



THE UNIVERSITY OF
ALABAMA IN HUNTSVILLE

Back Safety and Safe Lifting

Back Safety

➤ Learning goals:

- Learn safe body mechanics (lifting, standing, sitting, lying)
- Get your back in shape (exercises for strength, flexibility)

Back Safety

➤ Definitions:

- **Manual handling:** force exerted to lift, lower, push, pull, carry or otherwise move, hold or restrain something
- **Manual handling injury:** sprains, strains or fractures to muscles, tendons, ligaments and joints

Common Causes of Back Injury/Pain

- Traumatic injury (auto, industrial or sports accident)
- Poor posture and alignment: makes movement difficult and awkward
 - Any posture that compromises the natural curve of the spine puts strain on the supporting back muscles and weakens them
 - Without proper support, the vertebrae are forced to carry weight they are not meant to carry: premature spinal degeneration
 - Also makes movement difficult and awkward, increasing the chances of injury

Common Causes of Back Injury/Pain

- Overexertion: failure to ease off activity or change position, ignoring twinges
- Cumulative strain: excess body weight, repetitive movements, working in awkward positions, age (wear and tear)
- Emotional stress: Causes muscle contraction, contracted muscles do not allow for proper circulation

Back Anatomy

➤ Spinal Cord

- Central nervous system (with brain)
- Pair of spinal nerves exit below each vertebrae
- Cervical nerves go to the arms; lumbar area to the legs

Back Anatomy

➤ Muscles

- Spinal (back) muscles: stabilize the spine, they are not made for lifting
- Buttock and thigh muscles: strong and durable
- Stomach muscles: Also used in lifting. When they are weakened then back muscles tighten

Muscles

- Dynamic muscle work:
 - Involves muscle contraction and movement
 - Blood flushes out lactic acid which causes muscle fatigue (can work for lengthy periods)
 - Lifting and stacking boxes is an example
- Static muscle work:
 - Muscles hold the body without movement
 - Sustained contraction halts blood flow to muscles: lactic acid builds up, causes fatigue
 - Bending over a workbench and sitting at a computer are examples

Spinal Balance

- Spine is aligned in three “S” shaped curves
- Balanced to keep weight evenly distributed on spine
- Proper balance places least amount of stress on spine
- Vertebrae pushed out of line causes pain, invites injury

Posture is important!

Posture

➤ Standing

- “Stack” ears, shoulders, hips, knees and ankles in a straight line
- Tuck in chin
- Shoulders back and down
- Stuck in gut: a pot belly can act as a load and pull spine out of balance
- If standing for long periods, elevate one foot to reduce stress in lower back

Posture

➤ Sitting

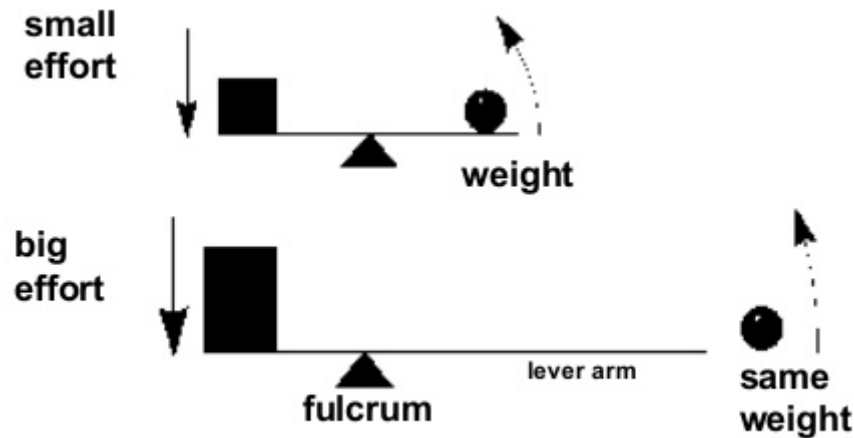
- Sit with ankles, knees, thighs and elbows at right angles
- Keep head balanced over shoulders
- Keep shoulders relaxed (not hunched)
- Sit back in chair for support

Safe Body Mechanics

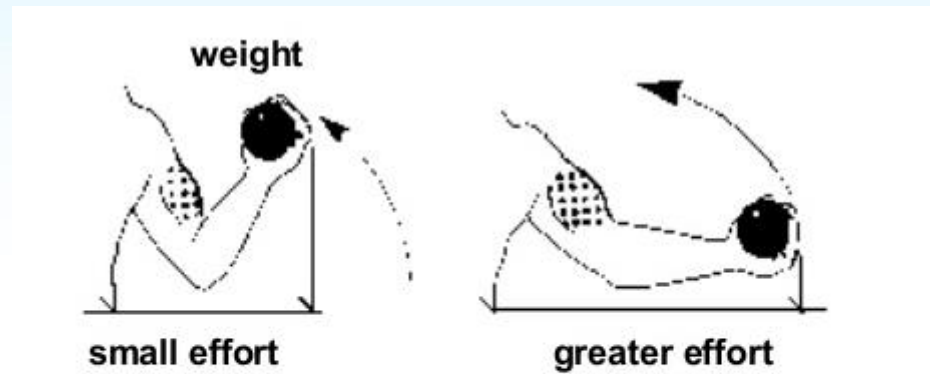
- Body mechanics: The relationship between your posture and your movement
- Good body mechanics avoids putting undue strain on your back

