Protecting Your Back

Presented by

André Gauvin

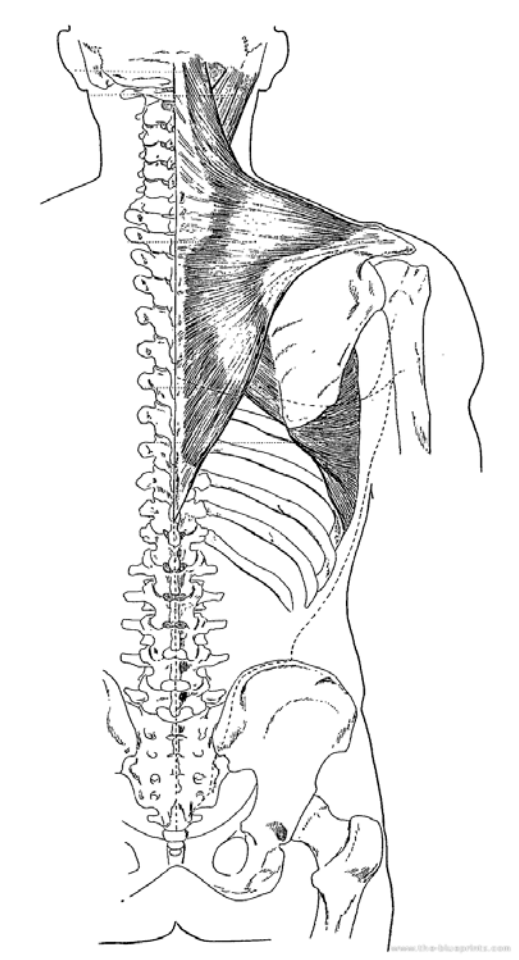
Ergonomist – Sudbury Clinic

Occupational Health Clinics for Ontario Workers Inc.
Centres de santé des travailleurs (ses) de l'Ontario Inc.

Back Injury Statistics

- 60 % of all adults will experience backache at one point in their lives
- 65% of industrial workers report low back pain symptoms during their career.
- Low back pain is the most frequent cause of activity limitation in individuals under 45 yrs, and the third leading cause in individuals between 45-64 yrs.

Maintaining A Healthy Back



A healthy back relies on your skeletal system, soft tissue system and your nervous system to function properly.

Occupational Health Clinics for Ontario Workers Inc.
Centres de santé des travailleurs (ses) de l'Ontario Inc.

How Does the Back Work?

- Cervical vertebrae (C1-C7)

  -flexible vertebrae that support head and neck

- Thoracic vertebrae(T1-T12)

  -larger more rigid and form the chest cavity

- Lumbar Vertebrae (L1-L5)

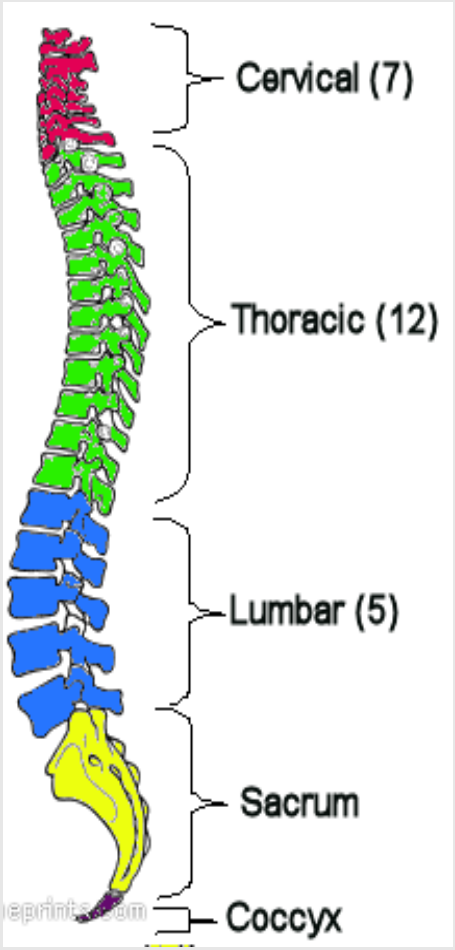
  -massive vertebrae and carry most of the weight of your body.

- Sacrum (S1)

  -single bone made up of five fused bones

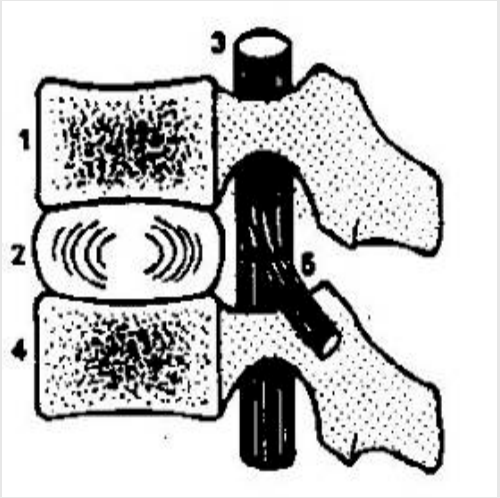
- Coccyx

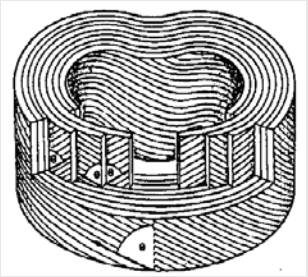
  -Also known as your tailbone



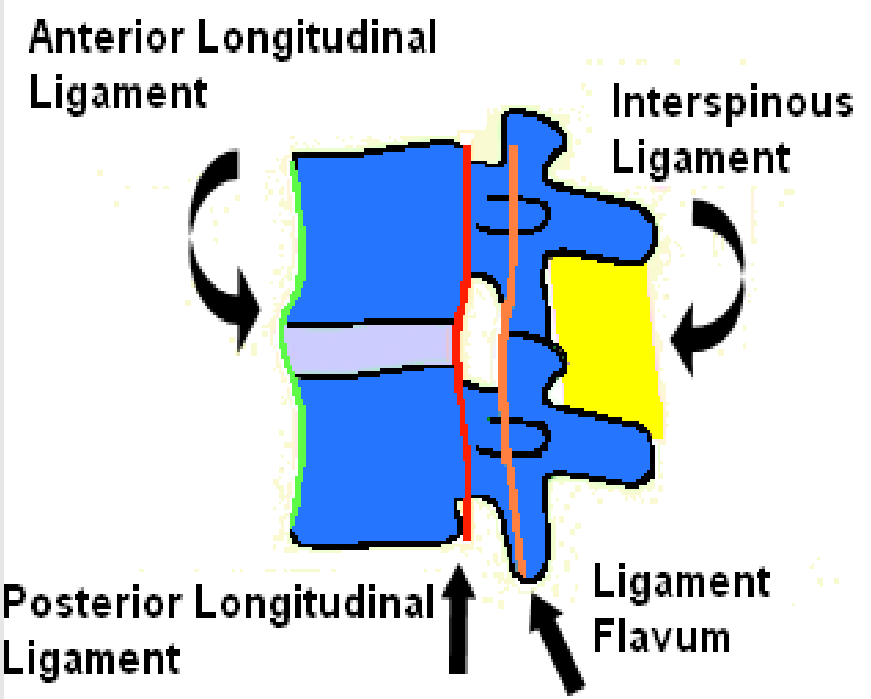
How Does the Back Work?

