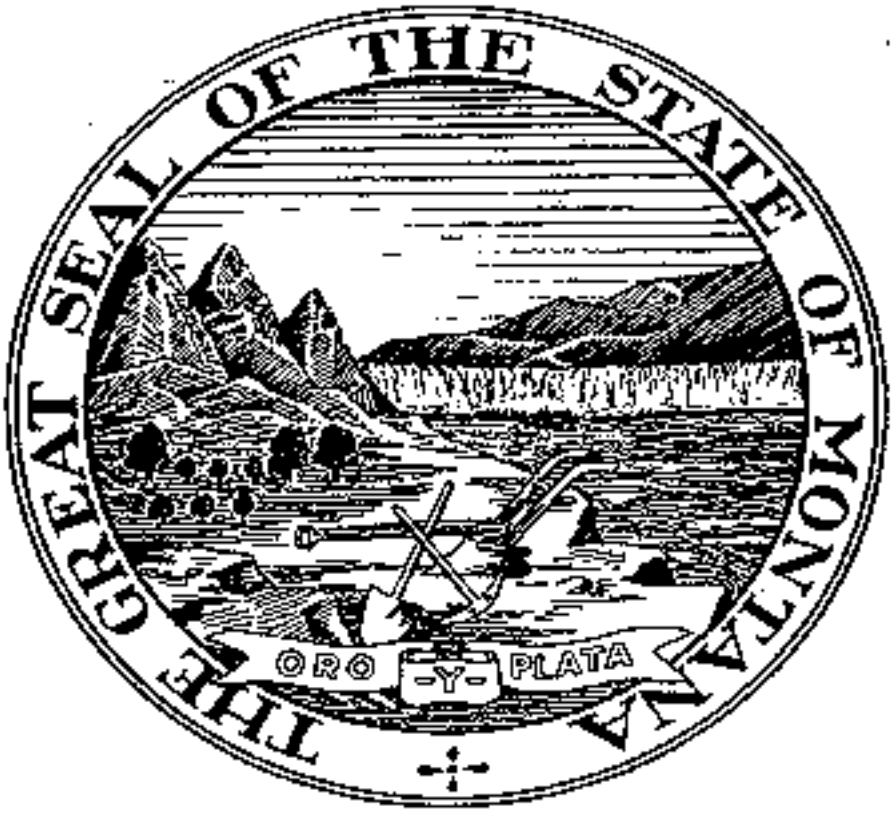
# Preventing Back Injuries

## Occupational Safety and Health Bureau




## Montana Department of Labor and Industry

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# Preventing Back Injuries

## I. Introduction

The Occupational Safety and Health Administration (OSHA) considers back injuries as one of the nations biggest safety problems. According to the Bureau of Labor Statistics (BLS), back injuries account for one in every five workplace injuries and illnesses. In addition to the pain and suffering of employees, back injuries cost industry billions of dollars in compensation and indirect costs.

Preventing back injuries in the workplace is a major safety challenge. No approach has been found for totally eliminating back injuries caused by lifting; however, injuries can be reduced in numbers and severity with effective training, ergonomic design, proper lifting techniques, and worker fitness.

This pamphlet provides the information necessary for employers to establish a back injury prevention program and train their employees in avoiding back injuries.

## II. Anatomy of the Back

Back injuries can involve the spine, nerves, ligaments, and muscles of the back. Most back problems are related to the spine. The spine provides mobility, stability, and structure for the human body, as while as protection for the spinal cord. It is made up of many small bones called vertebrae and consists of five regions: cervical, thoracic, lumbar, sacrum, and coccyx (pronounced cock-six).

The vertebrae are separated and cushioned by intervertebral discs, which act as shock absorbers between the vertebrae. These discs help absorb the weight of the head and upper body and absorb the shock of any unusual load or sudden downward pressure. Each disc is tightly bonded, top and bottom, to the adjacent vertebrae. Inside of the disc is a soft gel-like substance called Nucleus Pulposus, which is made mostly of water. The tough outer layer of the disc is called Annulus Fibrosis. Ligaments hold the vertebrae and discs together.

The spine also houses and protects the spinal cord. The spinal cord is the main “information highway” for the entire body, and is composed of millions of nerves. The spinal cord is housed inside of the spinal canal.

