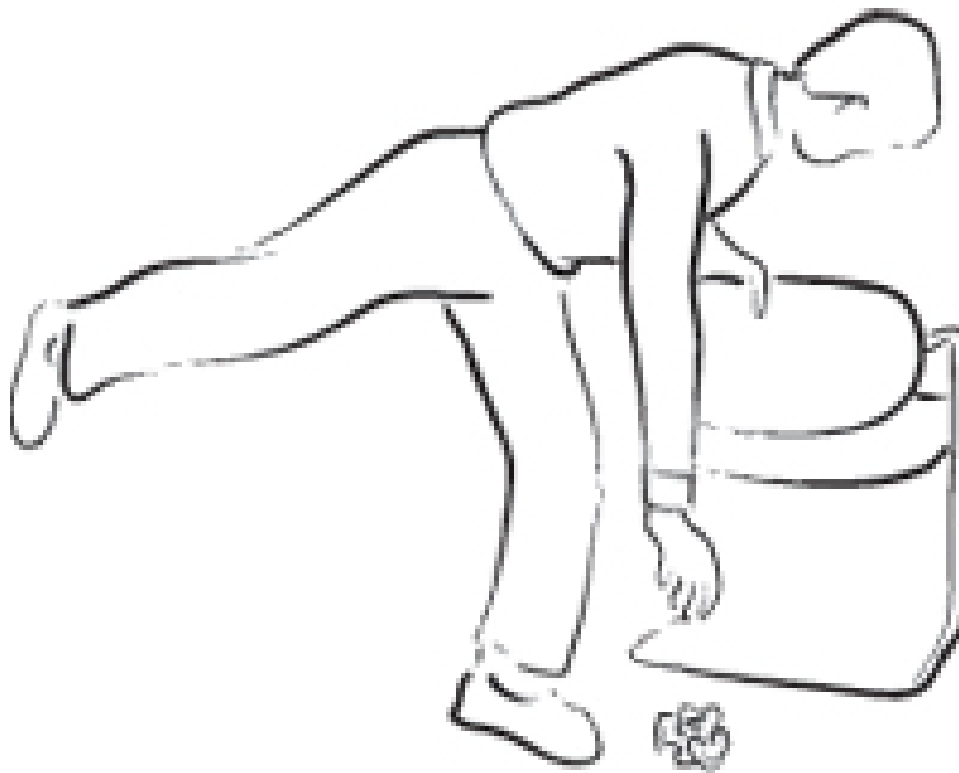
Diagonal Lift

Fig. 1 The diagonal lift

Keep your head up, back arched, and feet spread with one foot ahead as you lift. Keep the weight close to your body.



Golfer's Lift



Use the Power Lift

Stoop



AVOID!!

Squat



CAUTION!!

Power Lift

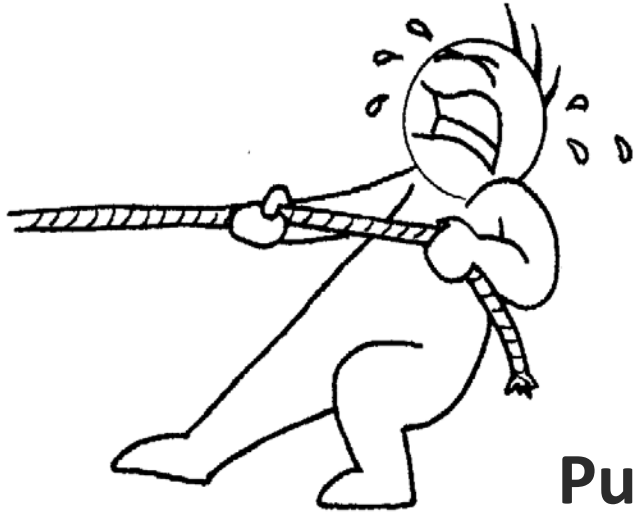


OKAY!!

