Using Good Body Mechanics for Smart Work Practices!

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Ergonomics is fitting the job to the person

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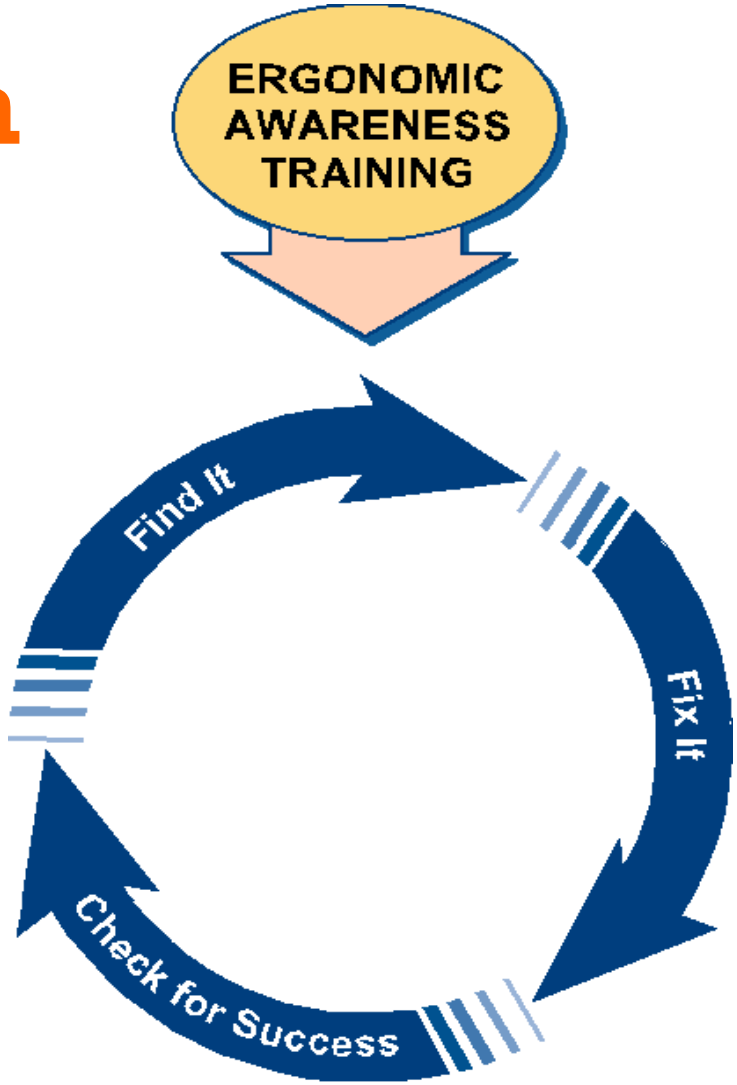
Ergonomics is a process, not a program



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What is ergonomics?

Ergonomics is the science of improving employee performance and well-being in relation to the:

- Job tasks;
- Equipment;
- The environment.

Ergonomics is:

- A continuous improvement effort to design the workplace for what people do well, and design against what people don't do well.

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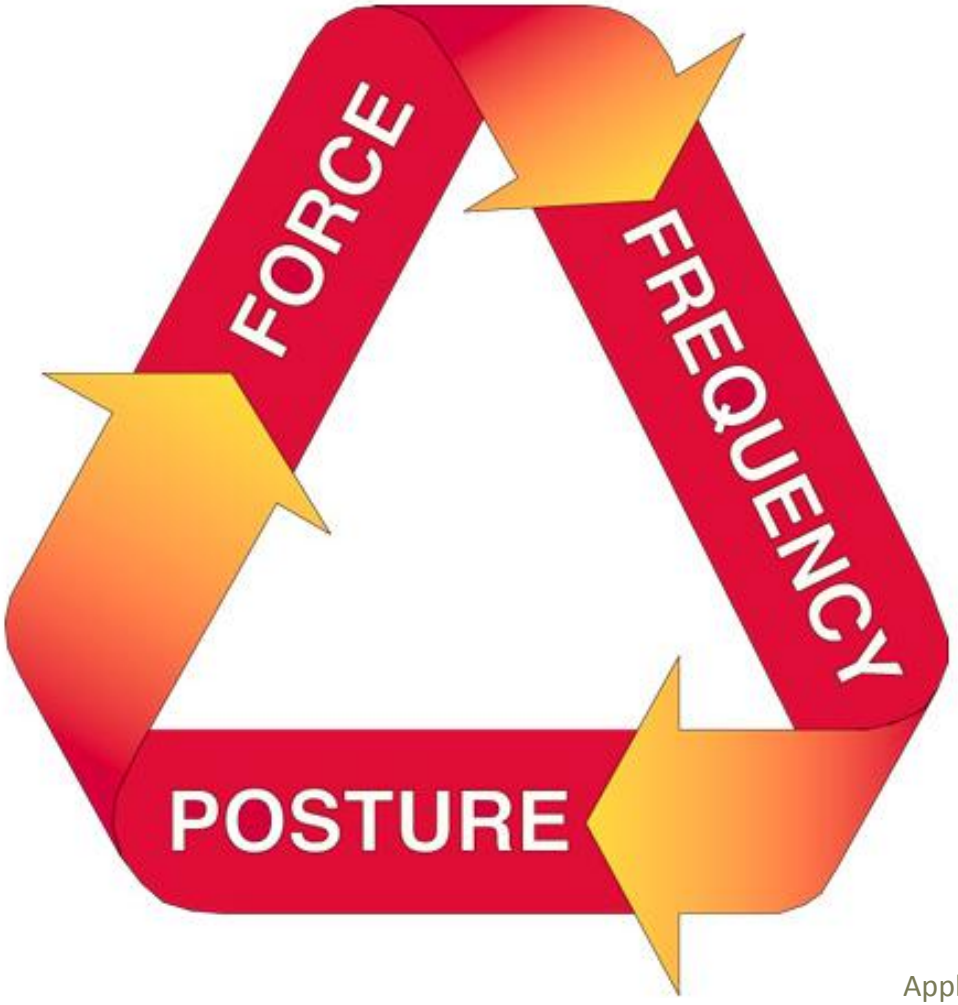
Posture, force and frequency



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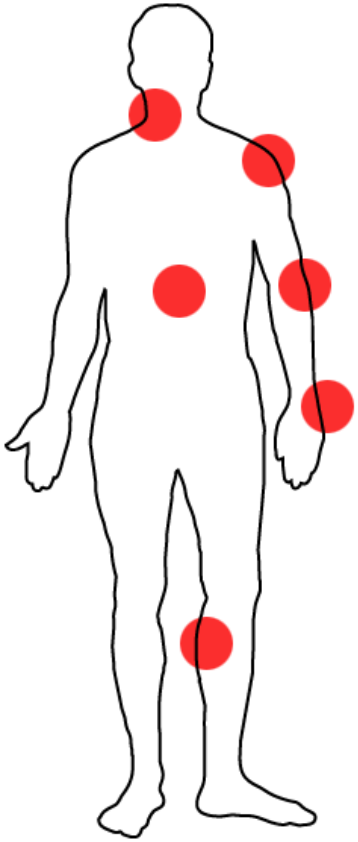
WMSDs

What are work-related musculoskeletal disorders

Work-related indicates that they occur in relation to certain activities performed routinely on the job.

Common terms used to refer to WMSD include:

- Cumulative trauma disorders;
- Repetitive motion disorders;
- Repetitive strain injuries;
- Overuse syndrome.