- Intervertebral discs are the "shock" absorber between the vertebrae
  - The outer layer is the annulus
  - The inner layer is the nucleus
- Ligaments and muscles
  - control movement and
  - support the spine





Ligaments



- Tough elastic fibres
- Connects bone to bone
- Connect and stabilize vertebrae as one structure.
- Prevents excessive movement

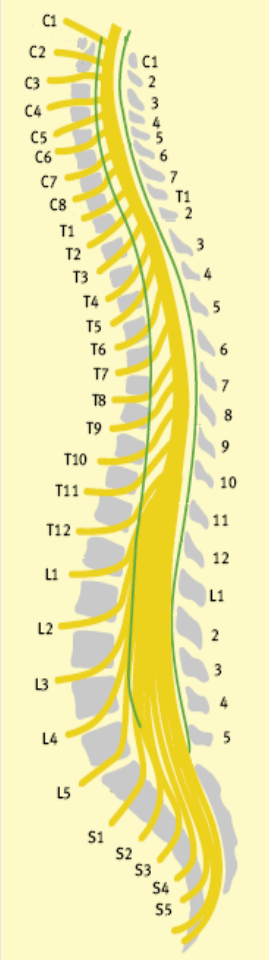
Back Muscles

- Provide movement
- Provide stabilization
- Under voluntary control
- Keep vertebrae aligned
- Short and less powerful than leg muscles.
- Two layers: superficial and deep.

Abdominal Muscles

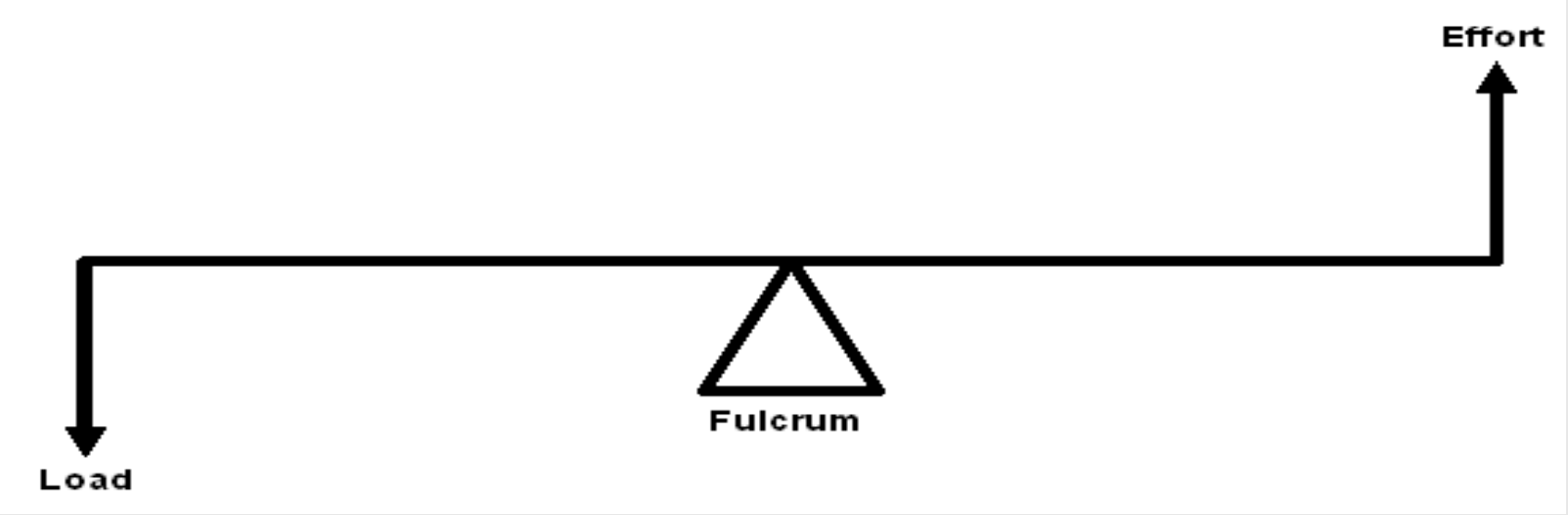
- Help to support the abdominal contents and spine.
- They stabilize the spine and protect the lower back.
- Three sets of abdominal muscles run vertically, transversely and obliquely.
- They are broad and flat.

The Spinal Cord



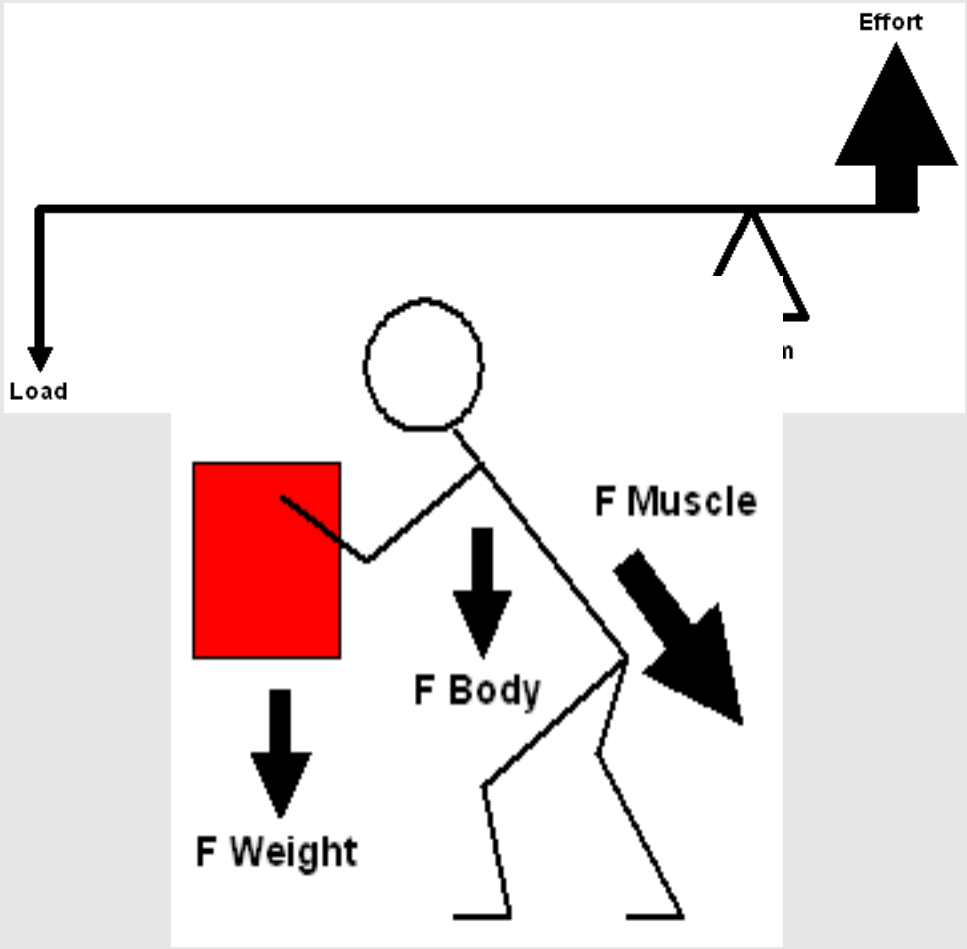
Biomechanics of the Back

- In a lever system, when the fulcrum is in the middle of the lever, the upward force required to lift the object is equal to the downward pull of the object.