The back muscles can be associated with back pain. The every day wear and tear on muscles can lead to soreness, strains, sprains, and muscle spasms. Muscle spasms can spread to other muscles and become very painful. Emotional stress can also cause muscle spasms in the back.

Nerves in and around the spine can become irritated by pressure from some other part of the spine, such as the discs. Nerves branch out from

the spine and spread to other parts of the body. Every nerve root leaves the spinal canal at a point near to a disc, passing through a narrow bony exit formed by the vertebrae.

## III. Causes of Back Injuries

Workers can injure their backs from manual material handling, impact trauma, and repetitive trauma.

- **Manual material handling** includes injuries from lifting, carrying, holding, and lowering objects.

- **Impact trauma** can injure the back when workers are in an accident, such as falls, slips, being struck by materials or equipment, or being involved in an auto accident.

- **Repetitive trauma** occurs from working in an awkward position or lifting incorrectly over a period of time. Repetitive trauma can cause *cummulative trauma disorders (CTDs)*. As you repeat an unhealthy position or movement, small injuries occur and begin to add up when the movement is repeated. If you do not change how or what you are doing, more serious injuries can occur.

### Other Factors

There are several factors that can increase risk of having a back injury. These factors include poor posture, physical conditioning, and age.

**Poor Posture** can lead to back problems. Standing, sitting, and lying down incorrectly will put strain on your spine. The spine is designed to operate best when it is in a "natural S" shape. Bending the spine out of its natural position for long periods of time often leads to muscle fatigue and back pain.

**Physical Conditioning** can affect your back. If your back muscles are weak, or if you are overweight, your back must work harder.

**Age**. As we grow older the muscles in our backs lose their strength and do not function as efficiently.

## IV. Types of Back Injuries

### A. Cumulative Trauma Injuries

Cumulative trauma injuries occur from repeated minor injuries over a period of time. These injuries can occur from repeated awkward lifting of objects or twisting of the back. The minor damage that occurs gradually weakens and stiffens the back.

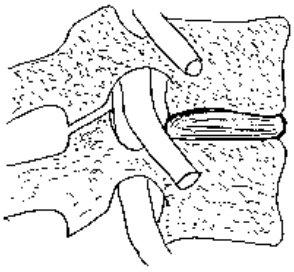
**B. Strains and Sprains**

Muscle stains and sprains occur when muscles are poorly conditioned or overworked. When workers bend in any direction or bend repeatedly they can strain their back muscles. Muscle fibers tear and when they heal they create scare tissue.

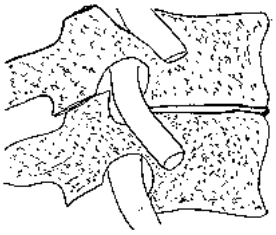
**C. Degenerative Disc Disease**

Months or years of back abuse can lead to a degenerative disc disease. Listed below are descriptions and diagrams of the forms of degenerative disc diseases.

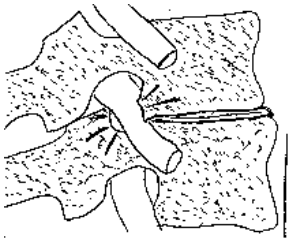
(1.) Normal state.



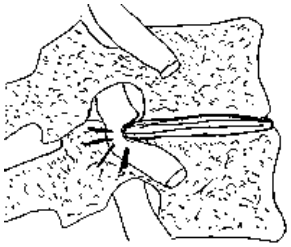
(2.) Early degeneration. The disc space narrows forcing over-riding of the articular processes at the facet joint. The body of the top vertebra settles backward and downward on the bottom vertebra, the two vertebras can rub against each other creating great pain. The port of exit for the nerve root loses vertical height and its horizontal configuration becomes distorted. The disc has lost internal pressure, its casing fibers have become slack and there is potential slipping of one vertebra upon the other.



(3.) Pinched nerve. Further narrowing of the disc space, the vertebra pinches the nerve root with motion of the spine.



(4.) Herniated disc or ruptured disc. The disc casing has blown out allowing the remaining gel packing to extrude and impinge upon the nerve root.



## V. Preventing Back Injuries

The most effective way to prevent back injury is to redesign the work environment and work tasks to reduce lifting hazards. Companies should implement a comprehensive ergonomic program to help eliminate all muscleskeletal injuries at the workplace.

