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Back Injury Prevention...Proper Lifting Techniques

Approximately 8 of every 10 adults will have low back problems at some time in their life. Likewise, millions of people will suffer serious pain with long-term physical problems.

In addition, it is estimated that back injuries disable more than 400,000 people each year and cost Americans nearly \$75 billion annually in medical treatment, lost wages, and insurance costs. In fact, back injuries one of the leading cause of missed workdays and lost wages.

Injuries occur most often when the back muscles are weak or by improper lifting and carrying. Weak muscles can make simple activities such as sitting, standing, or lifting potentially harmful.

Since you have a physical job, your back must endure a vigorous daily workout.

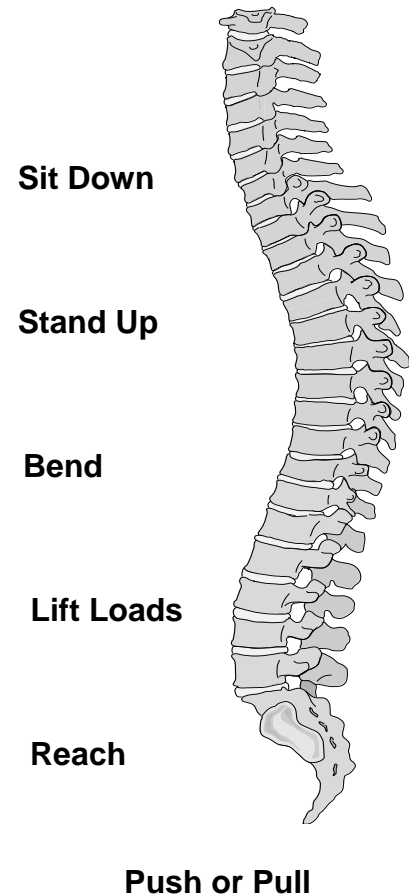
By taking a few minutes each day to strengthen and stretch your muscles, you can prevent injuries and make your job easier on your back.

Prevention

This training is designed to help you:

- ❑ Understand how the back works.
- ❑ Learn proper lifting and carrying techniques.
- ❑ Become familiar with mechanical aids.
- ❑ Know what to do in case of an injury.
- ❑ Learn proper exercises and lifestyle choices.

Your Back Helps You...



Basic Anatomy 101

The back is more prone to injuries than any other part of the body because it holds up the entire body, supports most of the body's weight and plays a leading role in almost every move we make.

The spine is not perfectly straight. It has three natural curves designed to keep it aligned. The lower back is the **lumbar curve**, the middle back is the **thoracic curve**, and the neck is the **cervical curve**.

The bones that make up the spine are called **vertebrate**, between the vertebrate are cushions of cartilage, called **discs**. The outer part of the disc is soft, and the inside is comprised of a jelly-like substance. The discs act as "shock absorbers" which separate the vertebrate and keep them evenly spaced. They also allow the joints to move smoothly. **Muscles** connect the vertebrate by bands of tissue called **tendons**.

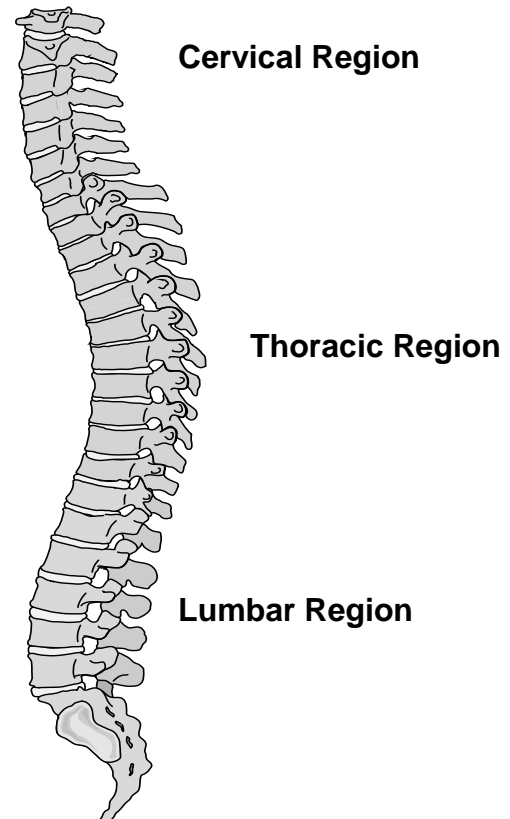
The muscles of the stomach, buttocks, and thighs support your spine with each movement. The stronger these muscles are, the stronger your back will be.