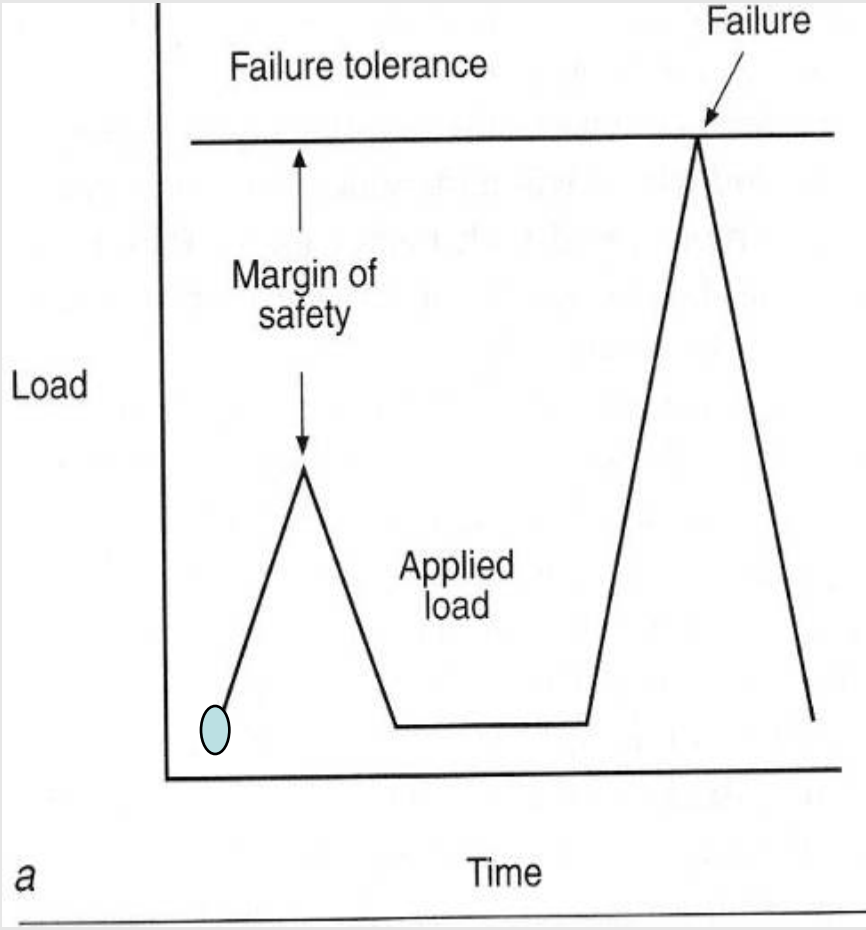


Biomechanics of the Back

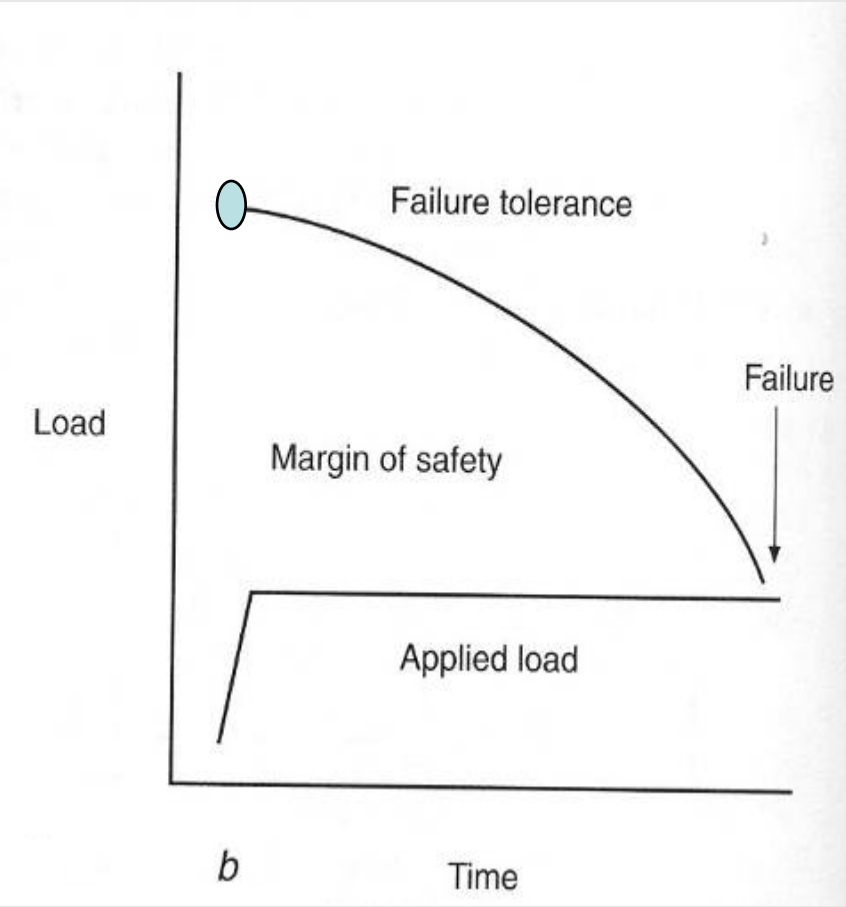
- Force of the muscle = load x gravity.
- As the horizontal distance from the fulcrum to the load (the low back to the object lifted) increases, so does the mechanical stress placed on the muscles and joints of the low back.