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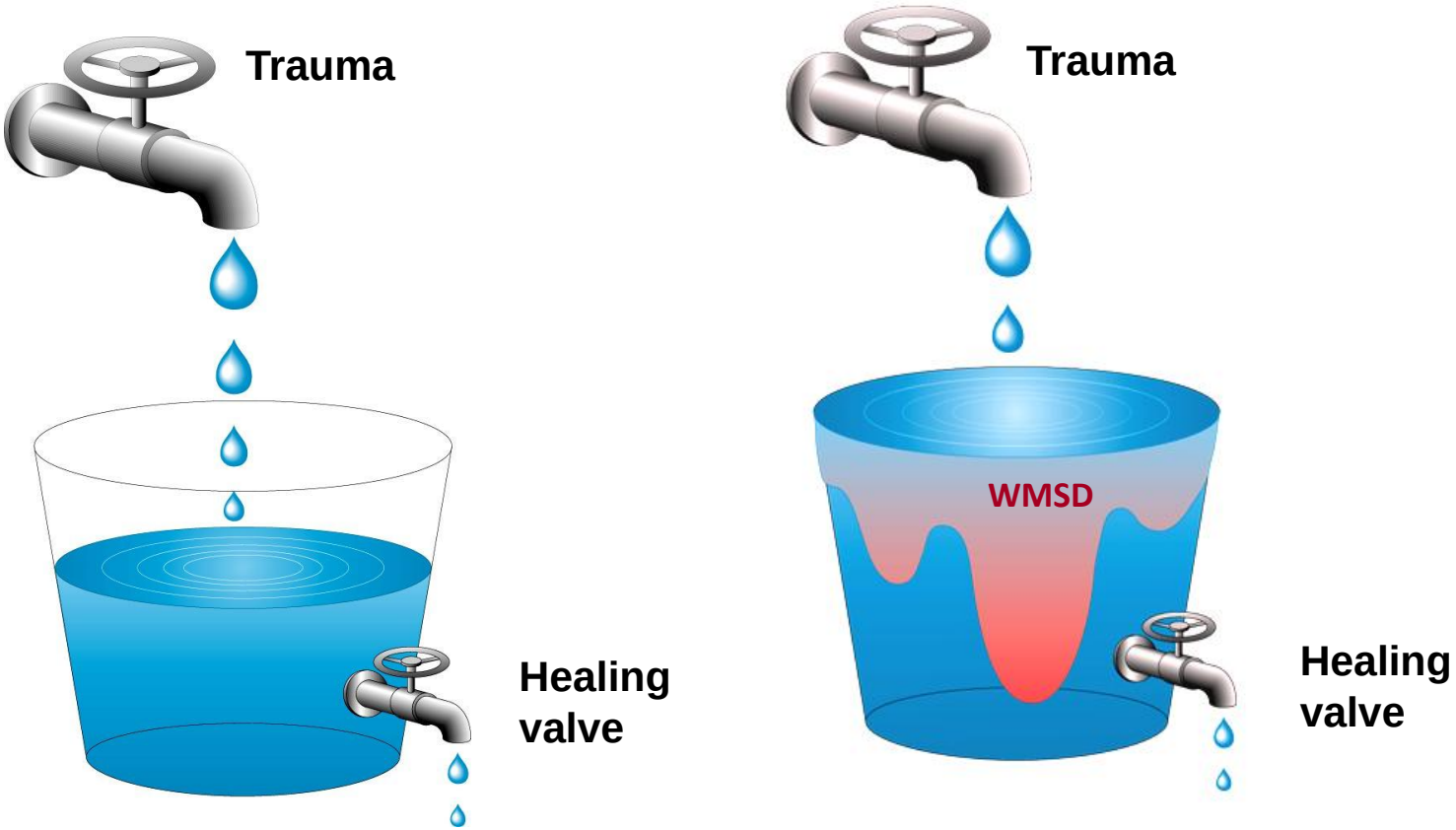
The "trauma bucket"



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Ergonomics: Practical approach

Find it → **Fix it**

Wash rag

Tool/Target

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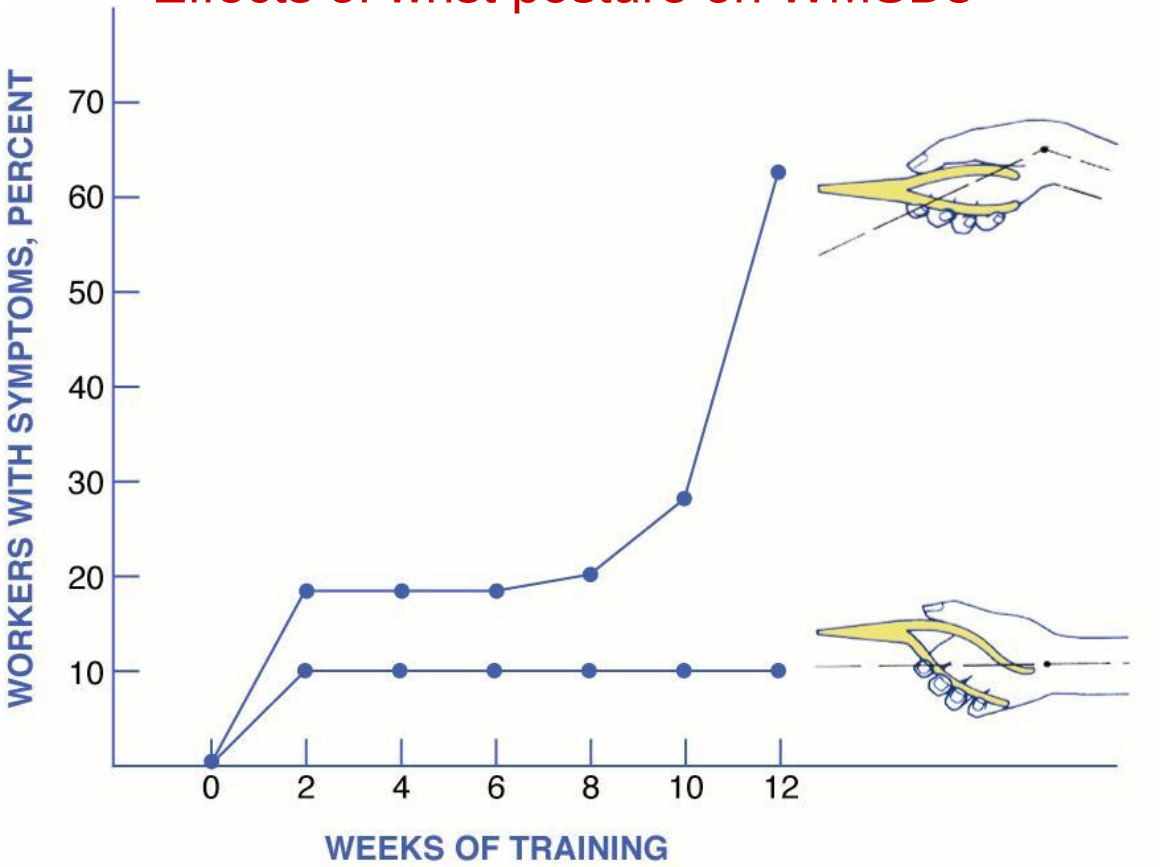
Improved posture reduced WMSDs

Risk factors

Effects of wrist posture on WMSDs



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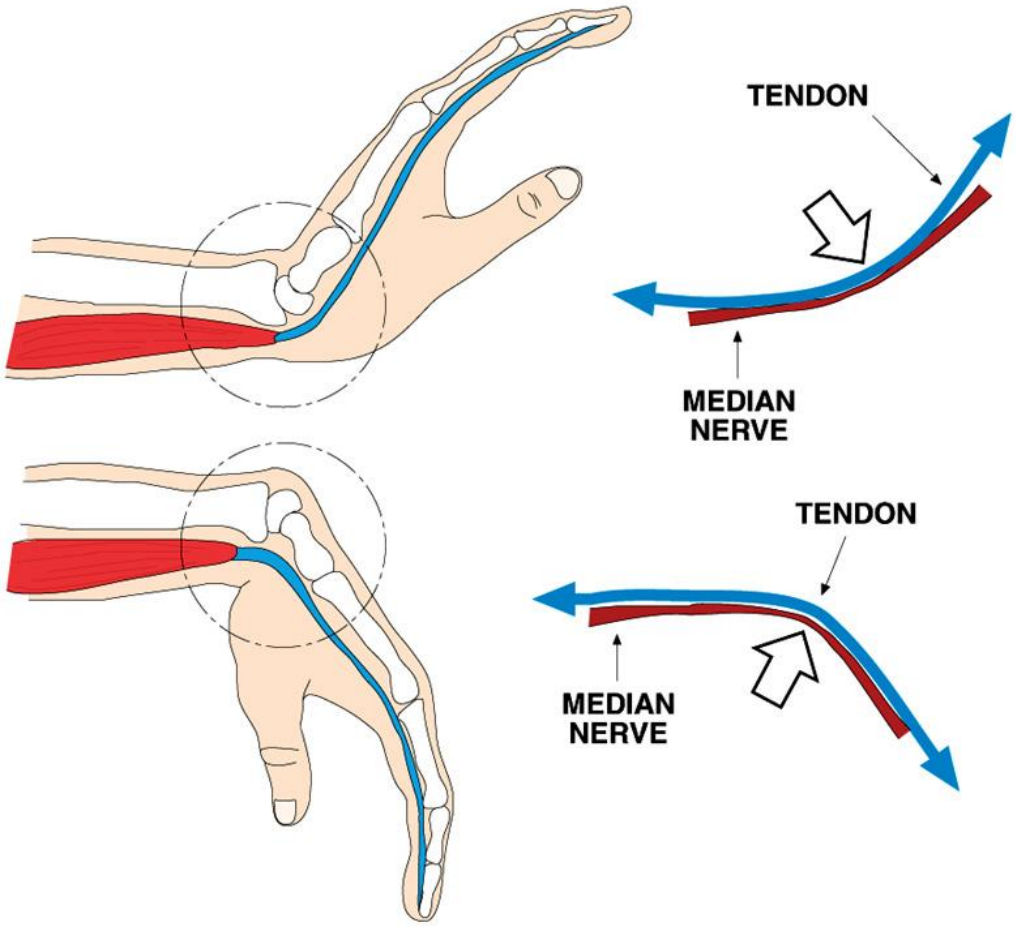
Tendon mechanics