The vertebrate line up to form a hollow tube, which serves to protect the spinal cord. The spinal cord is the link between your brain and the rest of your body. Nerves run through the spine and branch out to the rest of the body through the spaces between the vertebrate.

Lifting is an involved process. When you use good body mechanics and healthy movement, however, you help your back to lift safely.

During a proper lift, muscles and ligaments in the abdomen, buttocks, and thighs work to take the enormous stress off the spine. **The vertebrate must support your weight and the weight of the load as it continues to protect the spinal cord.** The discs cushion every movement the vertebrate make. The curves of the spine also absorb shock during movement.

Your back has a natural
"S-Shaped" Curve...



Proper Lifting Techniques

There is a right way and a wrong way to lift. Regardless of the weight of the load, how strong you are, or how frequently you lift proper body mechanics will help minimize the risk of experiencing a back injury. Some important lifting techniques include:

- ❑ Wear supportive shoes with traction.
- ❑ Bend and stretch to get ready.
- ❑ Test the load to see if you can handle it safely—if not, get help from a co-worker or use mechanical aids.
- ❑ Keep a wide stance and solid footing.
- ❑ To improve balance, keep your heels down and turn your feet slightly out.
- ❑ Tighten your abdominal or stomach muscles.
- ❑ Do not hold your breath—exhale with the greatest exertion.
- ❑ Get a good grasp on the load.
- ❑ Keep the load close to your body to reduce strain.
- ❑ Keep your head up and trunk tall to maintain your natural curves.
- ❑ Lift steadily with your legs, not your back.
- ❑ Point your feet in the direction of the move, don't twist.



If a load is too heavy or bulky to lift alone, get help. Either use mechanical aids (e.g. hand truck or dolly), get assistance from a co-worker, or make multiple trips if the load can be split into smaller ones. Don't jeopardize your back for the sake of saving a little time.

If lifting from above the shoulders:

- ❑ Decide if you can handle the load safely.
- ❑ Designate a place to set the load down.
- ❑ Use a step stool or platform to reach areas above the shoulders.
- ❑ Slide the load close to your body, keep solid footing, and a firm grasp.
- ❑ Let your arms and legs do all the work.

Lifting and Turning:

- ❑ “Hug” the load.
- ❑ Move your body as a single unit.
- ❑ Take several steps to turn your body in the direction you want to move.
- ❑ Bend your knees to set the load down.

Pushing Loads:

- ❑ Tighten stomach muscles (but don't hold your breath).
- ❑ Keep elbows and the load or mechanical equipment close to your body.
- ❑ Put one foot forward to balance yourself.
- ❑ Bend your knees and elbows.
- ❑ Push off with your back leg, taking steady, short steps. Always push the load using your body weight—not your feet. If you must pull a jammed object or cart, follow the same steps, only push off backwards with your forward leg. Get help if you can't free the object.

What can go wrong?

Strains are caused by over-stretching, bending and lifting incorrectly, slouching, and by carrying excess body weight. The muscles and ligaments that support the back become strained from continuous misuse, poor standing or by sitting posture, weak, unused muscles, or being overweight.

Overflexion or bending too far increases the pressure on the discs resulting in pain and stiffness.

Overextension or arching backward, forces the facets between the vertebrae to take the weight of the load you are lifting.

Herniated Disc or “slipped disc” results from overstrain, repeated strain, improper lifting, bending over, or long-term deterioration due to age. Painful pressure on the nerves in the back happens when the jelly-like fluid inside the discs leaks and presses on the nerves. The loss of fluid inside the disc can also cause the disc to lose some of its cushioning effect.

Ruptured disc is when the disc tears and the jelly-like substance inside pours out.