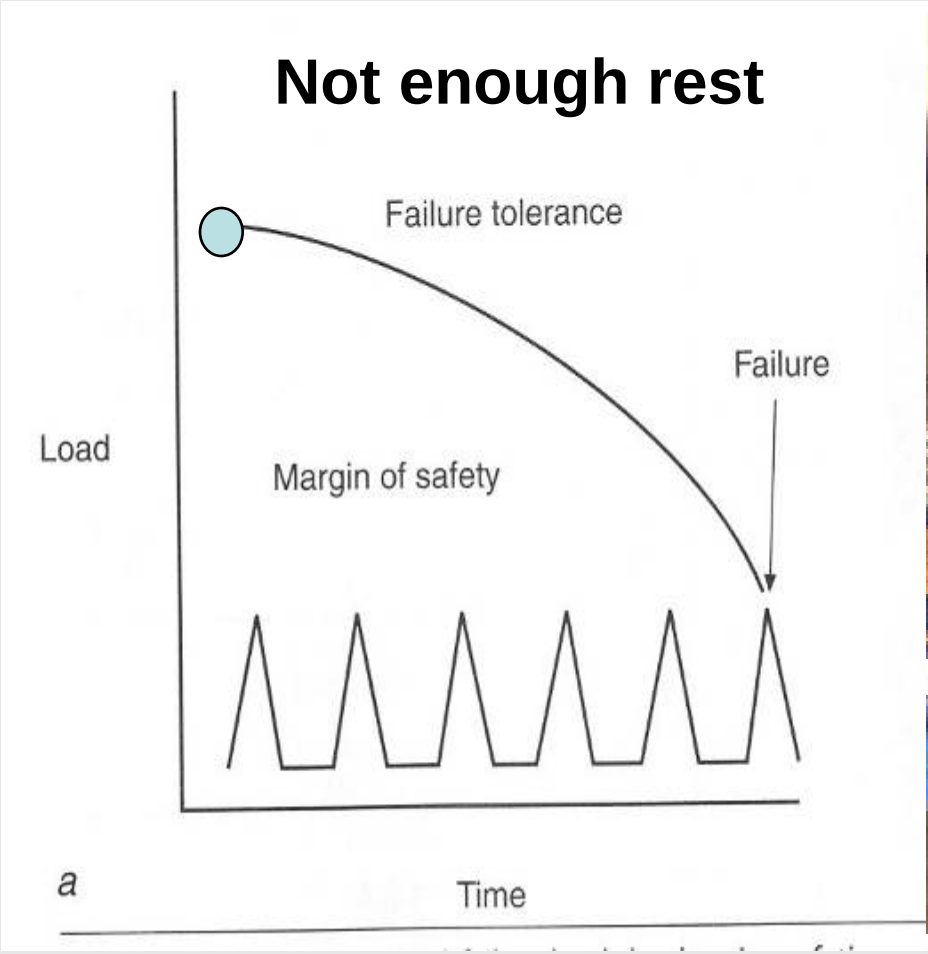
Single high load = Injury



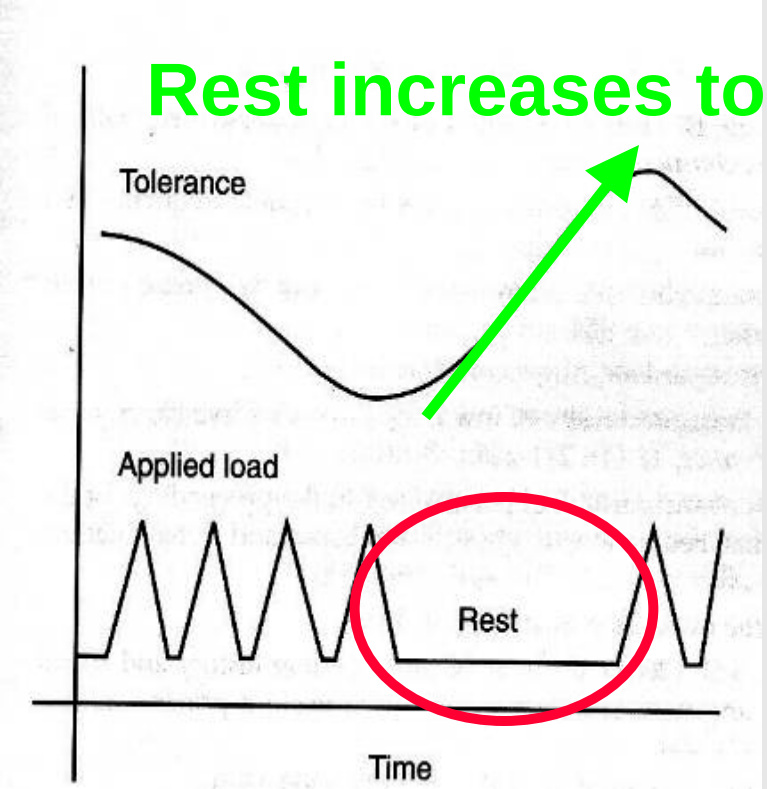
No repetition, no relief = Injury



Too much repetition = Injury



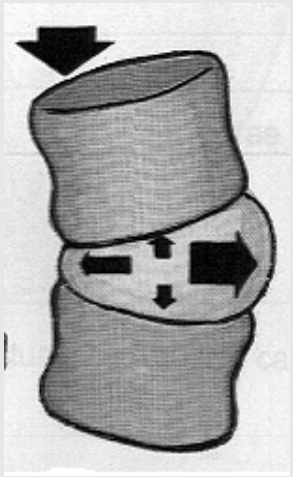
We all need rest

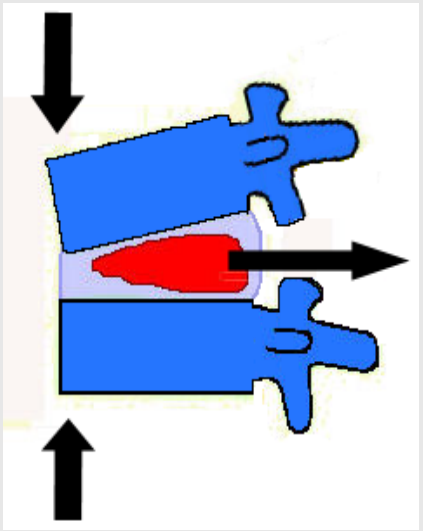


- Loading causes tiny micro-tears, or injuries in tissues
- Rest allows the tissues to recover and tolerance increases
- If there is no rest these micro-tears grow into full fledged injury

What happens inside the spine when we bend?

- Awkward Posture
  - Prolonged bending stress, the annular fibers
  - Results in movement of nucleus against annular fibers





Degeneration of the IVD

- Normally results from chronic loading of the tissues over time
- Loading includes - unnatural postures (away from normal), amount of force exerted and duration/frequency of time spent in unnatural postures

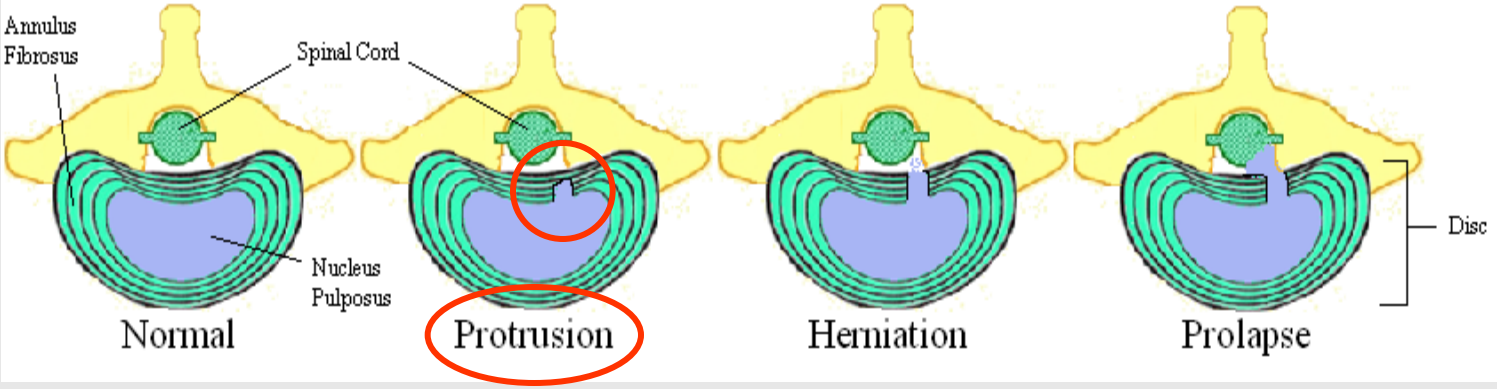
Back Degeneration - Stages

- Results from the wearing of the IVD
- Annular rings become brittle and loose strength
- Fluid inside the disc exerts pressure on the fibrous sheath causing it to expand into the spinal canal
- Fluid then exerts pressure onto spinal nerves