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Hands/Wrists

Flexed ≥ 45°

Extended ≥ 45°

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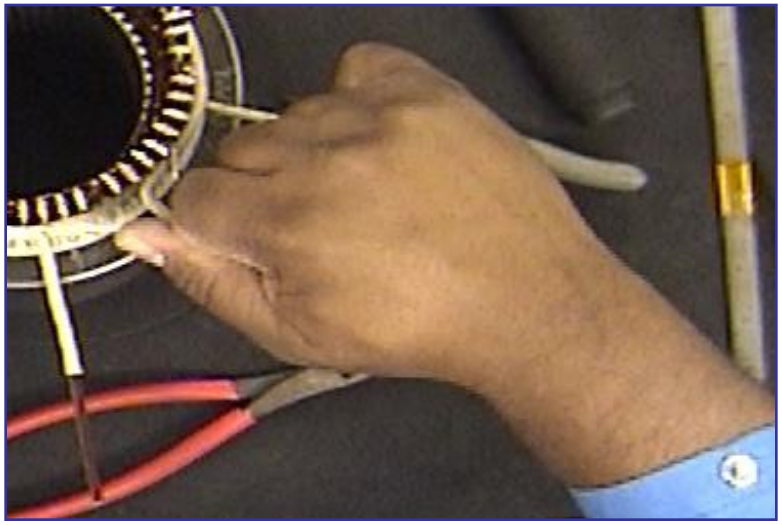
Hands / Wrists

Ulnar Deviation



Radial Deviation

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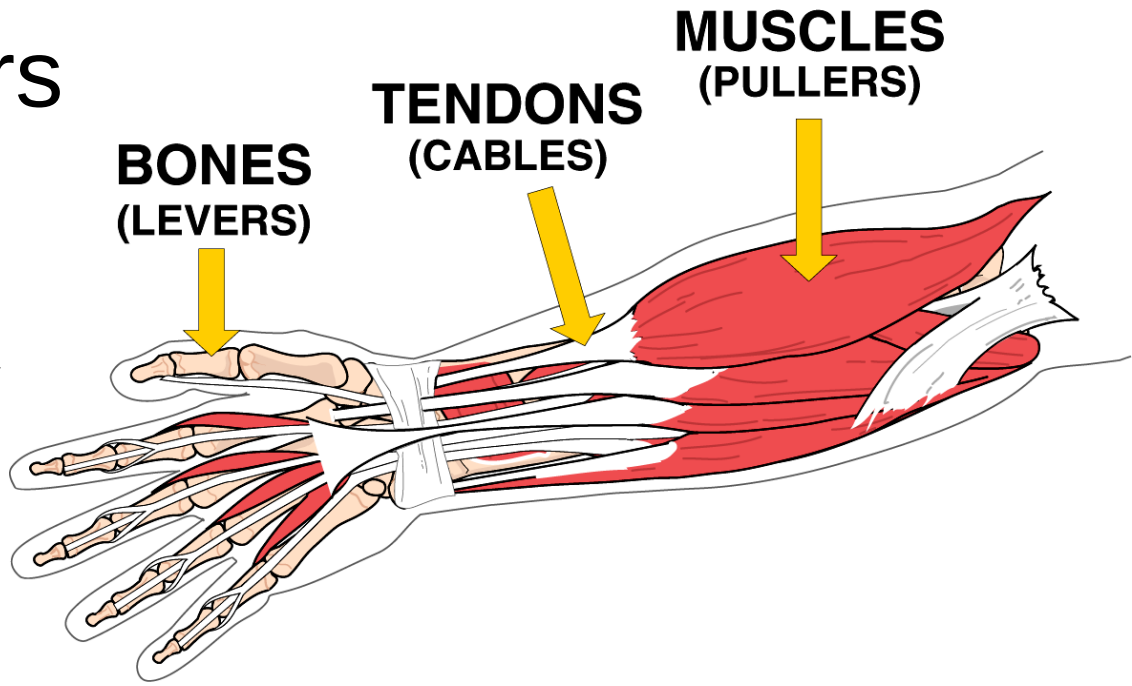
Types of WMSDs

Tendon disorders

- Tendons connect muscles to bones.
- Tendon disorders typically occur at or near the joints where the tendons rub ligaments and bones.



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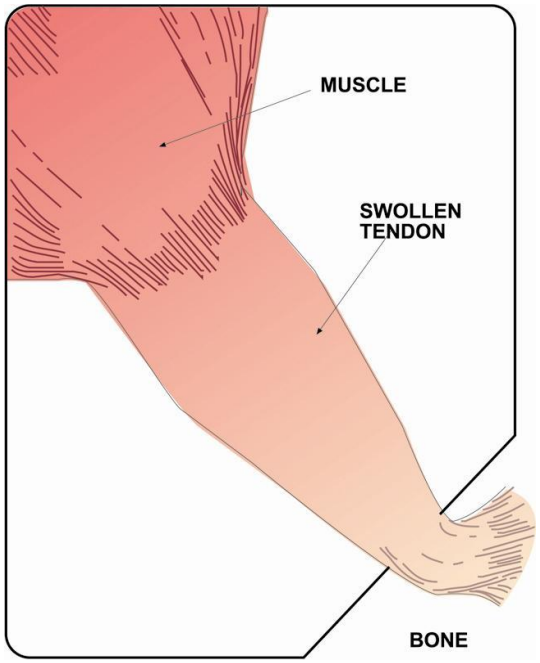
Types of WMSDs

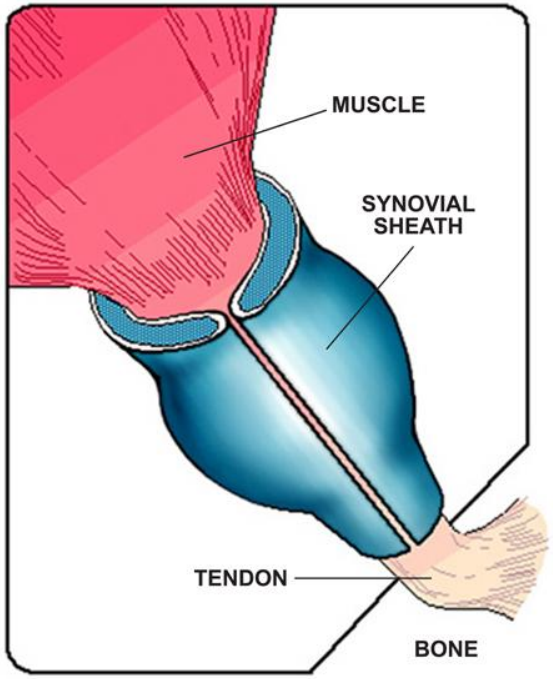
Tendinitis

- Inflammation of the tendon



Tenosynovitis

- Inflammation of the tendon and the tendon sheath



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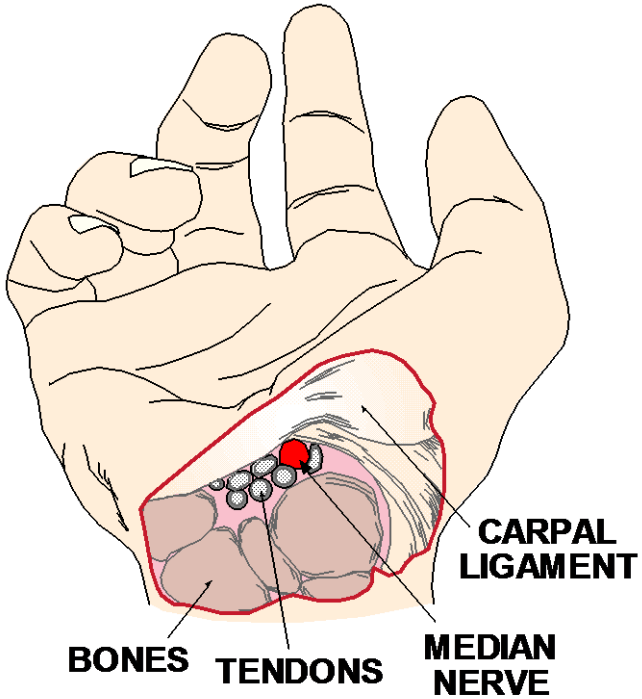
Types of WMSDs