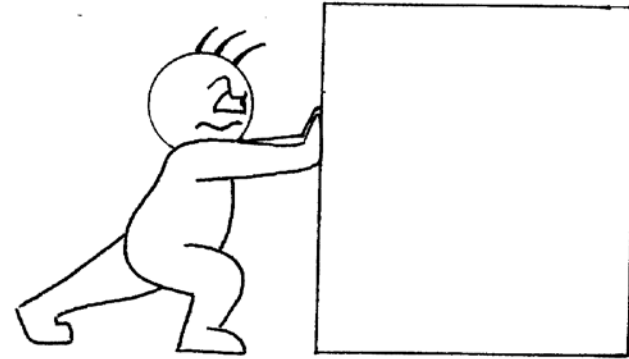
Evaluate:



Push or Pull?



Vs.



Push rather than *pull*. Pushing a load is generally less stressful on your body because you use the weight of your body and maintain a more neutral posture. When you pull, your body is often **twisted** and you frequently use only one hand.

How would you move this?



Pushing, Pulling Tasks



Wheeled Dollies

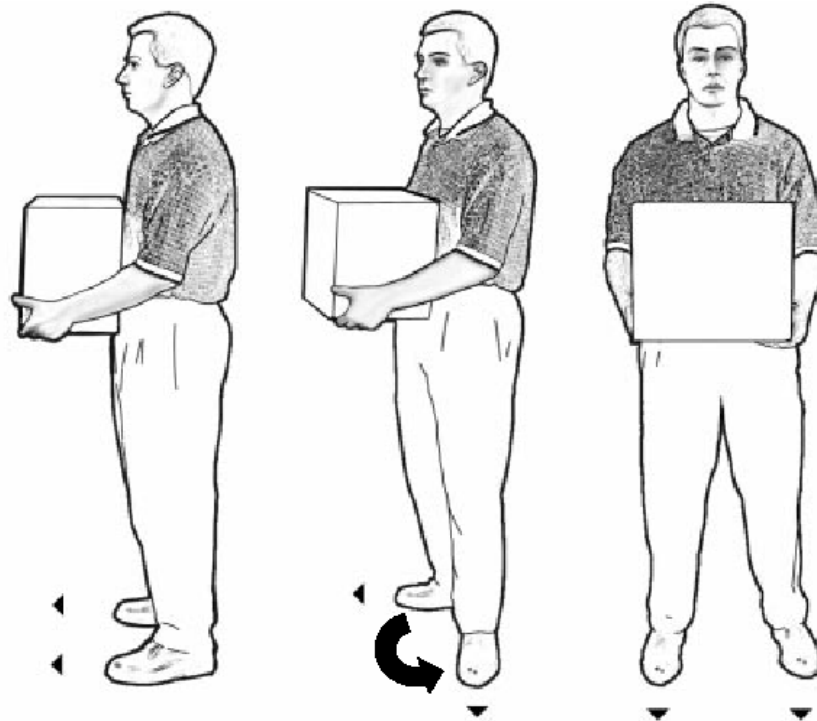
Push/Pull Force Required

~ 12% of the Gross Weight

Example:

400# cart ~ 48# push/pull
force required

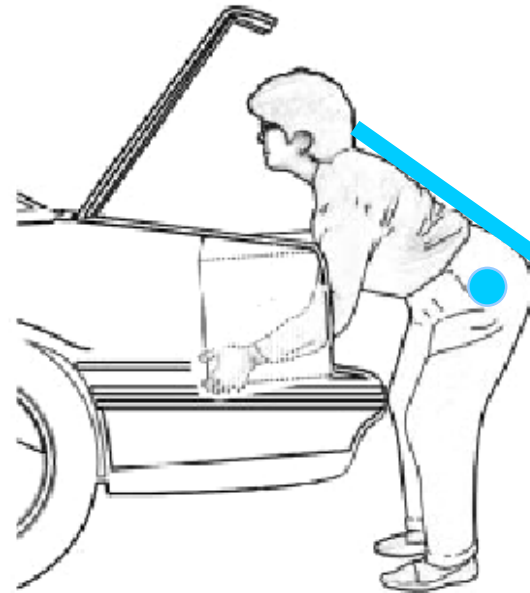
Ways To Carry Objects



- Keep the load close
- Pivot with feet instead of twisting

Protect your back

Keep the curves: > bend hips/<knees



Avoid the “C” shaped spine



Too large = team lift



=



Too Heavy = Use Mechanical Lift

- Know your lifting abilities and limitations
- Gauge the weight of the load before lifting
- If questionable, use mechanical lift