Stages of Degeneration

1) Disc Protrusion

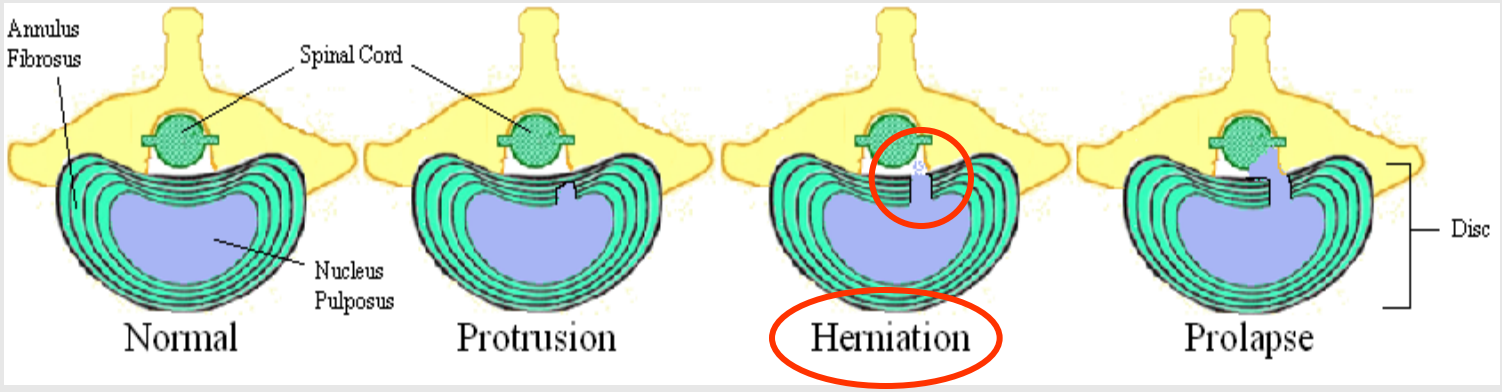
- Fluid inside disc stretches fibers
- Does not penetrate fibers



Stages of Degeneration

2) Disc Herniation

- Rupture of fibers usually in back region of disc
- Fluid expelled into area of weak fibers
- Partial protrusion into vertebral canal



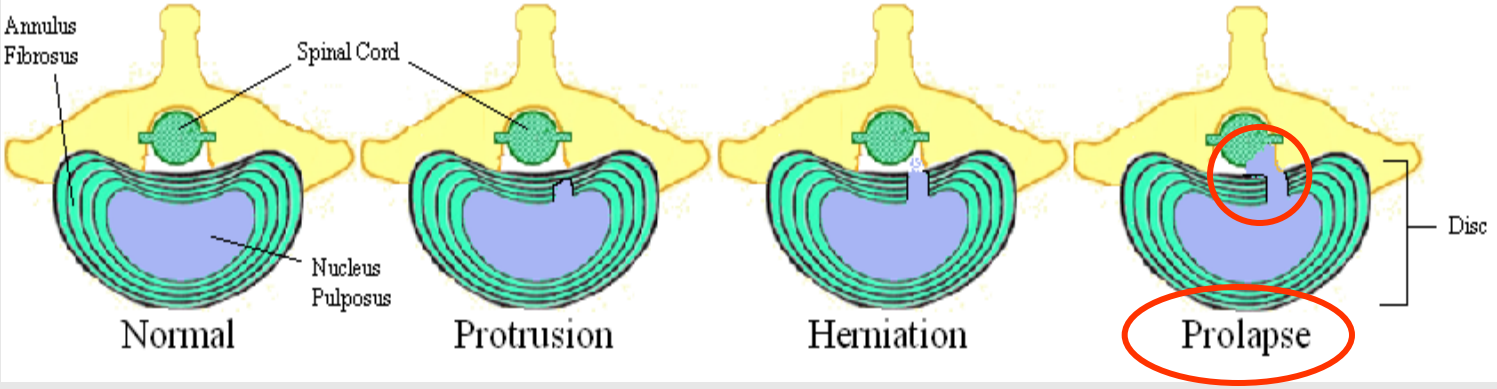
Stages of Degeneration

3) Disc Prolapse

- Complete rupture of fibers
- Fluid migrates into vertebral canal

Not as common as many think

In studies, discs require a load for several thousand cycles through FULL range to get to this point



Can Lifting Technique Make a Difference?

YES

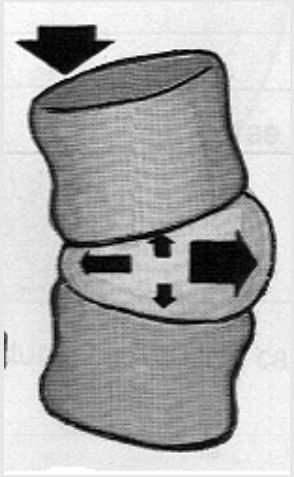
!

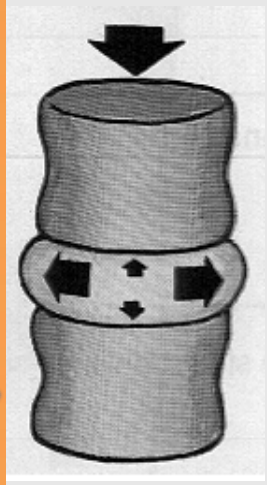
Occupational Health Clinics for Ontario Workers Inc.

Centres de santé des travailleurs (ses) de l'Ontario Inc.

Posture

- “Good” posture is important
- You want to maintain the three natural back curves
- Strong back and abdominal muscles are the key





Principles of Lifting

B ack Straight

A void Twisting

C lose to Body

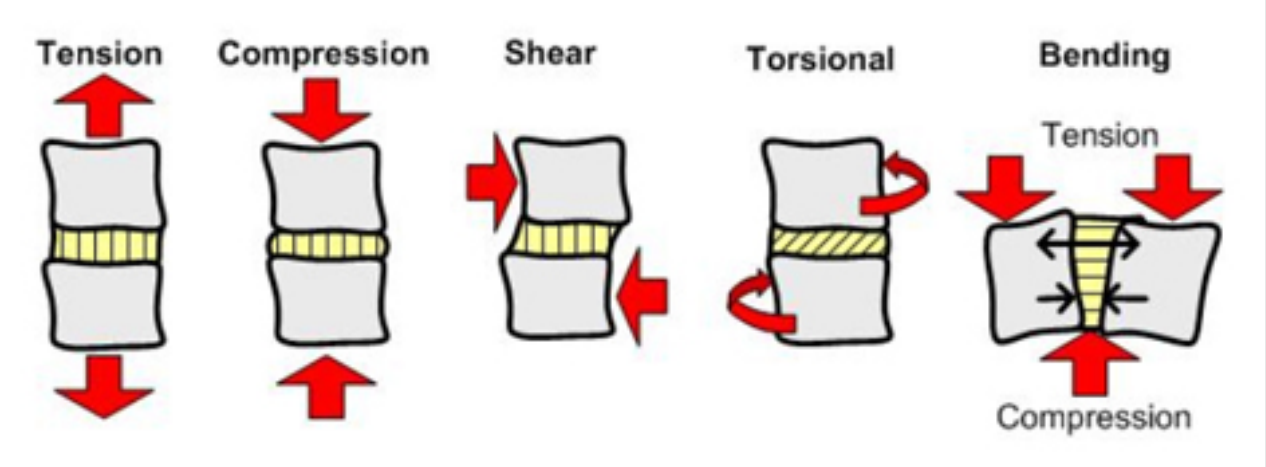
K eep Smooth

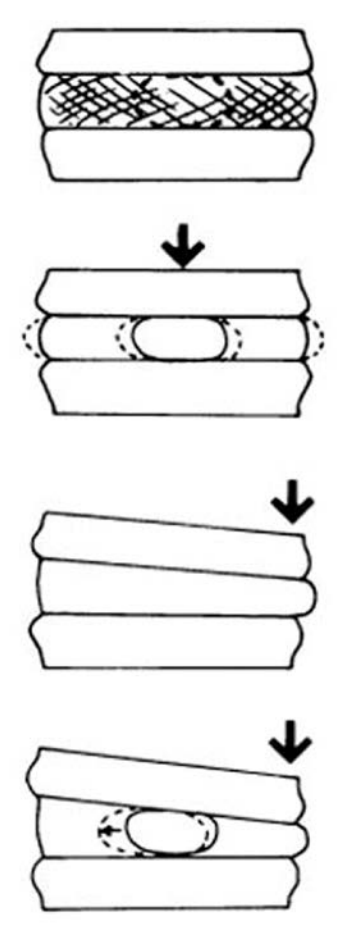
Occupational Health Clinics for Ontario Workers Inc.