Nerve disorders

- Result from nerve entrapment or pressure on the nerve either by muscle swelling and/or irritation by the surrounding tendons or muscles
- Impede blood flow, oxygenation, and nerve signal transmission



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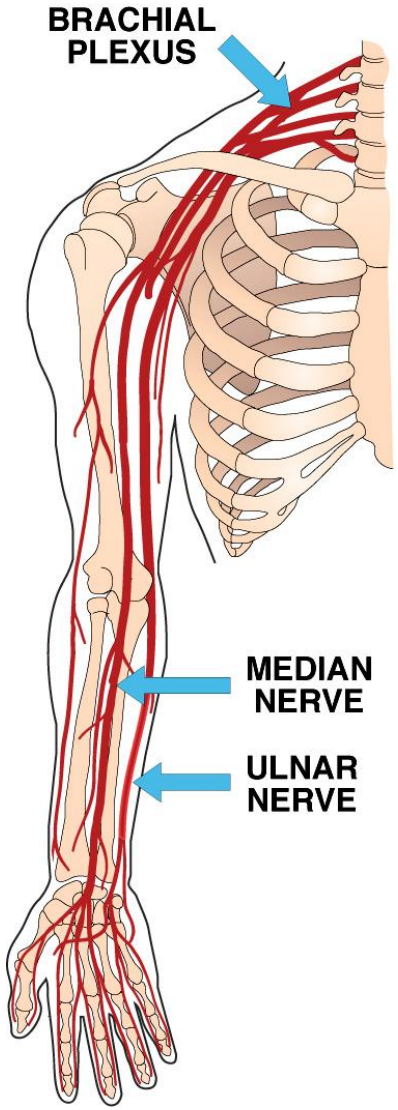
Types of WMSDs

Neurovascular disorders

- Affect both nerves and nearby blood vessels
- May lead to reduced circulation, resulting in less oxygen and nutrients to the muscles



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Elbow

Rotated forearm

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Shoulders

Arm raised ≥ 45°

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Shoulders

Arm behind the body

Shoulders shrugged

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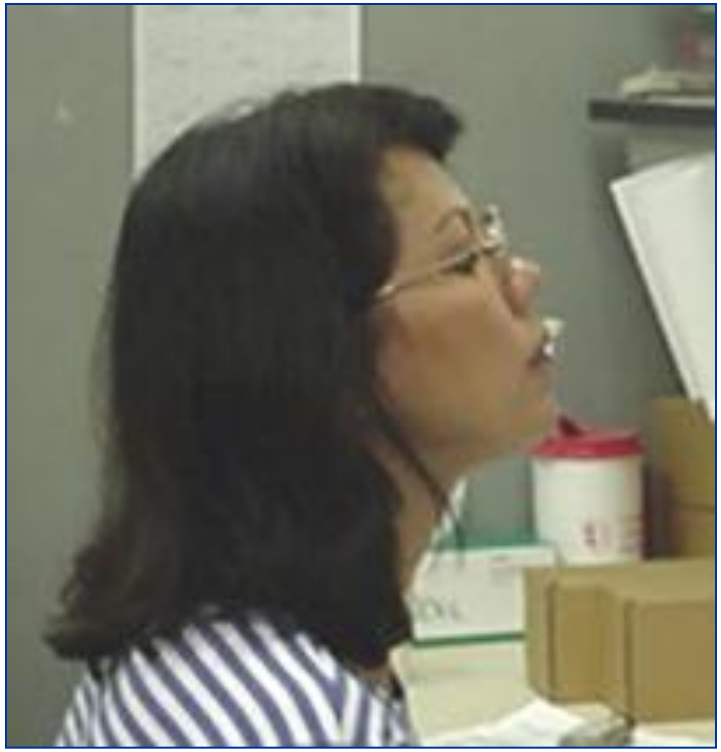
Neck

Flexed ≥ 30°



Extended

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Neck

Sideways

Twisted ≥ 20°

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Back

Flexed ≥ 20°

Sideways

Extended

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Back

Twisted

Unsupported

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Legs

Squat

Kneel

Unsupported

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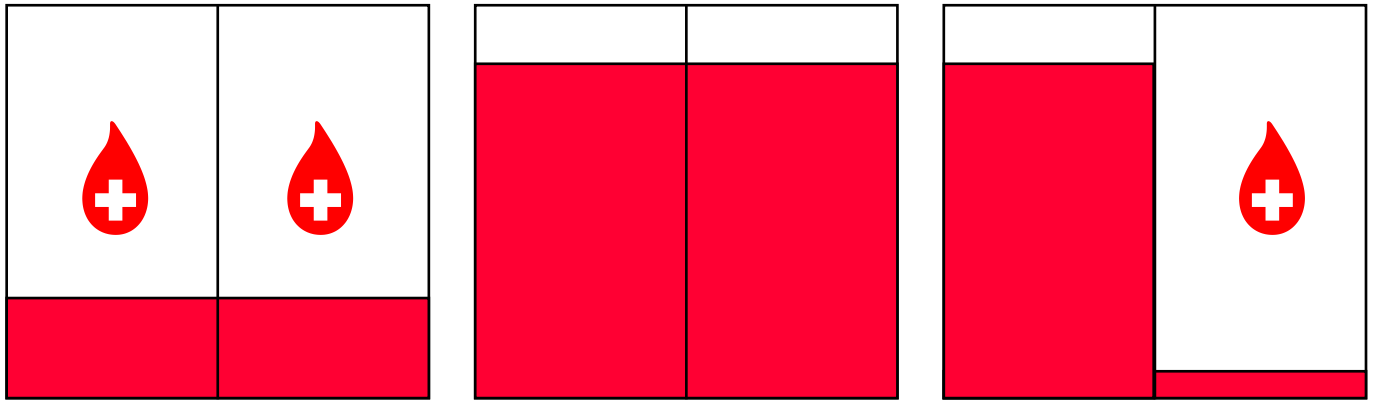
Muscle blood usage

