



PRINCIPLES FOR PROPER BODY MECHANICS

Self-Study Guide

OBJECTIVES OF THE PRINCIPLES FOR PROPER BODY MECHANICS

Upon completion of this self-study guide, you should be familiar with Principles for Proper Body Mechanics.

Successful completion of this program can be accomplished by completing the examination on the last page of this self-study guide with a score of 80% or better.

PRINCIPLES FOR PROPER BODY MECHANICS

- Faulty body mechanics is a contributing factor in most back disorders.
- Lifting with the back in a flexed posture, especially repetitive lifting is one of the leading causes of back disorders even though one may not notice any problems at first.
- Injury to the disc occurs gradually as a result of perhaps hundreds of thousands of repeated forward bends and lifts. This forward bending and lifting is especially stressful on the lower back when done with the legs straight. If the legs are straight the trunk acts as a lever arm and increases the compressive load on the back by seven to ten times.
- Similarly, lifting objects at arm's length also significantly increases the compressive load on the back.
- Lifting should be accomplished with the back in an upright position with the eyes neutral and the feet spread out at a diagonal angle keeping smooth curves in neck, trunk, and lower back areas.
- Correctly adjusting chairs and work surface heights are important factors in preventing fatigue and the resulting slumped posture.
- Twisting the back, especially in a forward bent position, is perhaps the most stressful action on the back. The fibrous rings of the disc can be damaged by twisting.
- Avoid reaching high over the head with a heavy load. This situation causes an increased arch in the lower back and, if repeated constantly throughout the day, irritation of the facet joints and ligaments can occur.
- Sleeping postures are just as important as working and sitting postures. The normal balanced position is best for the back. Either extreme of slumping into a flexed position or having an excessively arched back is harmful. It is at night when one sleeps that the disc absorbs fluids and regains its height. Mattresses which are either too soft or too hard are bad for the back. A mattress should be soft enough to conform to body contours, but

firm enough to support the back in a balance posture. Water beds are often recommended.

- Disc injuries occur as a result of months or years of forward bending and or slumping sitting.
- Practice good posture.
- When sitting, the back should be supported in the normal arched position. The head and shoulder are held in an erect, well balanced position. In this position the weight of the head and shoulders is evenly distributed throughout the structures of the back and neck.
- It is often helpful to place a rolled towel, small pillow or cushion behind the back or under the posterior hip/buttock area to maintain a normal arched position.
- When standing, keep work at a proper height so that the neck and lower back are held in an upright balance position. Work that is too low will cause a forward head strain on the neck and increase disc loading and pressure on the lower back. Work that is too high may cause the opposite problem – a sway back and a strain on the facet joints. This position may be changed by placing one foot on a bar or step stool occasionally. It is wise to move frequently when one is standing or sitting, especially if the position is a stressful one.
- The most important principle to remember when lifting is to keep the back in a normal position. This arched position tends to put the muscles in a short, strengthened position. It also distributes the weight more evenly between the disc and facet joints and places a more balanced weight on the disc. Professional and Olympic weight lifters are taught to squat and bend their legs in order to get as much lift with their legs as possible. They are also taught to keep their heads up and their backs arched in neutral to avoid push into the belt to increase intra-abdominal pressure. It is often helpful to place one foot ahead of the other when lifting to get the object being lifted closer to the body. This position is especially important when lifting large, bulky items. This diagonal lifting position also balances the weight within a wide, safe base of support.
- Often stress to the lower back is caused by lifting a load that is too heavy. Even when good body mechanics are used there is a limit to the stress that the back can stand. More than one person may be required or a mechanical hoist or lifting device may be needed for heavy objects. Injuries often occur as a result of forward bending and lifting when mechanical lifting devices are readily available but are not being used.
- It is always a good idea to slide heavy objects rather than lift them. The same body mechanics principles apply when pushing or pulling, in that a balance neutral back posture is desirable. Teamwork is important. When two or more people are carrying

something, good communication is essential. In addition, it is essential to keep the weight close to the body. A ten pound weight can produce a 100 pound force in the lower back if the poor body mechanics are used. Also, when the arms are used as the lever arm, the force will be seven to ten times greater if the weight is held at arm's length.

- Twisting the trunk, especially in a forward bent position, is particularly harmful to both the disc and the facet joints. Pivoting rather than twisting is essential in avoiding a lower back injury. Lifting with a sudden, jerking motion is also potentially harmful and should be avoided.

The ultimate responsibility for good health lies with you. Low back injuries are no exception.

If questions, call Melissa Waddell, PT at (740) 947-6378.



10 BODY MECHANICS PRINCIPLES OF LIFTING

1. Stand with your feet apart and with one foot slightly forward.
A broader base of support increases stability.
2. Head and trunk upright and aligned.
Energy efficient because center of gravity does not shift far from center of base. Try to keep eyes level with horizon.
3. Knees and hips flexed.
Lowering the center of gravity increases stability.
4. Bring the object as close to your center of gravity as possible.
A shorter resistance lever arm requires less effort.
5. Elevate surface to waist height.
A weight close to height of your center of gravity conserves energy and maintains stability during the lift.
6. Use your lower extremities to generate effort/force.
Lower extremities are strong anti-gravity muscles.
7. Maintain the lumbar curve.
Changes in position of body segments will change the forces acting on the lumbar spine and increase the risk of injury.
Keep eyes looking level with horizon and gently contract abdominal muscles.
8. Avoid rotation of spine – shift weight from LE to LE.
Minimize the risk of back injury and enlarge your BOS to allow for a shift of the center of gravity.