Centres de santé des travailleurs (ses) de l'Ontario Inc.

Back Straight (Neutral Spine)

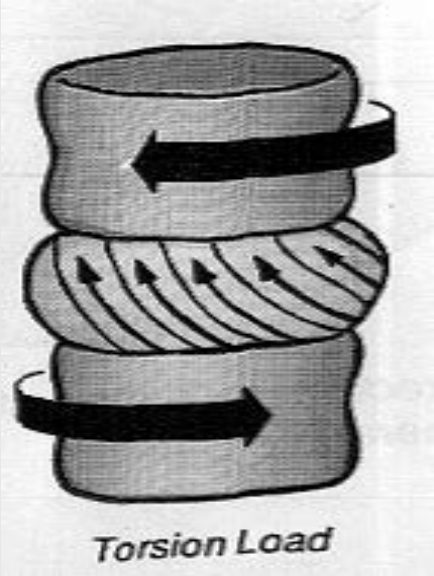
- Aligns spine.
- Maintains spine's neutral curves.
- Keeps spine moving smoothly.





Avoid Twisting

- Twisting makes discs weaker, and facet joints inflamed and sore.
- Instead, pivot or move feet.

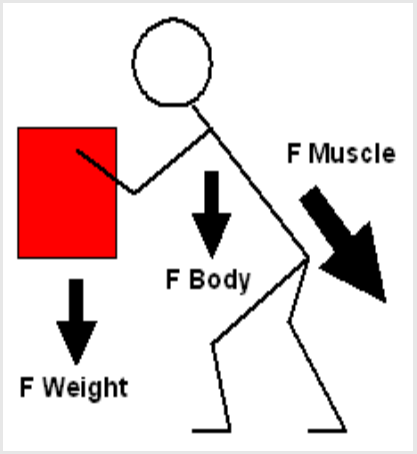


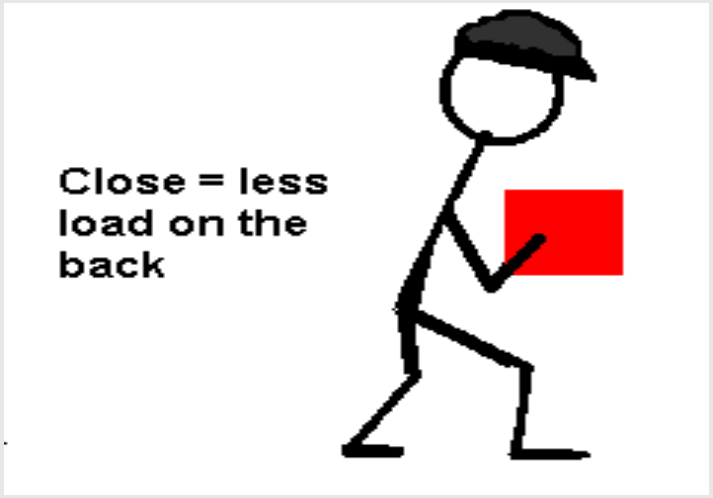
Close to Body

- Back joints act as a fulcrum.
- Muscles counterbalance the weight.

Muscle Force = distance x load

- ⇑ distance from body = ⇑ stress on the back.





Keep Smooth

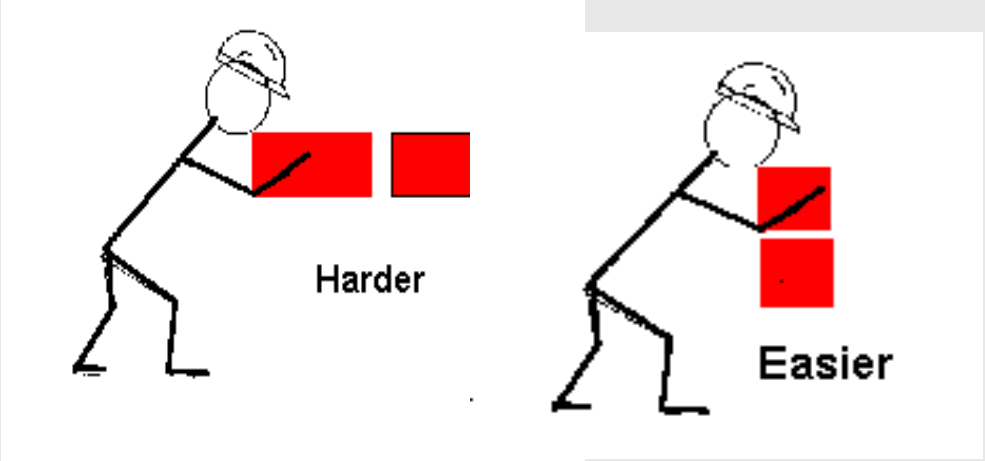
- Jerking increases the load on the discs.

- Lifting should be a smooth, continuous movement.

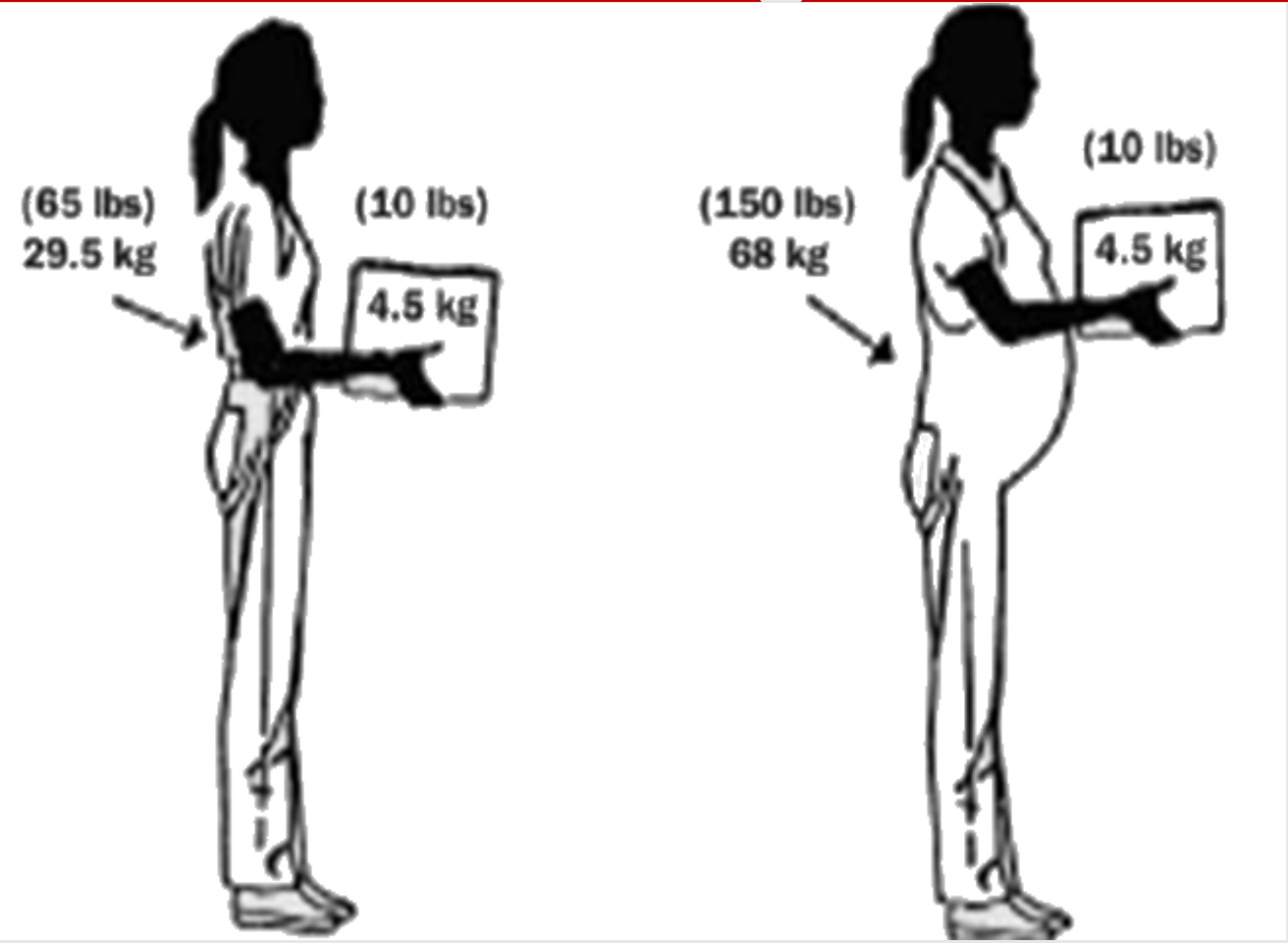
Occupational Health Clinics for Ontario Workers Inc.
Centres de santé des travailleurs (ses) de l'Ontario Inc.