Resting

Dynamic

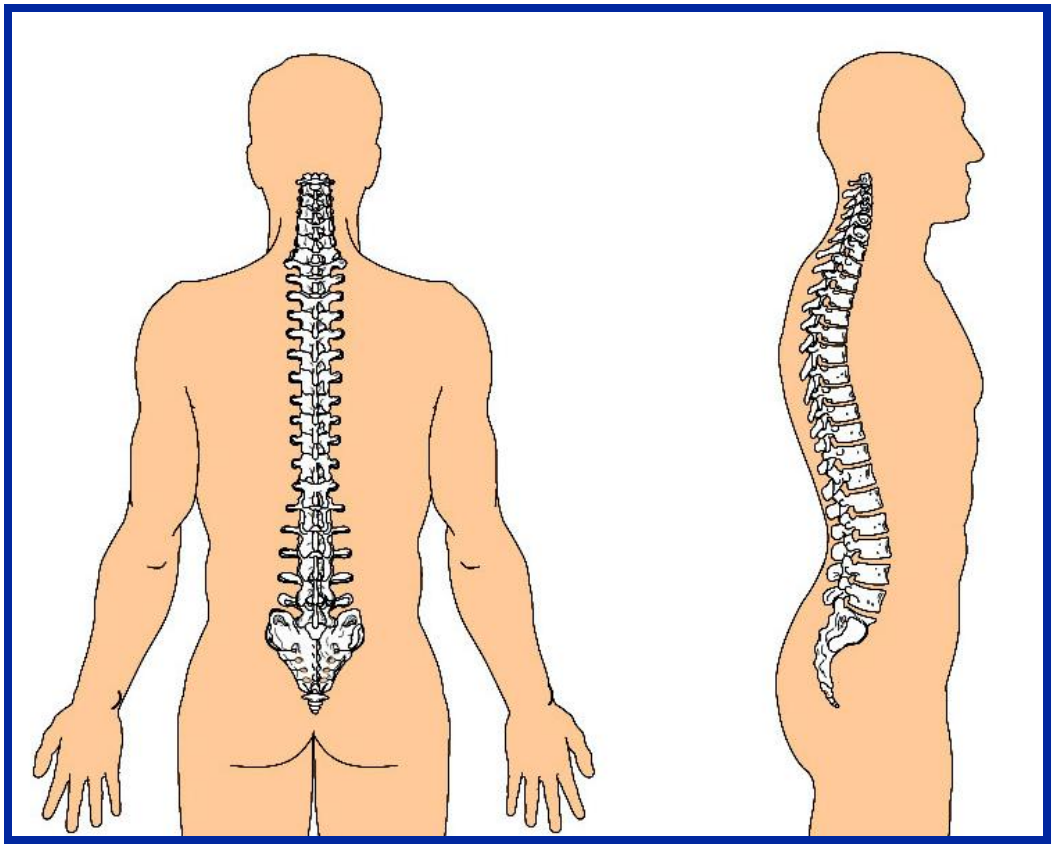
Static



WMSDs

Back disorders

- Unstable structure



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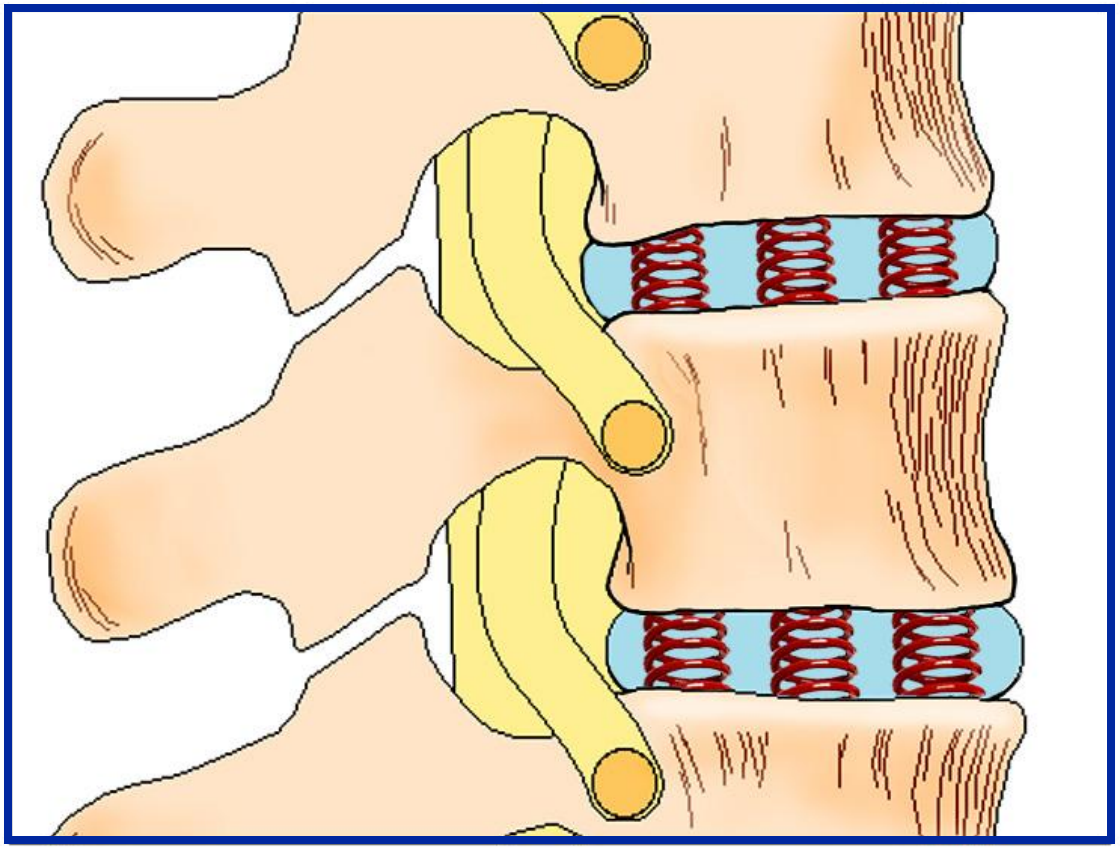
WMSDs

Back disorders

- Unstable structure
- **Leaky discs**



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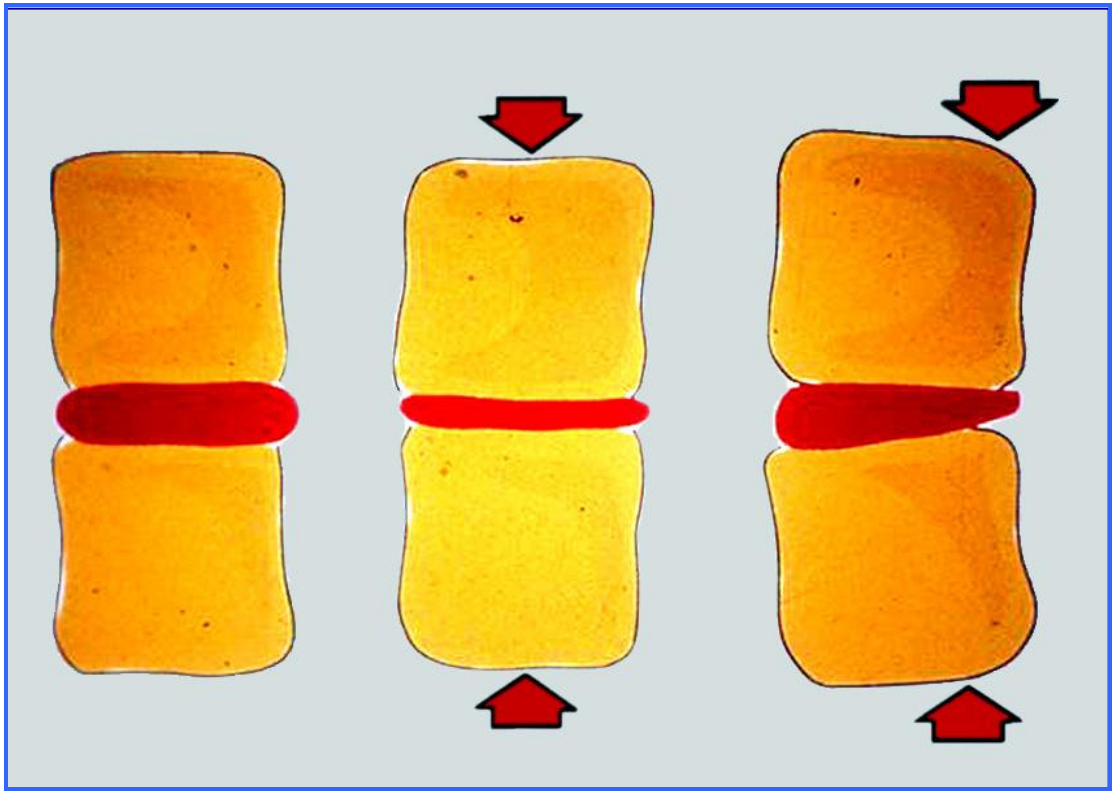
WMSDs