### A. Ergonomics Program.

Ergonomics is the interaction between workers and the objects they use in their work environment. An effective ergonomics program must include four parts: (1) worksite analysis, (2) hazard prevention and control, (3) medical management, and (4) training and education. (Please see "Ergonomics Prevention of CTDs" Montana Safety Bureau.)

(1) Worksite analysis.

The objectives of a worksite analysis are to recognize, identify, and correct all ergonomic hazards. This would be evaluating jobs that require frequent lifting, twisting, bent postures, or pushing or pulling.

(2) Hazard Prevention and Control.

Redesign workstations and tasks so that:

- The load is close to the body.
- The load is between shoulder and knuckle height.
- Twisting lifts are eliminated.
- Gravity moves the load when possible.
- Slides, conveyors, chutes, hoists, hydraulic lifts, and hand trucks are used to move heavy loads.
- Weight is reduced to the lowest level.
- There is sufficient workspace for proper lifting techniques.
- Seated workers have adjustable swivel chairs with back support.
- Bending at the waist or back is minimal.

(3) Medical Management

An effective medical management program for back injuries and CTDs is an essential part of an ergonomics plan. Medical management will allow for early detection of injuries so that they can be treated before they become more serious. It will also prevent future problems from developing. The medical management program should address the following:

- Injury and illness record keeping.
- Early recognition and reporting.
- Systematic evaluation and referral.
- Conservative treatment.
- Conservative return to work.
- Systematic monitoring.

- Training in which employees are instructed how and when to report injuries.

(4) Training and Education.

Training and education are critical components of ergonomic programs for employees potentially exposed to ergonomic and lifting hazards. Training should include identifying lifting hazards and using safe lifting techniques, as well as other ergonomic risk factors.

The training program should provide an overview of the potential risk of illnesses and injuries, their causes, early signs and symptoms, means of prevention, and treatment. The program should also include means for adequately evaluating its effectiveness. Written records should be kept of training materials, persons who preformed the training, dates of the training, and who attended the training.

**B. Proper Lifting Techniques**

1. Assess the Situation

Before lifting or carrying a heavy object, assess the situation. Ask yourself the following questions?

- Can you lift this load safely or is it a two-person lift?
- How far will you have to carry the load?
- Is the path of travel clear of clutter, cords, slippery areas, overhangs, stairs, curbs, or uneven surfaces?
- Will there be doors that are closed? Ask someone to hold the door open or place a wedge under the door to keep it open.
- Once the load is lifted will it block your view, will you be able to see over the top of the load?
- Can the load be disassembled, carried in pieces, then reassembled?
- Should you be wearing any personal protective equipment, such as gloves or safety shoes?

2. Before You Lift

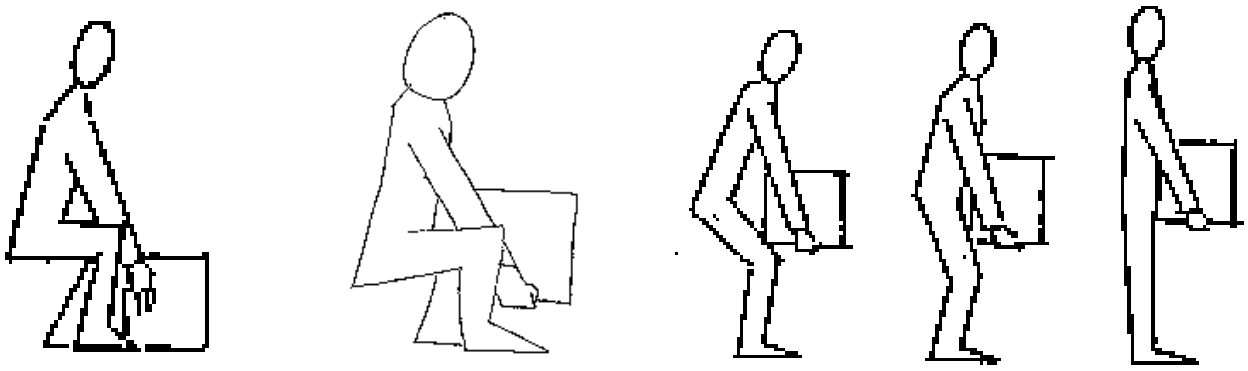
"Size up the load." Test the weight by lifting a corner of the object. If it is too heavy or if the object is an odd shape, stop.