Object Size & Horizontal Location

- The dimensions of an object can make one object seem ‘heavier’ to lift than another of the same weight
- Do not reach – try to decrease the horizontal distance



Body Size & its affects on spinal loading



How to Lift Properly

- Plan ahead before lifting.
- Lift close to your body.
- Feet shoulder width apart.
- Bend your knees and keep your back in a neutral position.
- Tighten your stomach muscles.

Occupational Health Clinics for Ontario Workers Inc.
Centres de santé des travailleurs (ses) de l'Ontario Inc.

How to Lift Properly Continued

- Maintain normal breathing.
- Test load.
- Lift with your legs.
- If you're straining, get help.

Lifting Safety is also Affected by...

Object Weight

Object Size

Grip

Asymmetry

Vertical Location

Occupational Health Clinics for Ontario Workers Inc.

Centres de santé des travailleurs (ses) de l'Ontario Inc.

Object Weight

Heavier Loads

- Harder to lift
- Increase your probability of getting injured

KEY - use a lifting aid or get another person to help of the load is heavy or awkward

Vertical Location
Vertical Travel Distance

- It is easier to lift loads stored between knuckle height and waist level
- It is harder to lift loads from the ground
- Avoid lifting above shoulder height
- Minimize the vertical distance required to lift

Unbalanced Loading

- Unbalanced loads increase the risk of injury
- Lifting combined with twisting increases the risk for injury
- Overreaching increases the risk of injury

- Avoid one-handed carrying
  - Unbalanced loading
  - Increased stress on the discs

Grip

- Poor coupling (grip) increases the risk of injury.
- Examples:
  - Can Claw
  - Gorilla Gripper

Remember Lifting Technique Makes a Difference

Good Lifting Technique

Technique

Load Lifted = 10 kg

Poor Lifting

RWL = 11.96 kg

SAFE lift

RWL = 5.41 kg

UNSAFE lift

Occupational Health Clinics for Ontario Workers Inc.

Centres de santé des travailleurs (ses) de l'Ontario Inc.

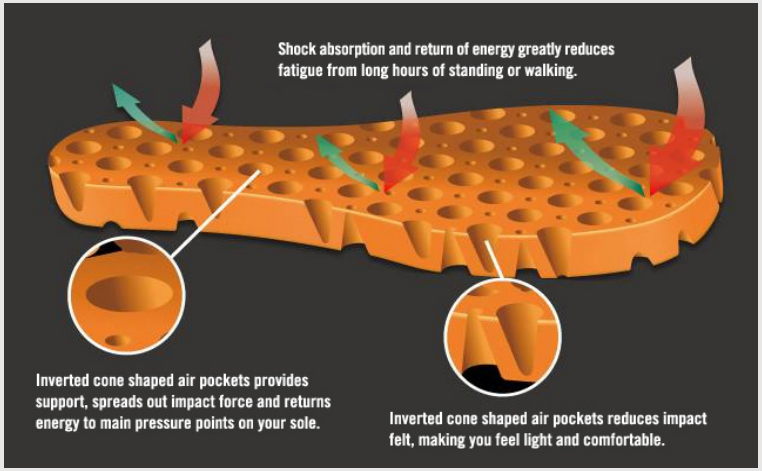
Carrying Loads

- Minimize carrying when possible
- Use an aid
  - Wheelbarrow
  - Dolly
  - Cart
- How to use a dolly safely
  - Push loads rather than pulling them
  - Keep the knees bent and the back straight

Occupational Health Clinics for Ontario Workers Inc.
Centres de santé des travailleurs (ses) de l'Ontario Inc.

Prolonged Standing

- Proper cushioned footwear should be used
- Anti fatigue boots have had positive comments generated by users
  - A s another al me result



Back Care Can also Make a Difference

Exercise

Warm-up

Posture

Planning

Occupational Health Clinics for Ontario Workers Inc.
Centres de santé des travailleurs (ses) de l'Ontario Inc.

Regular Exercise

- **Regular exercise helps to slow down the 'normal' degenerative changes associated with aging**
- **Strengthen your back and abdominal muscles equally**
- **Walking is an excellent exercise for the back (helps to keep the discs nourished)**

Stretching and Warming Up

- Prepare your body for physical activity (cold muscles are more likely to injure)
- Do not lift anything immediately after sitting in a vehicle - walk around and ‘loosen up’
- Be weary of your back – it is very vulnerable when you first wake up.
  - Back muscles stiffen while you sleep. Avoid exerting yourself shortly after getting out of bed.
- Stretch

(calves, hamstrings, quadriceps, arms, back)