Back disorders

- Unstable structure
- Leaky discs
- **Uneven forces**



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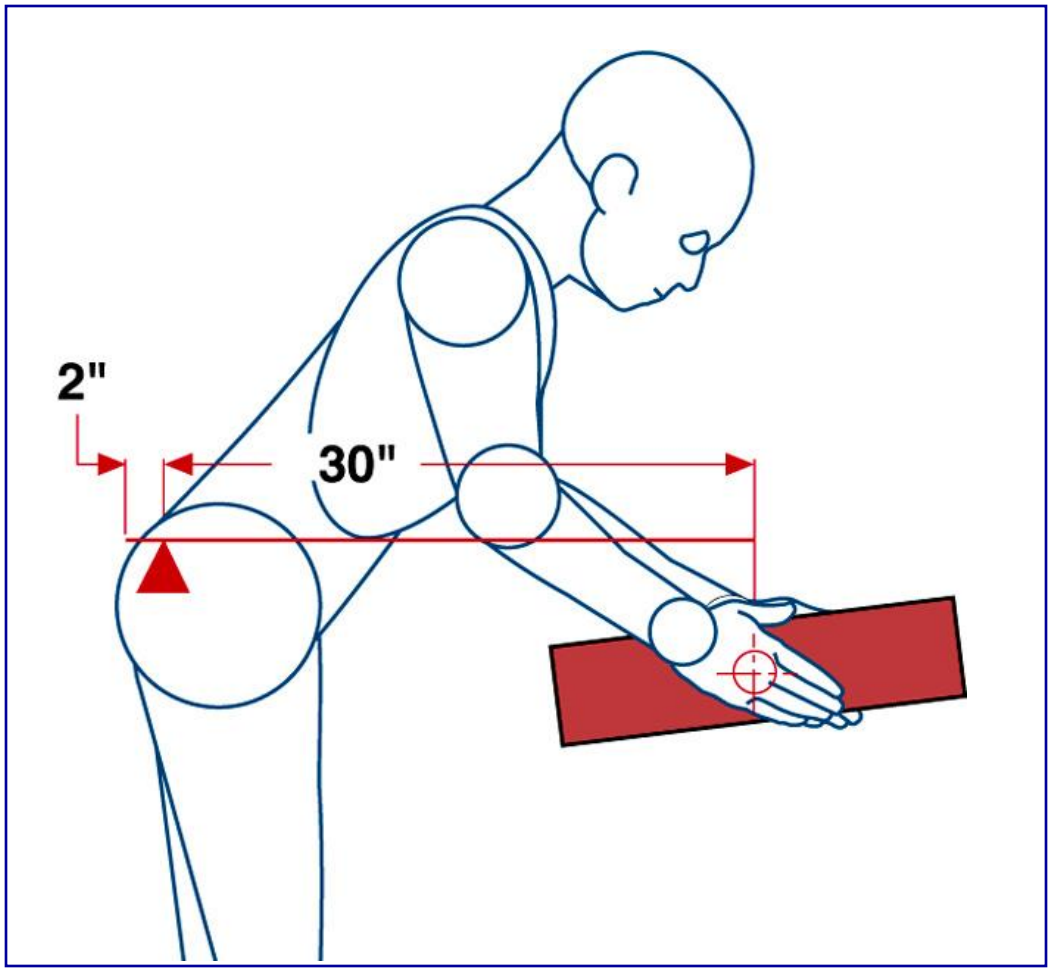
WMSDs

Back disorders

- Unstable structure
- Leaky discs
- Uneven forces
- **Inefficient lever**



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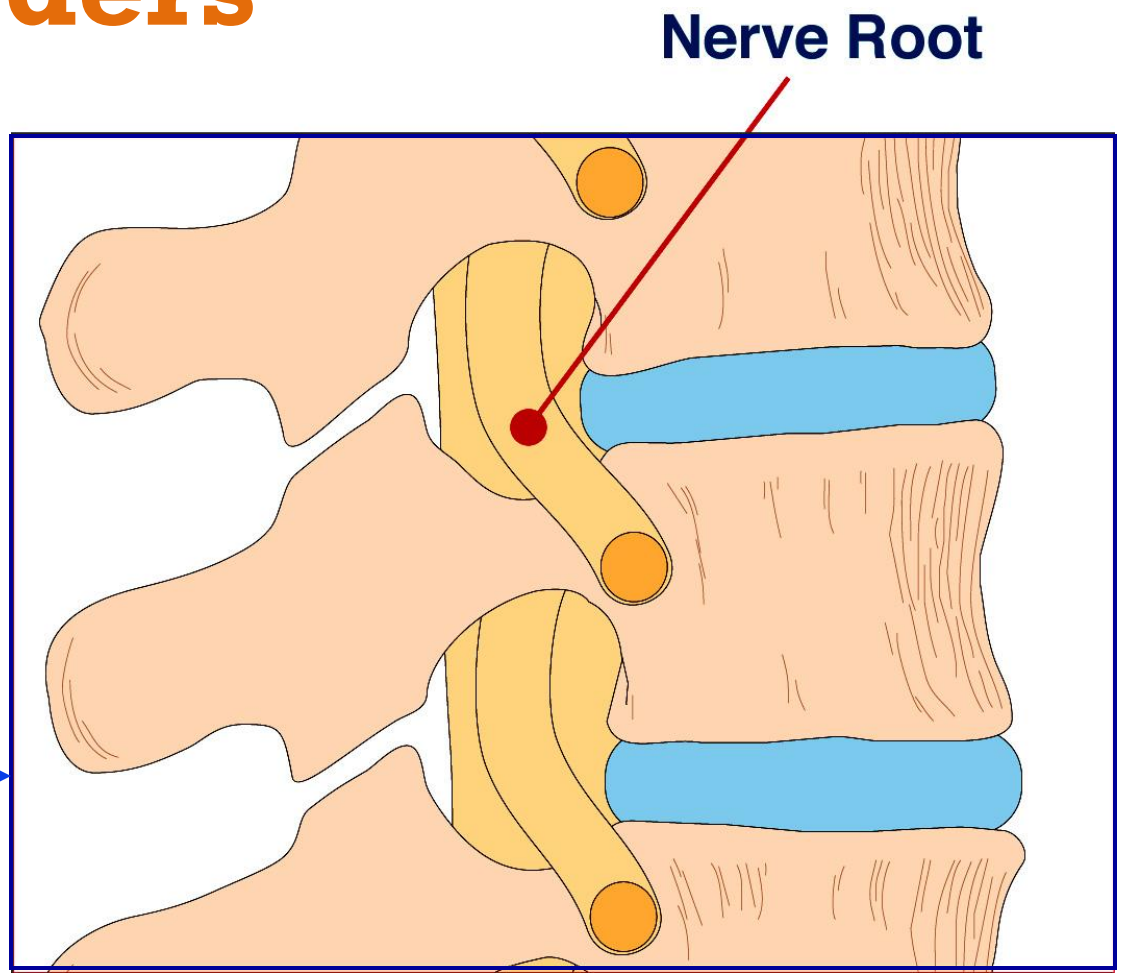
WMSDs

Back disorders

- Unstable structure
- Leaky siscs
- Uneven forces
- Inefficient lever
- **Tight tolerances**