Pinched nerve can result from either bony growths that form on the vertebrae or by problems with the alignment of the spine. This can cause pain on a nerve root, send a shooting pain down the legs, or cause a numbness, tingling, or pain in the arms, hands, and fingers. (These symptoms may also be associated with a ruptured or herniated disc.)

Muscle spasms occur when a muscle receives too many impulses at one time from the nerves, causing it to contract beyond its normal capacity. During a spasm, contractions can also take place involuntarily, especially when the area is inflamed, when a tendon is pulled, or a nerve is irritated.

Weak muscles can result from neglect and lack of exercise and conditioning.



Back Belts—Do They Prevent Injury?

The National Institute for Occupational Safety and Health (NIOSH) is part of the Centers for Disease Control and Prevention (CDC) within the Department of Health and Human Services. NIOSH is the federal Institute responsible for conducting research and making recommendations for the prevention of work-related injuries and illnesses.

What Is the Purpose?

Back injuries account for nearly 20% of all injuries and illnesses in the workplace and cost the nation an estimated 20 to 50 billion dollars per year. The National Institute for Occupational Safety and Health (NIOSH) believes that the most effective way to prevent back injury is to implement an ergonomics program that focuses on redesigning the work environment and work tasks to reduce the hazards of lifting.

However, in response to the increasing human and economic costs of back injury, companies have implemented numerous other measures, either in conjunction with or in place of sound ergonomics programs. For instance, there has been a dramatic increase in the use of industrial back belts.

The decision to wear a back belt is a personal choice; however, NIOSH believes that workers and employers should have the best available information to make that decision. This pamphlet outlines the current state of scientific knowledge on back belts and stresses the importance of an overall ergonomics program. Companies should not rely on back belts as a "cure all" for back injury, but should begin to undertake prevention measures, which reduce the risks of lifting tasks.

Do Back Belts Prevent Injury?

In recent years, there has been a dramatic increase in the number of workers who rely on back belts to prevent injury during lifting. Back belts, also called "back supports" or "abdominal belts," are currently worn by workers in numerous industries, including grocery store clerks, airline baggage handlers, and warehouse workers. As their use has risen, NIOSH has increasingly been asked for advice on back belt selection. In response to these inquiries, the Institute decided to address a more fundamental question. Rather than ask "Which belt will best protect workers?" NIOSH researchers began with the question--"Do back belts protect workers?"



Employers relying on back belts to prevent injury should be aware of the lack of scientific evidence supporting their use.

A Lack of Scientific Support

After a review of the scientific literature, NIOSH has concluded that, because of limitations of the studies that have analyzed workplace use of back belts, the results cannot be used to either support or refute the effectiveness of back belts in injury reduction. Although back belts are being bought and sold under the premise that they reduce the risk of back injury, there is insufficient scientific evidence that they actually deliver what is promised.

The Institute, therefore, does not recommend the use of back belts to prevent injuries among workers who have never been injured.* If you or your workers are wearing back belts as protective equipment against back injury, you should be aware of the lack of scientific evidence supporting their use.

- Because the Institute's primary focus is on the prevention of injury, NIOSH did not address the use of back belts as medical treatment during rehabilitation from injury.

How Did NIOSH Come to These Conclusions About Back Belts?

NIOSH systematically reviewed published peer-reviewed scientific literature on back belts to determine if they actually reduce the risk of back injury. Because there were few studies on the association between workplace use of back belts and injuries, NIOSH also reviewed studies of the relationship between back belt use and forces exerted on the spine during manual lifting. In other words, much of the existing research is based on theories of what causes back injury, rather than on the actual rates of workplace injury with and without back belt use.

For a detailed technical report on the studies NIOSH reviewed, call 1-800-35-NIOSH to request "Workplace Use of Back Belts: Review and Recommendations" (Publication No. 94-122).

There is some research showing that workers believe they can lift more when wearing a back belt. If workers falsely believe they are protected, they may subject themselves to even greater risk by lifting more weight than they would have without a belt.

Putting you back to bed

For proper bed posture, a firm mattress is essential. Bed boards, sold commercially or devised at home, may be used with soft mattresses. Bed boards preferably should be made of 3/4 inch plywood.

Recommended



Lying on side, with knees bent, effectively flattens the back. Flat pillow may be used to support the neck, especially if shoulders are broad.