Mechanical Lifts



Use a step stool or ladder for high stuff

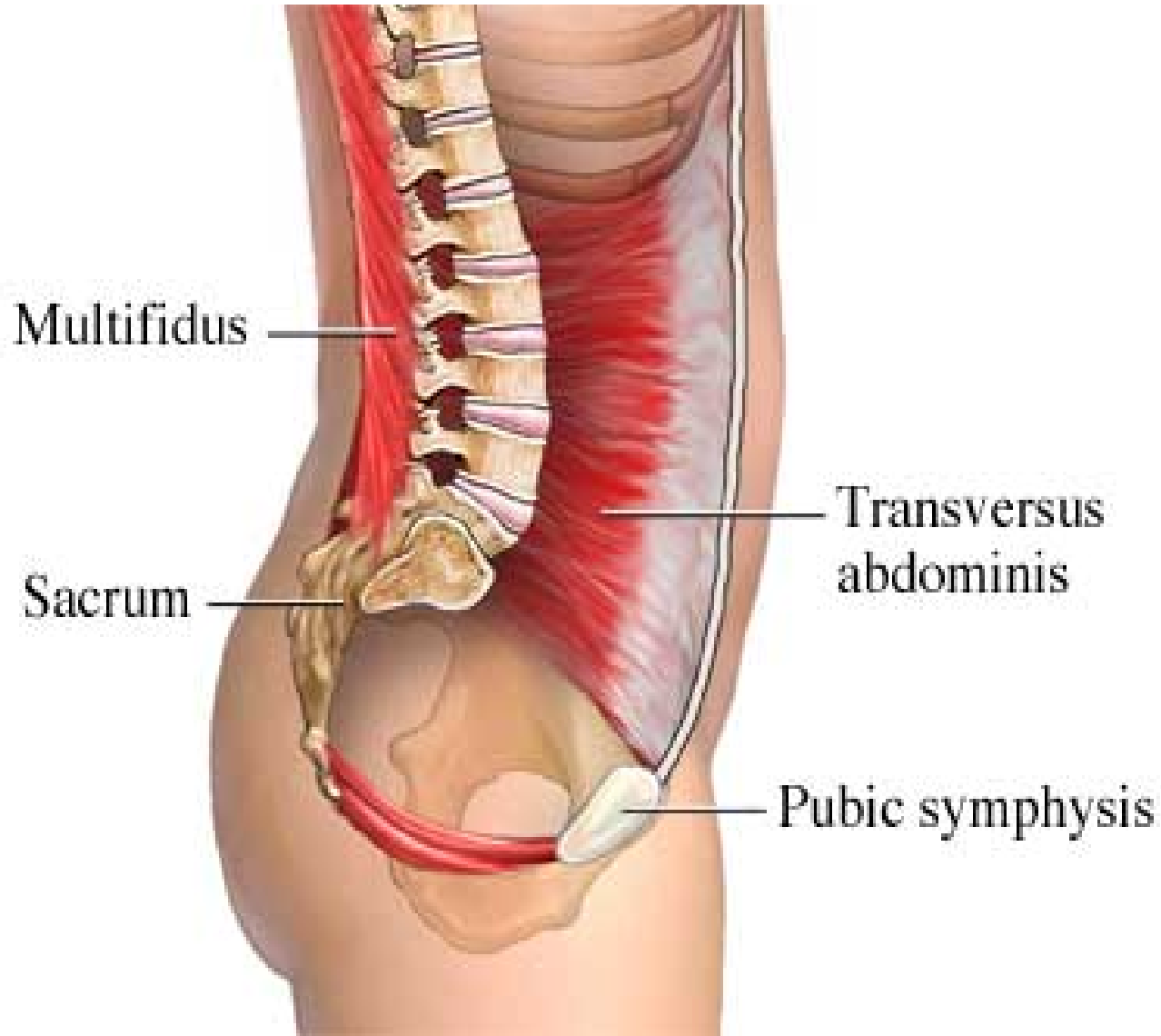




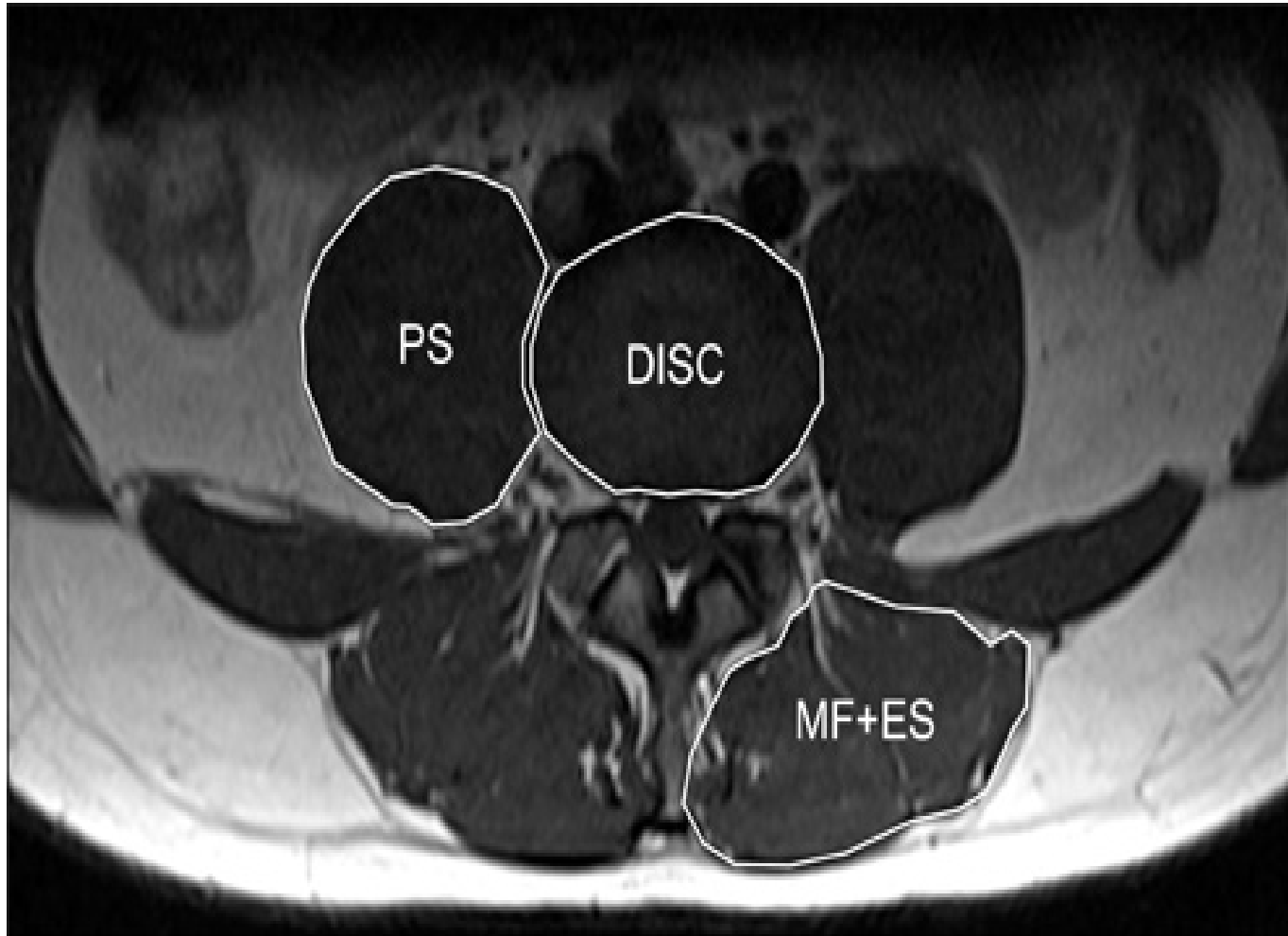
Step stools ladders & handle bars



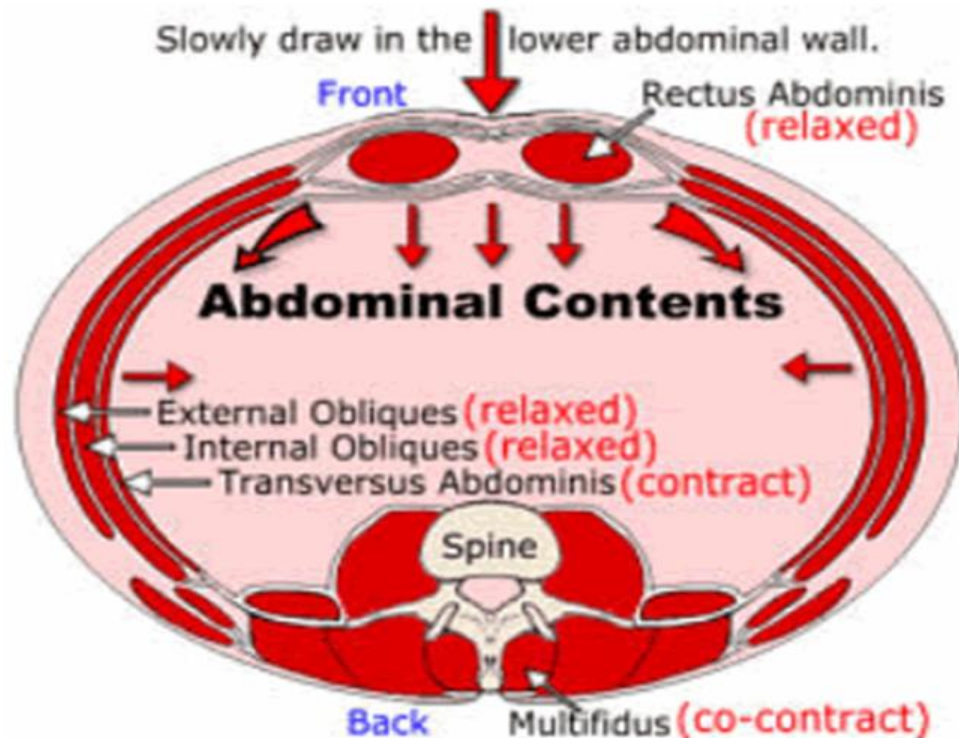
Core Strengthening Exercises



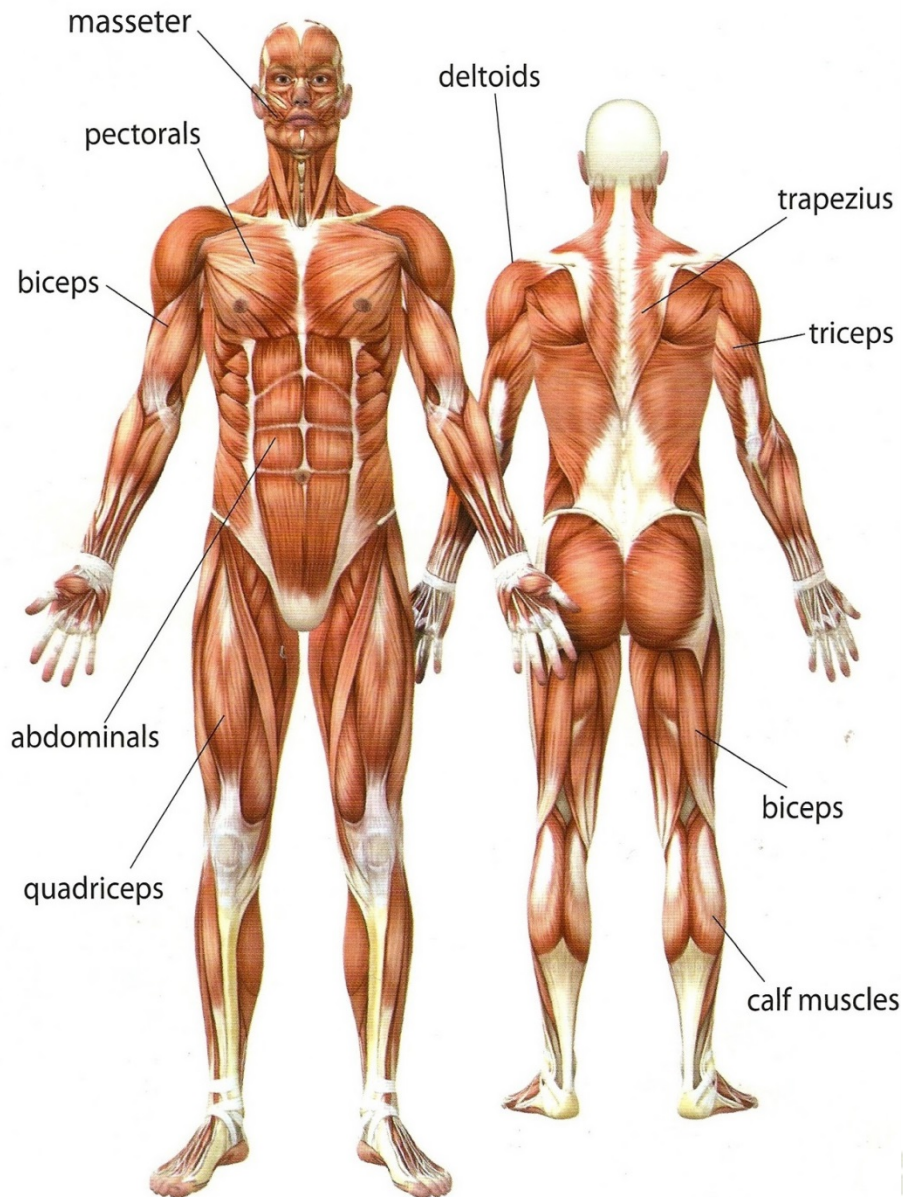
Cross sectional area of paraspinal muscles at L4-L5



Abdominal draw in maneuver



Stretching



Between: 20-40 Seconds

Warm-up: 5-10 minutes

Stretching: 30 Seconds

- Quadriceps
- Hamstrings
- Piriformis
- Gastrocnemius



Stretching







Proper Biomechanics

Standing – Maintain a **neutral pelvic position**. If you must stand for long periods of time, **alternate placing your feet on a low footstool** to take some of the load off your lower back.

Sitting – Choose a seat with **good lower back support** or place a pillow or rolled towel in the small of your back to maintain its normal curve. Keep your **knees and hips level**.

Lifting – Co-contraction of TrA and MF. Let your legs do the work. Move straight up and down. Keep your **back straight and bend only at the knees**. Hold the load close to your body. Avoid lifting and twisting simultaneously.

Sleeping –

- Lie on a firm mattress.
- One pillow.
- Side lying with pillow b/w the knees.



➤ Questions?

Demonstration