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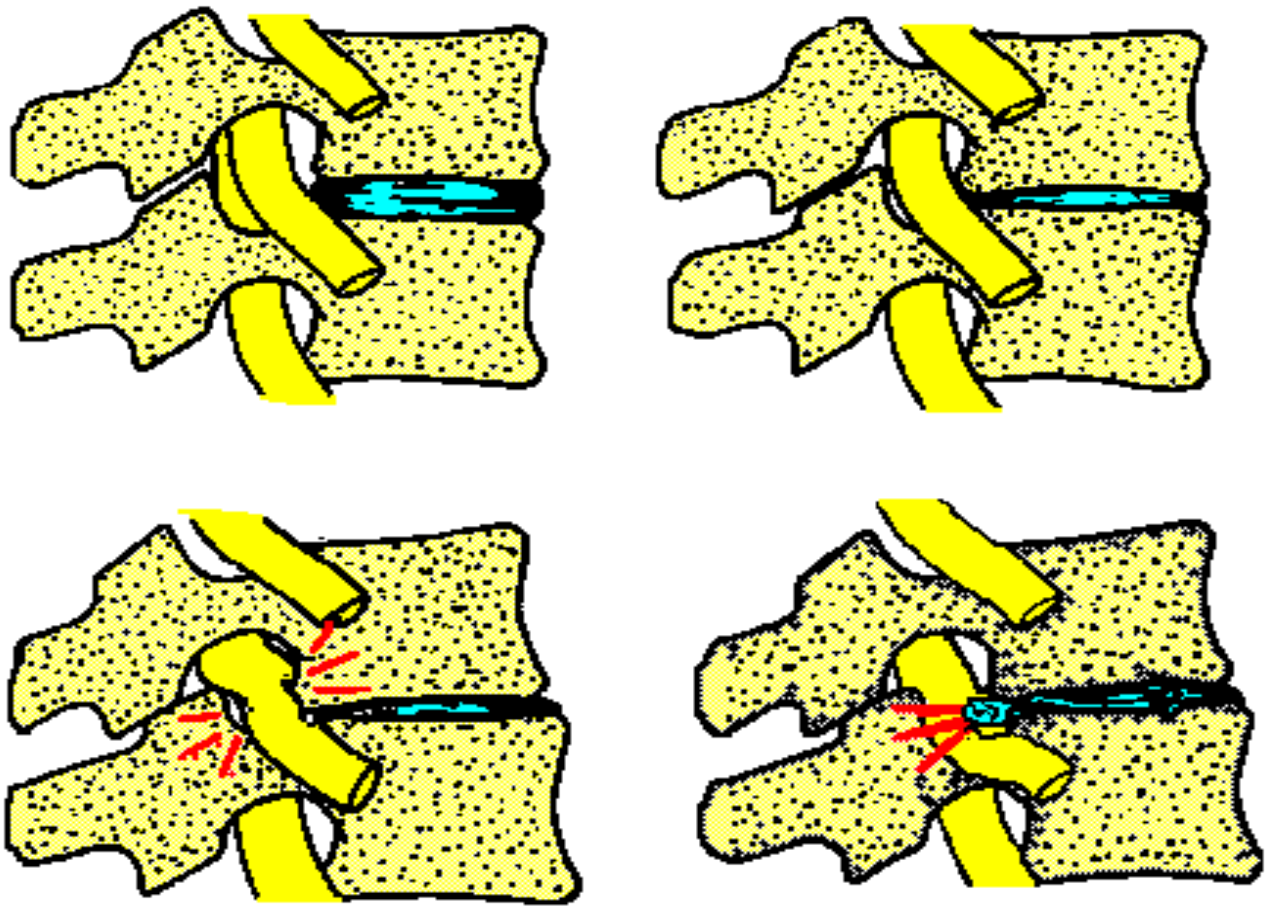
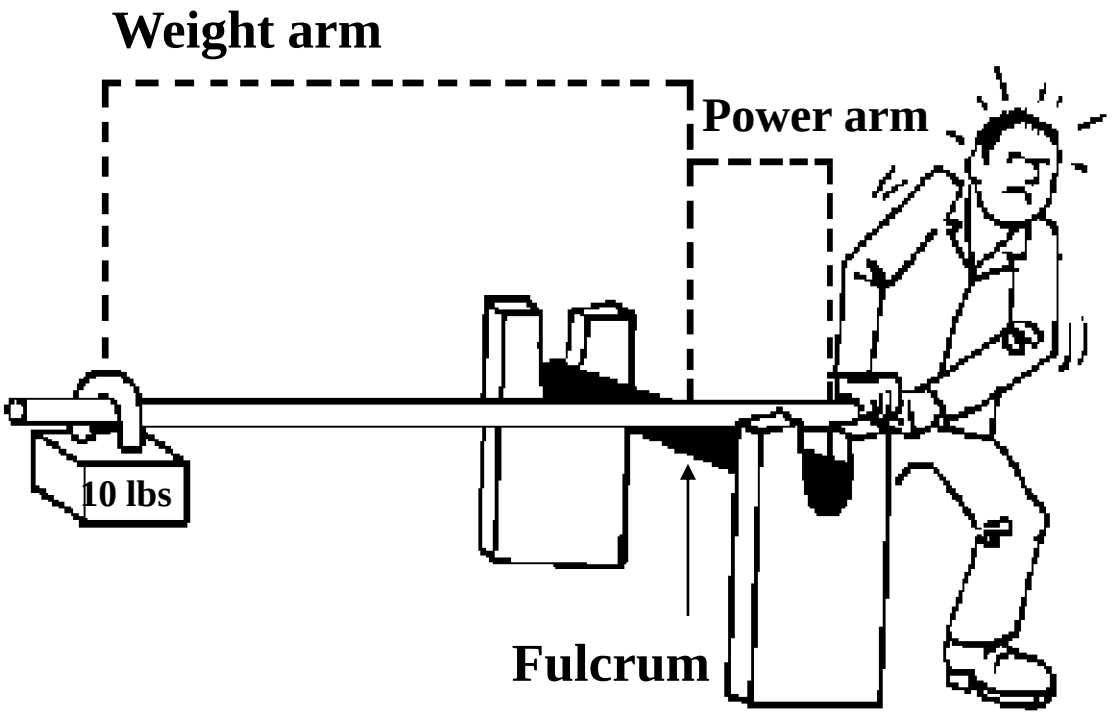
Disc disorders



Biomechanics



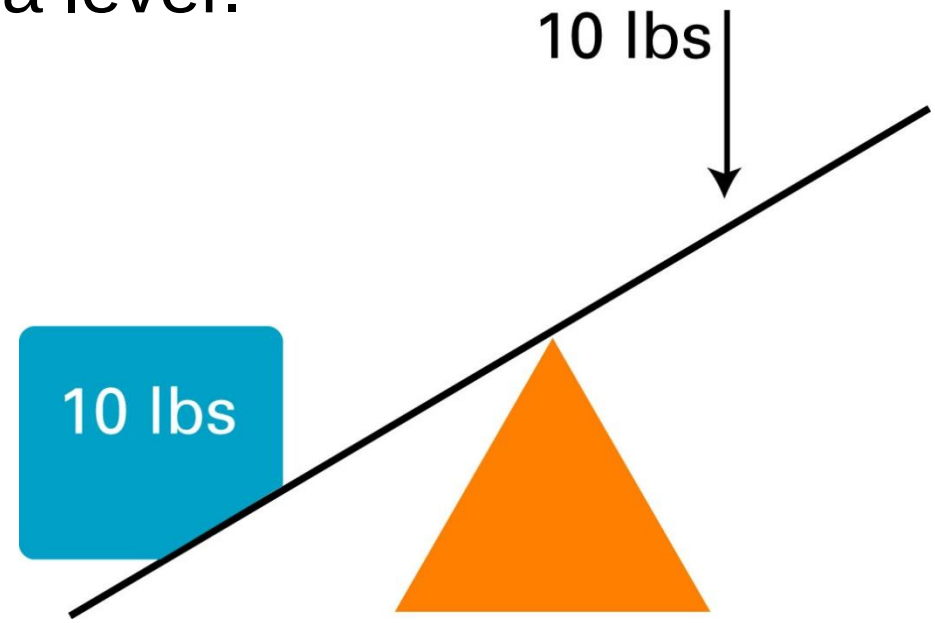
(Wgt) (WgtArm) = (PwrArm) (Force)
(10 lbs) (5 ft) = (1 ft) (Force)
Force = 50 lbs.

The forces involved

The amount of force you place on your back in lifting may surprise you!

Think of your back as a lever.

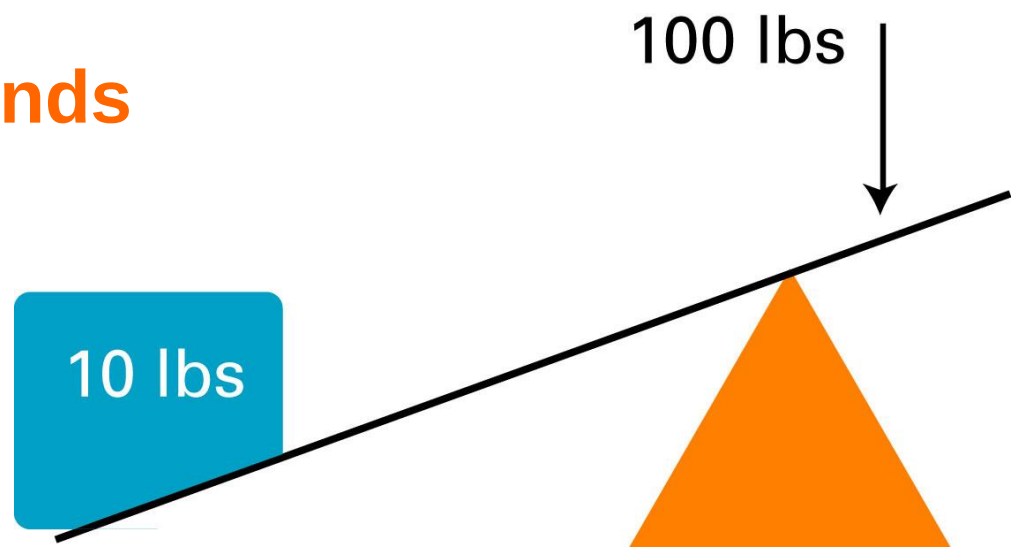
With the fulcrum in the center, it only takes ten pounds of pressure to lift a ten pound object.