Sleeping on back is restful and correct when knees are properly supported.



Raise the foot of the mattress eight inches to discourage sleeping on the abdomen.

Caution



Lying flat on back makes swayback worse.



Use of high pillow strains neck, arms, shoulders.



Sleeping face down exaggerates swayback, strains neck and shoulders.

Standing and Lifting

Recommended



Use of a footrest
relieves swayback.



Bend the knees and
hips, not the waist.



Hold heavy objects
close to you.



Never bend over with-
out bending the knees.

Caution



Not this way.



Not this way.



Not this way.

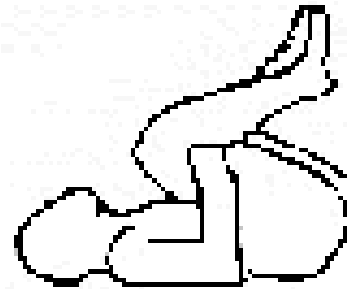


Not this way.

RECOMMENDED EXERCISES FOR STRETCHING

LOWER BACK

- ❑ Lie on your back with your knees bent and feet resting on the floor.
- ❑ With your hands, pull one knee to your chest, then pull the other until you feel a gentle stretch in the lower back.
- ❑ Hold 10 counts, then put one leg down at a time.
- ❑ Do 10-15 repetitions



Lie on your back with your knees bent slightly and feet resting on the floor.

- ❑ Keeping your shoulders on the floor, slowly drop your knees to one side, until you feel a gentle stretch in the lower back.
- ❑ Hold 10 counts, then bring your knees back to the center before repeating the stretch.
- ❑ Do 10-15 repetitions to each

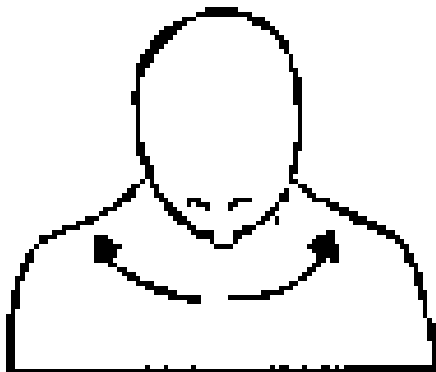
ABDOMINALS

Lie on your stomach and prop up on your elbows until you feel a gentle stretch along your stomach muscles.

- ❑ Hold 10 counts, then relax.
- ❑ Do 10-15 repetitions.
- ❑ IF THIS IS PAINFUL, TRY LYING FLAT ON YOUR STOMACH, INSTEAD.

ABDOMINALS

- ❑ Sit or stand with your feet shoulder-width apart and a normal curve in the low back, midback and neck.
- ❑ Slowly bend to one side until you feel a gentle stretch along the other side of your body.
- ❑ Hold 10 counts, then relax.
- ❑ Do 10-15 repetitions to each side.



NECK

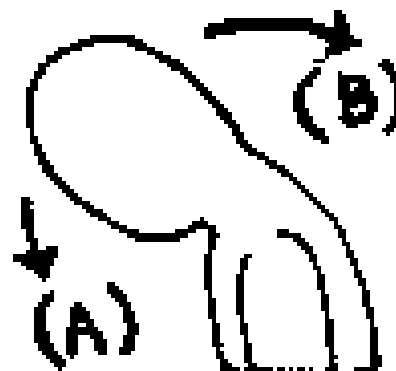
- ❑ Slowly tuck your chin in to your chest.
- ❑ Keeping the chin tucked, slowly rotate your head toward one shoulder until you feel a gentle stretch in the neck muscles.
- ❑ Hold 10 counts, then relax.
- ❑ Do 10-15 repetitions to each side.

(A) Slowly tuck your chin in to your chest until you feel a gentle stretch in the muscles along the back of your neck.

- ❑ Hold 10 counts, then relax.
- ❑ Do 10-15 repetitions.

(B) Keeping your mouth closed and leading with the chin, slowly tilt your head back until you feel a gentle stretch in the muscles along the front of your neck.