Safe Body Mechanics

- Use the Principles of Levers: A weight, a short distance from the fulcrum requires less effort to move than the same weight a farther distance from the fulcrum



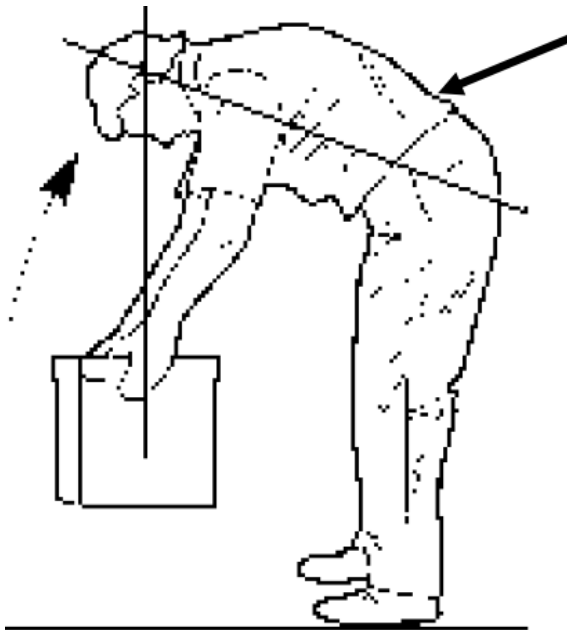
Principles of Levers



If the load is further away, the greater the strain on the person doing the lifting

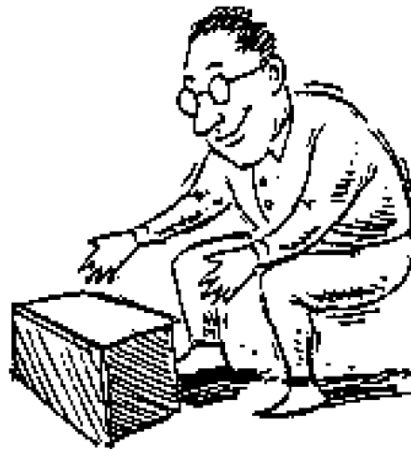
Principles of Levers

- The worst lifting situation occurs when the body is used like a lever and extended over the load
 - The lower back becomes a fulcrum supporting the weight of the body plus the load



Techniques for Safe Lifting

- Get a firm footing: keep feet shoulder width apart, toes out, distribute weight evenly on soles of both feet
- This stance adds stability and reduces stress on muscles



Techniques for Safe Lifting

- Bend your knees: not your waist
- When the knees are bent, the weight comes first onto the thighs and hips, not the spine
- Bending at the waist puts tremendous pressure on the vertebrae
- You can also lower your body down on one knee and glide the object up into your body to get a good grip before pushing your body upward

Techniques for Safe Lifting

- Tighten stomach muscles: they support spine when lifting reducing force of the load
- Get a good grip: use both hands
- “Hug” the load: hold it as close as possible to your body; the closer it is to your spine, the less force it exerts on your back



Techniques for Safe Lifting

- Lift with your legs
 - Gradually straighten to a standing position
 - Lift steadily and smoothly without jerking



Carrying

- Keep back straight: to help shift weight onto the legs



Techniques for Safe Lifting

- Avoid twisting
 - Twisting can overload the spine and cause injury to the feet, knees, and torso
 - Your feet, knees, and torso should always be in the same direction
- Pivot with your feet, not your back



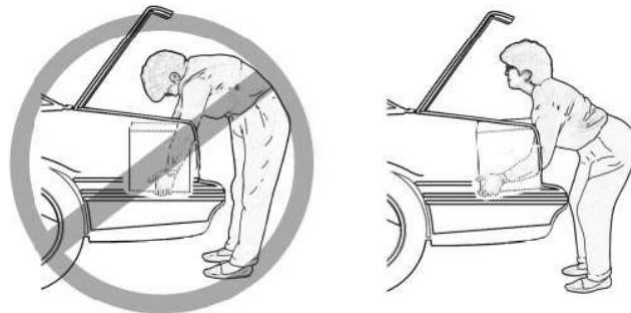
Techniques for Safe Lifting

- Use the same technique to set down the load



Lifting Awkward Loads

- Reaching into a bin or car trunk:
 - Stand with feet shoulder distance apart
 - Slightly bend knees and squat, bending at hip joints, not waist
 - Slide the load as close to your body as possible
 - Raise yourself with leg and hip muscles
 - If possible, rest knees against edge for support