9. Synchronize muscle contractions by counting 1 – 2 – 3 lift.
For maximum efficiency the whole body must work together as a unit.
10. Know your capabilities.
Don't attempt a task if there is a doubt about the ability to complete it safely.

LIFTING PRINCIPLES

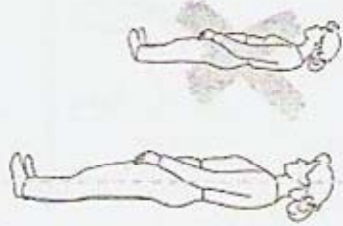
- Maintain proper posture and head alignment.
- Slide object to be lifted as close as possible.
- Move obstacles out of the way.
- Test before lifting, ask for help if too heavy.
- Tighten stomach muscles without holding your breath.
- Use smooth movements, do not jerk.
- Use legs to do the work and pivot with your feet.
- Distribute the workload symmetrically and close to the center of trunk.
- Push instead of pull whenever possible.

Prepared By: Melissa Waddell, PT

Jan 29, 2008

POSITIONING - 4
Posture - Standing

Good posture is important. Avoid slouching and forward head thrust. Maintain curve in low back and align ears over shoulders, hips over ankles.



POSITIONING - 5
Standing

For prolonged standing, alternate placing one foot in front of the other or on a stool. Wear low-heeled shoes, and maintain good posture.



POSITIONING - 8
Reading

When reading, hold material in ideal position and maintain good sitting posture.



POSTURING - 13
Computer Work

Position work so feet forward. Use proper work and seat height. Keep shoulders back and down, wrists straight, and elbows at right angles. Use chair that provides full back support. Add footrest and lumbar roll as needed.



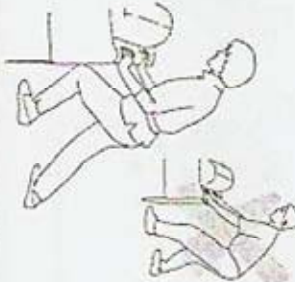
MOVEMENT - 2
Avoid Twisting

Avoid twisting or bending back. Pivot around using foot movements, and bend at knees if needed when reaching for articles.



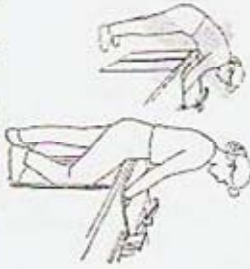
MOVEMENT - 12
Pushing/Pulling

Pushing is preferable to pulling. Keep back in proper alignment, and use leg muscles to do the work.



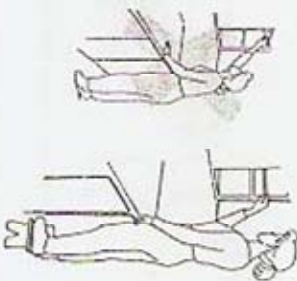
ADL - 8
Housework - Sisk

Place one foot on ledge of cabinet under sink when standing at sink for prolonged periods.



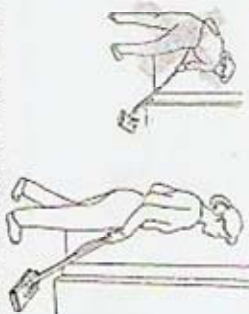
ADL - 10
Housework - Reaching Up

Keep a step-stool handy for items on upper shelves above shoulder level.



ADL - 19
Housework - Vacuuming

Hold the vacuum with arm held at side. Step back and forth to move it, keeping head up. Avoid twisting.



SELF-STUDY TRAINING GUIDE

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Jan 29, 2008

Name: For:
 and By: melissa waddell, pt

MOVEMENT - 1
 Bending



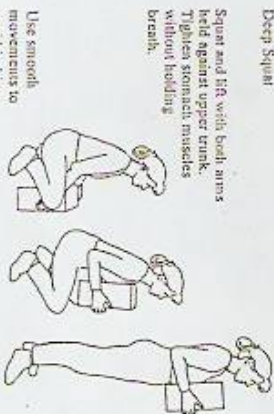
Hold at hips and knees, not back. Keep feet shoulder-width apart.

LIFTING - 2
 Ask For Help



Ask for help and delegate to others when possible. Coordinate your movements when lifting together, and maintain the low back curve.

LIFTING - 10
 Deep Squat



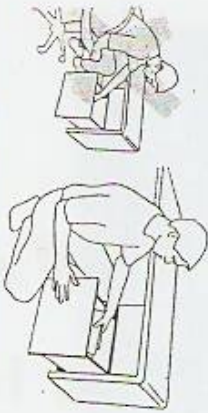
Squat and lift with both arms held against upper trunk. Tighten stomach muscles without holding breath.

LIFTING - 9
 One Knee



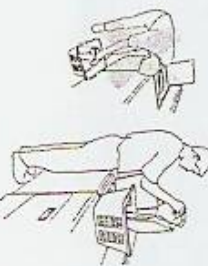
Slide object up one thigh, and hold close at waist level with both hands before standing up.

MOVEMENT - 7
 Reaching Into Drawer



Squat to reach or rearrange your work area, and avoid twisting and bending.

ADL - 11
 Laundry - Loading Wash



Position laundry basket so that bending and twisting can be avoided.

ADL - 14
 Laundry - Unloading Wash



To unload small items at bottom of washer, lift leg opposite to arm being used to reach.

ADL - 15
 Laundry Basket



Squat down and hold basket close to stand. Use leg muscles to do the work.

ADL - 16
 Laundry - Unloading Dryer



Squat down to reach into clothes dryer. Small items can be placed in a large zippered mesh bag, and pulled out using a receiver.