The forces involved

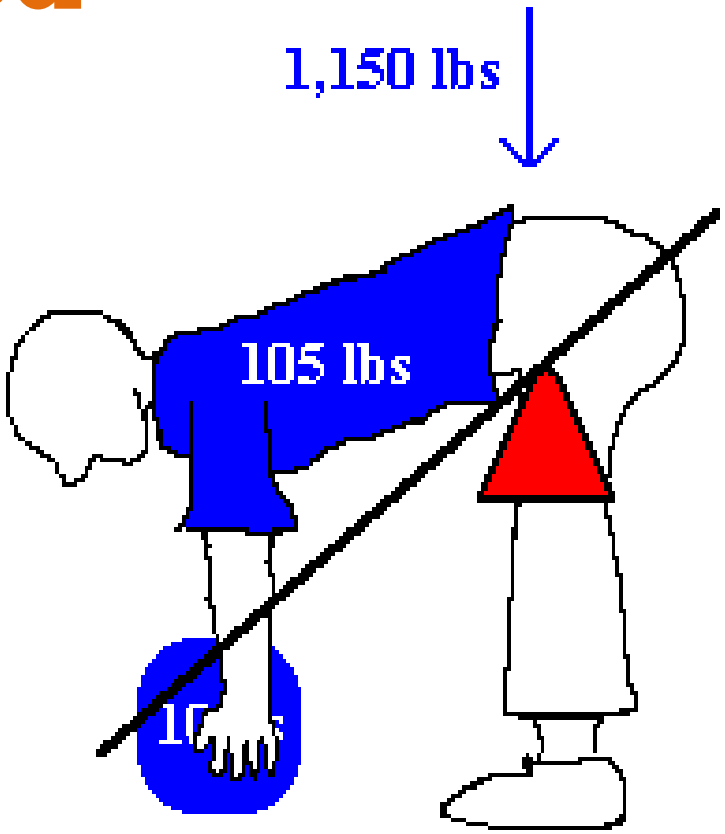
If you shift the fulcrum to one side, it takes much more force to lift the same object. Your waist acts like the fulcrum in a lever system, on a 10:1 ratio.

Lifting a 10-pound object puts 100 pounds of pressure on your lower back.



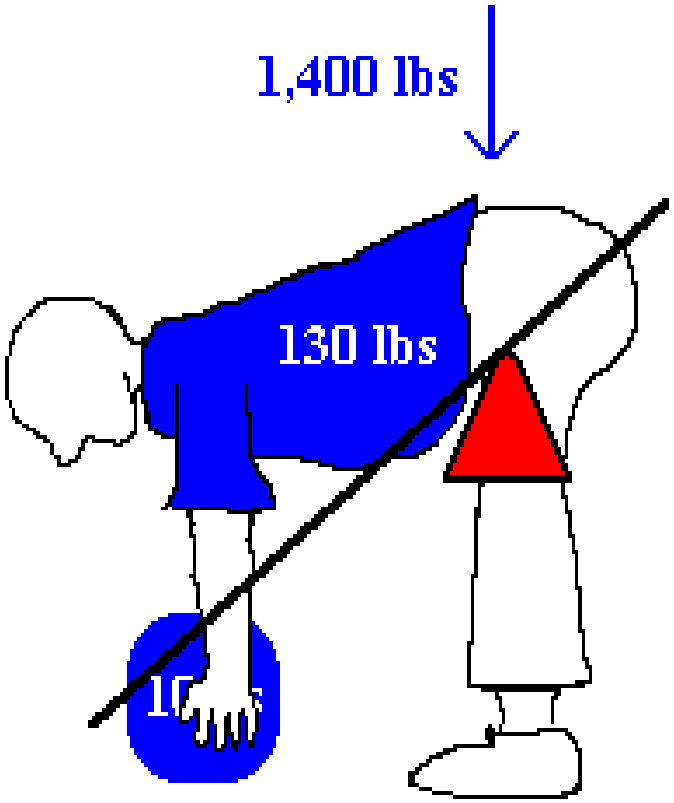
The forces involved

When you add in the 105 pounds of the average human upper torso, you see that lifting a 10-pound object actually puts 1,150 pounds of pressure on the lower back.

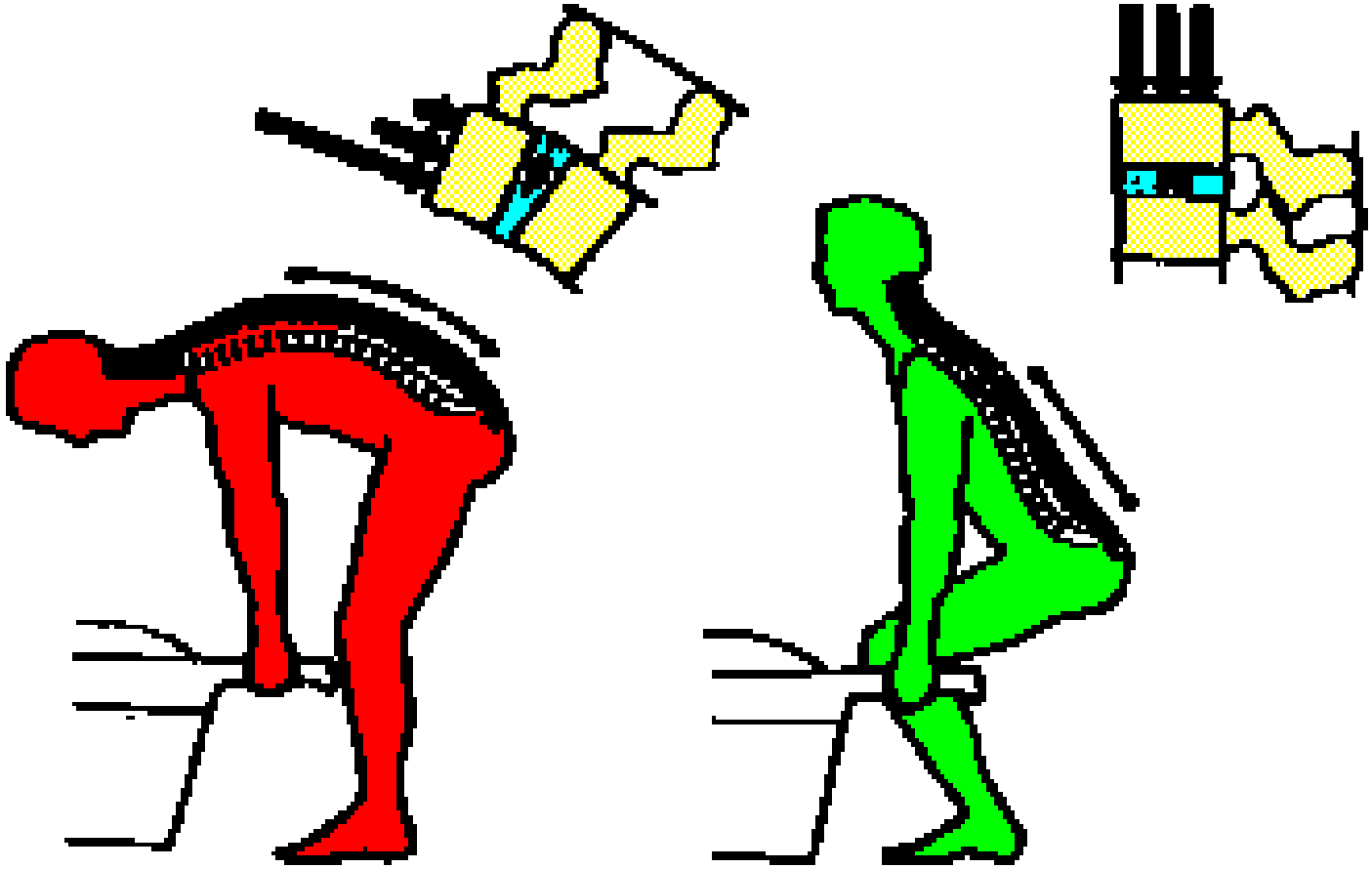


The Forces Involved

If you were 25 pounds overweight, it would add an additional 250 pounds of pressure on your back every time you bend over.



Compressive force distributions



How to prevent back injuries

- Eliminate unnecessary lifting!
- Automate or mechanize lifting.
- Place objects up off the floor.
- Raise/lower shelves.
- Use carts and dolleys.
- Use lift-assist devices whenever you can.
- Test the weight by picking up a corner.
- Get help!

Design strategies - lifting zone

- Locate objects between knuckle and heart levels.
- Minimize reach.
- Eliminate bending.
- Eliminate twisting.
- Avoid high speed or acceleration.

Using good body mechanics:

- Tool – target
- Use the right tool.
- Get close and square up with the load.
- Spread the feet, with one slightly in front.
- Squat instead of bending with back straight.
- Get a good firm grip.
- Lift in a smooth, gradual manner.
- Move the feet; don't twist the body.

Additional good body mechanics

- Build a bridge by supporting one hand on the knee or on a fixed object when one-handed lifting is required.
- Use the back leg as a counterbalance and build a bridge when lifting light objects out of deep bins or from low levels.
- Keep the hips moving with the upper body if lateral or rotating movement is necessary.

Additional resources

- CDC Web site, NIOSH laboratory ergonomics guidelines: http://www.cdc.gov/od/ohs/ergonomics/labergo.htm
- UCLA, laboratory ergonomics check list and tips/presentations: http://ergonomics.ucla.edu/lab.html

Questions ?

Thank You !