Hard to Reach Loads

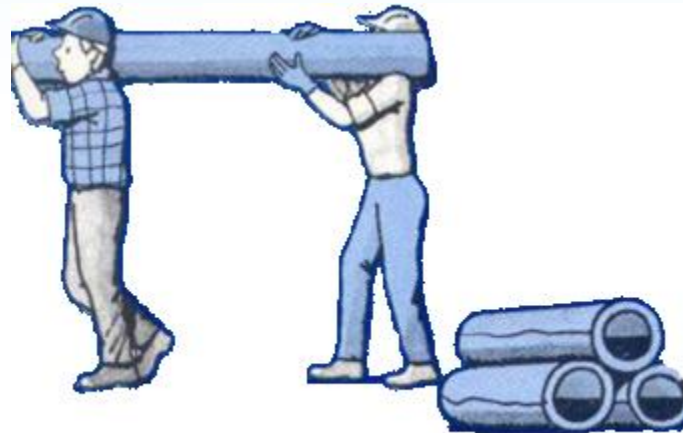
- Do not reach above the shoulders: use a stepstool or ladder
- Test the weight before removing from shelf
- Place item on lower shelf
- Slide it toward you and hug it close to your body

Two Person Loads – Team Lifting

- Both persons should be about the same height
- One person should charge of the lift, so that you are working together not against each other
- Lift together, walk in step and lower the load together

Two-Person Long Load

- Shoulder on the same side
- Keep load level
- Walk in step



Loading Truck or Shelf

- Put the load on the edge and push it into place



Awkward Location

- Don't force your body to conform to the workspace
- Use the golfer's lift to pick up light, small loads when you can't bend your knees or get close to the object
- Swing one leg straight out behind you
- Keep your back straight while your body leans forward
- To help support your body, place one hand on your knee or on a nearby solid object



Awkward Loads

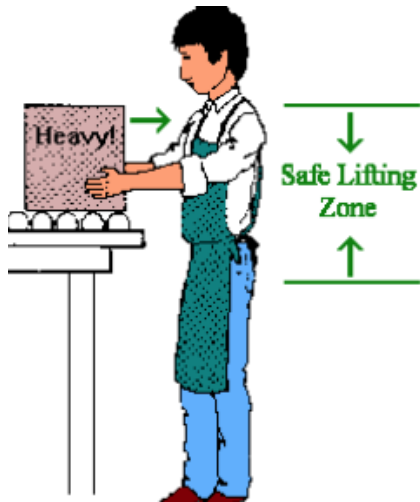
➤ Instead of lifting, push a load



➤ Push, Don't pull!

Repetitive Lifting

- If you must lift many items:
 - Design workspace so items to lift are in your safe lift zone
 - Use mechanical assistance or get help



Safe Lifting

➤ Don't:

- Lift anything that exceeds $\frac{1}{3}$ – $\frac{1}{2}$ your body weight
- Lift from the floor if possible
- Twist and lift
- Lift with one hand (unbalanced)
- Lift loads across or over obstacles
- Lift while reaching or stretching
- Lift from an uncomfortable posture
- Fight to recover a dropped object

Exercise

- Benefits:
 - Muscle strength helps maintain natural curves
 - Keeps back strong and supple
 - Warm muscles increase ease of movement
- More energy: increased blood and oxygen flow flushes out lactic acid
- Cool down exercises decrease potential stiffness

Exercise “Dos”

- Change your posture/position often
- Stretch frequently throughout the day
- Keep body flexible (not rigid or fixed)
- Warm up before any strenuous work or lifting
- Move slowly and gently
- Stop if there is any discomfort

Exercise

- Wall slides to strengthen back, hip, and leg muscles
 - Stand with your back against a wall and feet shoulder-width apart. Slide down into a crouch with knees bent to about 90 degrees. Count to five and slide back up the wall. Repeat 5 times.

Exercise

- Leg raises to strengthen back and hip muscles
 - Lie on your stomach. Tighten the muscles in one leg and raise it from the floor. Hold your leg up for a count of 10 and return it to the floor. Do the same with the other leg. Repeat five times with each leg.

Exercise

- Leg raises to strengthen stomach and hip muscles
 - Lie on your back with your arms at your sides. Lift one leg off the floor. Hold your leg up for a count of 10 and return it to the floor. Do the same with the other leg. Repeat five times with each leg. If that is too difficult, keep one knee bent and the foot flat on the ground while raising the leg.

Exercise

- Partial sit-up to strengthen stomach muscles
 - Lie on your back with knees bent and feet flat on floor. Slowly raise your head and shoulders off the floor and reach with both hands toward your knees. Count to 10. Repeat five times.

Exercise

- Back leg swing to strengthen hip and back muscles
 - Stand behind a chair with your hands on the back of the chair. Lift one leg back and up while keeping the knee straight. Return slowly. Raise other leg and return. Repeat five times with each leg.

Exercise

➤ Stretch

- Stand with your feet slightly apart. Place your hands in the small of your back. Keep your knees straight. Bend backwards at the waist as far as possible and hold the position for one or two seconds.

Acknowledge Training

[Click here to acknowledge receipt of training](#)

If you have any questions contact:

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