- If there is any doubt, ask for help. Two or three lifting a heavy object is safer than trying to do it yourself.
- Use a handtruck, pushcart, or mechanical lifting device.
- Consider using gloves that will improve your grip and protect your hands.
- Never lift anything unless you are sure that you can do it safely using proper lifting techniques.
- Avoid over loading.
- Stretch out or "warm up" your back to increase circulation.

3. Lifting the Load

When lifting always keep your back straight or slightly arched**. LET YOUR LEGS DO THE LIFTING.**

- Start by placing your feet close to the load. Get firm footing.
- Center your body over your feet.
- Tighten your stomach muscles.
- Squat down like a weightlifter, bending your knees and keeping your back straight or slightly arched.
- Grasp the load securely with your hands, and pull the load close to you. The farther the load is from your body the heavier it is.
- Smoothly lift straight up. Never twist your body while lifting, keeping your head up.
- Look straight ahead, not down while lifting.
- Always lift with your legs, your leg muscles are powerful; the muscle bundles in the legs are each 8 to 10 inches or more in diameter, compared with the very thin ¼ - ½ inch layer of muscles along the back.



4. Carrying the Load

As you carry the load:

- Keep your back straight or slightly arched.
- Walk slowly and surely.
- Shift your feet to change directions. Never twist your back. Twisting actions puts a grinding, compressive weight on the cartilage in the spine; repeated frequently enough, the action can cause cartilage failure.
- Avoid leaning forward or backwards.
- Avoid lifting over your head.
- If you become tired, set the load down, and rest for a few moments.

5. Setting the Load Down.

Setting down the load is the reverse of lifting.

- Position yourself where you want the load.
- Squat down, let your legs do the work.
- Remember not to twist your body while setting down a load, and keep your head up.
- Once the load is where you want it, release your grip. Never release your grip until the load is secure.

6. Handtrucks and pushcarts

When using a handtruck or pushcart, remember:

- It is easier and safer to push than to pull.
- Stay close to the load, try not to lean over, keep your back straight and arched.
- Use both hands to control the handtruck or chart.
- Use tie-downs, if necessary, to secure the load.
- Avoid stairs and inclines. Use the freight elevator if available.

7. Forklifts

If an object is too heavy to lift or carry with a handtruck, use a forklift.
WARNING: Never attempt to operate a forklift or other lifting equipment unless you have been trained and authorized by your organization to do so.

**C. Maintaining a Healthy Back**

To keep your back healthy and pain free you need to use the proper lifting techniques both at work and at home. Maintaining the correct posture when you are standing, sitting, and lying down is important for back injury prevention. Maintaining proper weight and regular exercise are also important in keeping your back healthy.

1. Posture

Standing
- Stand up straight. Don't slouch.
- If you are standing for long periods of time use a footrest or anti-fatigue mats.
- Wear appropriate and comfortable footwear.

Sitting

- Sitting is actually puts more stress on your back than standing.
- Sit up straight and don't slouch.

- If you must sit for long periods of time, use a pillow or towel to support your lower back.
- Select and use a chair that fits you. Try to sit with your knees slightly higher than your hips.

Lying Down

- Use a mattress that does not sag.
- Sleep on your side with your knees bent or on your back. Avoid sleeping on your stomach with your head resting on a stack of pillows.

2. Exercise

Keeping your back and abdominal muscles strong can help you avoid back problems. Maintain good posture throughout your exercise session. If you have a history of back or other health problems, check with your doctor before starting any strenuous exercise program. Try to do some exercise every day if you can and gradually increase your intensity. Don't overdo it on the first day.

3. Stay at a Healthy Weight

Being overweight puts extra strain on your back. Try to eat food that is good for you and gradually cut back on high fat foods and sugar. Try to lose weight slowly at a steady pace, don't eat foods that you really don't need.

Back injuries are very serious and can lead to a lifetime of pain and suffering. Employers have the responsibility to protect their employees. Through an effective ergonomics program, training of proper lifting techniques, and employee education back injuries can be reduced in the workplace.