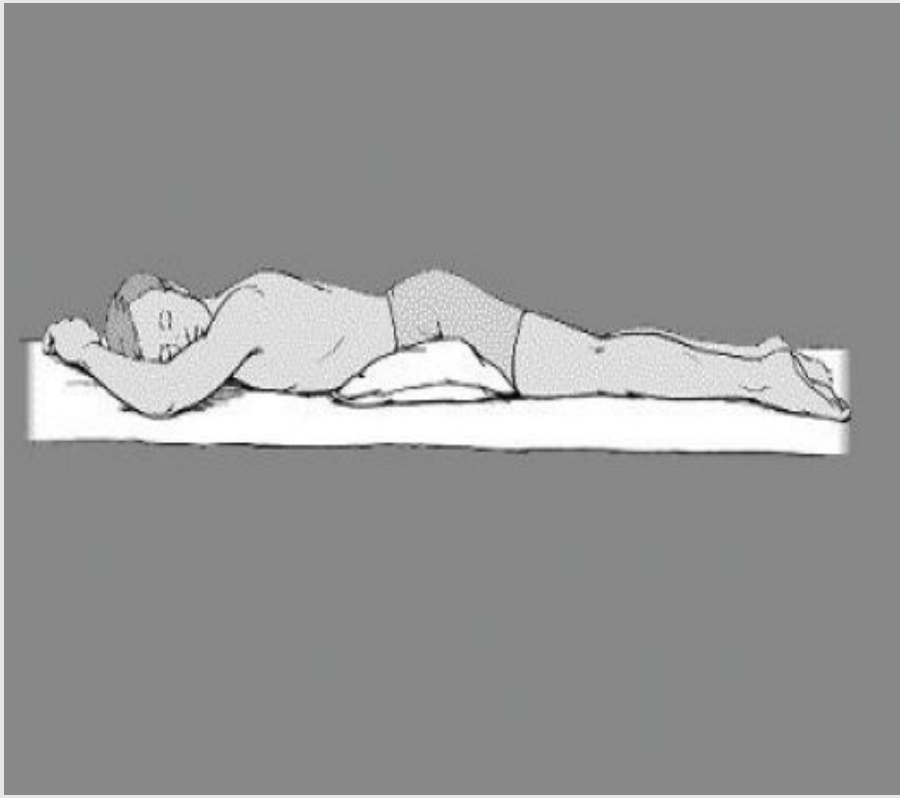
Sleep Positions

- Back has a natural ‘S’ curve.
- Pillows should support this while sleeping, so your muscles don’t have to.
- Misalignment can cause your muscles to seize up, causing cramps or a sore back/ shoulders.
- Try different sleep/pillow placement positions to find which one is best for you.

Occupational Health Clinics for Ontario Workers Inc.
Centres de santé des travailleurs (ses) de l’Ontario Inc.

Stomach Sleepers

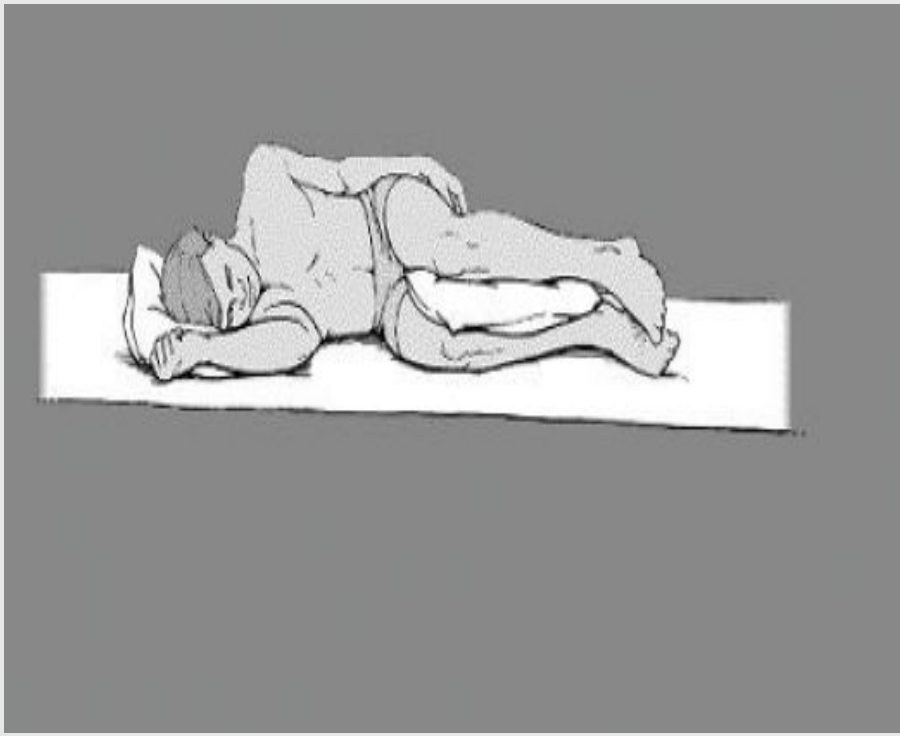
- Sleeping face down is a natural human instinct.
- Place a pillow under your hips to take the stress off your lower back and neck.
- Mattress too hard? Try placing other pillow under ankles instead of hips.



Occupational Health Clinics for Ontario Workers Inc.
Centres de santé des travailleurs (ses) de l'Ontario Inc.

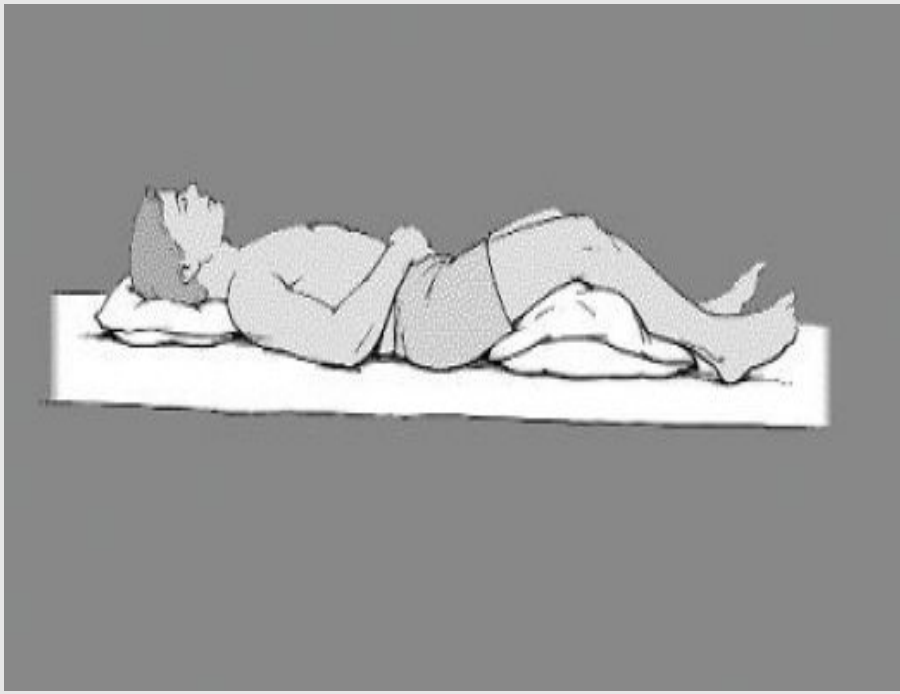
Side Sleepers

- Recommended by Chiropractors.
- Place one or two pillows under the head and neck, depending on their thickness, to ensure that your cervical spine is straight and elongated.
- An extra pillow between the knees opens your hips and prevents knees from knocking together or legs from chafing.



Back Sleepers

- Opens up lungs, but worse for snoring.
- Put one pillow under the head, and another under the knees to relieve pressure on the back.



Take Home Message

- Push rather than pull a load
- Do not try to catch falling loads
- Avoid lifts above shoulder height
- Do not lift and twist - TURN YOUR FEET
- Do not attempt to lift loads heavier than what YOU feel YOU can safely lift
- Develop a healthy lifestyle (exercise)
- Use lifting aids when available
- Think before every lift

Take Home Message

- Design lifting tasks to minimize the load on the back
- Use “good” lifting technique
- Back straight Avoid twisting Close to body Keep smooth
- Warm-up-stretch before lifting
- Communicate
- Plan the entire lift to avoid accidents
- Take breaks
- Find a sleeping posture that’s right for you

For More Information Contact your Local OHCOW Clinic

1-877-817-0336

www.ohcow.on.ca

- HAMILTON
- SARNIA-LAMBTON
- SUDBURY
- THUNDER BAY
- TORONTO
- WINDSOR

Occupational Health Clinics for Ontario Workers Inc.

Centres de santé des travailleurs (ses) de l'Ontario Inc.