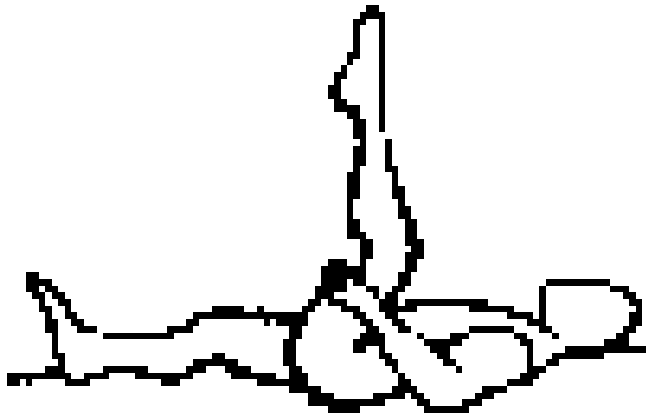
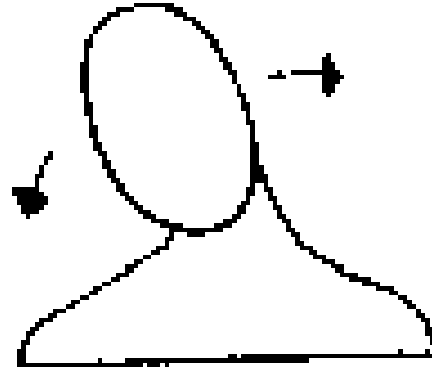
- ❑ Hold 10 counts, then relax.
- ❑ Do 10-15 repetitions.



NECK

Keeping your head in line with your shoulders, slowly bend your neck to the side until you feel a gentle stretch along the opposite side of your neck.

- Hold 10 counts, then relax.
- Do 10-15 repetitions to each side.



HAMSTRINGS

Lie with one leg resting on the floor and the other thigh flexed up toward the ceiling.

Holding your thigh with your hands, slowly straighten your knee until you feel a gentle stretch along the back of your thigh (hamstrings).

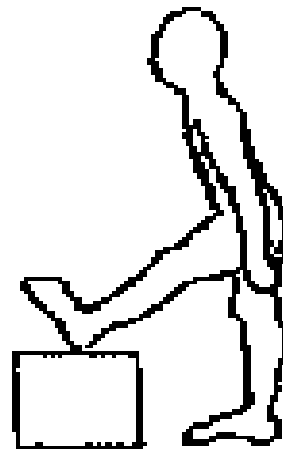
- Hold 10 counts, then relax.
- Do 10-15 repetitions with each leg.

Stand with a normal curve in the low back, midback and neck areas.

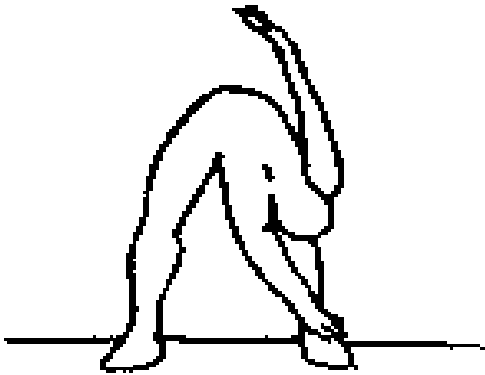
Place one foot on a step, bench or stool, keeping the knee almost straight and foot flexed back slightly.

Slowly lean forward until you feel a gentle stretch along the back of your thigh.

- Hold 10 counts, then relax.
- Do 10-15 repetitions with each leg.



EXERCISE CAUTION: The following exercises are not recommended.



Avoid flexion and rotation exercises.

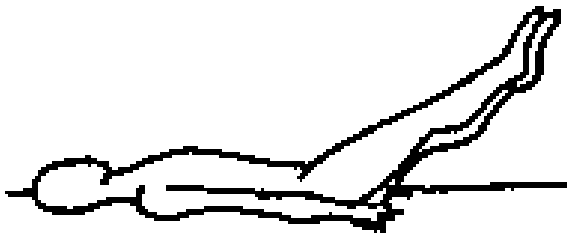
Caution:

- ❑ Flexion and rotation exercises put the back in the most vulnerable position for injury.
- ❑ Lifting the hands and feet at the same time increases disc pressure in the lower lumbar area.

Avoid neck rolls.

Caution:

- ❑ Head circles compress the cervical discs and can potentially cause nerve damage



Avoid any kind of double leg lift.

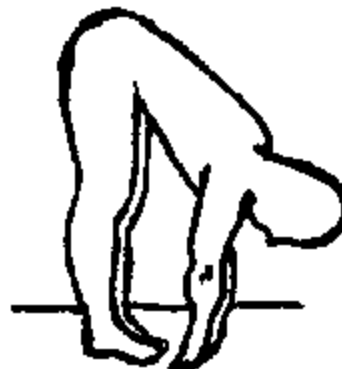
Caution:

- ❑ Hip flexor and lower back muscles perform much of the work in a double leg lift.

Avoid bending over to stretch the hamstrings.

Caution:

- ❑ This exercise contracts the hamstring muscles.
- ❑ Little flexibility is gained when a muscle is contracting.
- ❑ Forward flexion past 70° stresses the lower back.



The muscular balance of a strong, yet flexible support structure, is one of the major components of creating an exercise program for both the lower and upper back.

Such exercises are designed to reduce strain and imbalance, improve posture and positioning, increase range of motion, and strengthen the muscles that support the neck.

Remember, when exercising:

- Maintain the natural curves of your back during all activities.
- Use proper lifting techniques and body mechanics.
- **Consult your health care provider before beginning any exercise regimen and if you develop neck or back pain while exercising, if you experience numbness or tingling in your arms or legs, or for any other symptoms that concern you.**

Review

Back Basics

The spine is a flexible structure that consists of 24 movable bones, called vertebrae (7 in the neck, 12 in the chest, 5 in the lower back) that are connected by tough ligaments and separated by pads of cartilage, called intervertebral discs, that act as shock absorbers and allow the flexible movement of the spine, especially at the neck and the lower back.

When we are standing, the spine naturally curves both inwards and outwards. The inward curve, a position called lordosis, curves towards the front of the body at the lower back and neck regions. The outward curve, a position called kyphosis, curves towards the back of the body at the chest. Whenever we bend over, while standing, the five lumbar vertebrae of the lower back change position and shift from being in lordosis to being in kyphosis when we are completely bent over. The lumbar vertebrae change position again as we stand up from being bent over returning to lordosis position. Think about how much you move around and bend during a normal day. The lower back is probably the most used part of the spine, which likely accounts for the fact that low back pain and injury disorders are the most common back complaints.

Causes of Low Back Pain:

- ❑ straining the muscles or ligaments
- ❑ pressure on the intervertebral discs
- ❑ nerve compression or entrapment
- ❑ damage to the vertebra

In a review of the research literature, the National Institute of Occupational Safety and Health concluded that “muscle strain is probably the most common type of work or nonwork back pain” (Bernard, 1997). That’s good news for ergonomists because it means that we can investigate ways to reduce the effort of work to minimize injury risks.

The health of the intervertebral discs plays a major role in back injuries. If discs are damaged and begin to degenerate, the back loses flexibility and the capacity to absorb the daily forces associated with standing, moving and working. Intervertebral discs don't have a normal blood supply, instead, as the discs change shape as we move around, nutrients are drawn into the discs and waste products are pumped out. Moving the body helps this process by intermittently changing the forces on the discs. Moving around helps to keep the spine healthy.

What are the risk factors for low back injuries?

With data from over 40 research studies we now have a pretty good idea of the major risk factors for back injuries. These factors are:

- 1) heavy physical work
- 2) lifting and forceful movements
- 3) bending and twisting (awkward postures)
- 4) whole-body vibration (WBV)
- 5) static work postures.

These work-related risks for injuries can occur separately or in some combination. The more of these factors happening at any one time the greater the risk of injury.

References

- Bureau of Labor Statistics (1998) Lost-worktime injuries and illnesses: characteristics and resulting time away from work. US Department of Labor, WashingtonDC.
- B. P. Bernard. (Ed.) (1997) Musculoskeletal Disorders(MSDs) and Workplace Factors: A Critical Review of Epidemiological Evidence for Work-Related Musculoskeletal Disorders of the Neck, Upper Extremity, and Low Back. U.S. Department Of Health And Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, Cincinnati, OH