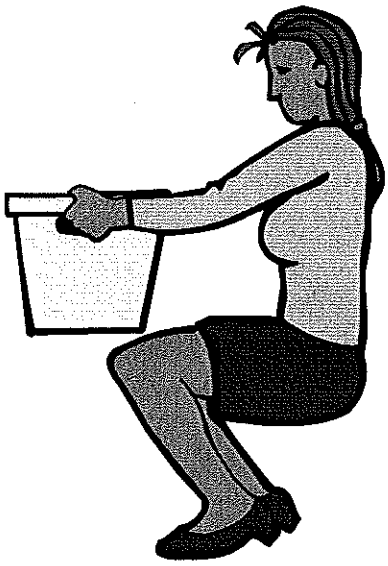
# Lifting and Back Safety



# YOUR BACK AND YOUR JOB — A WORKERS SURVIVAL GUIDE

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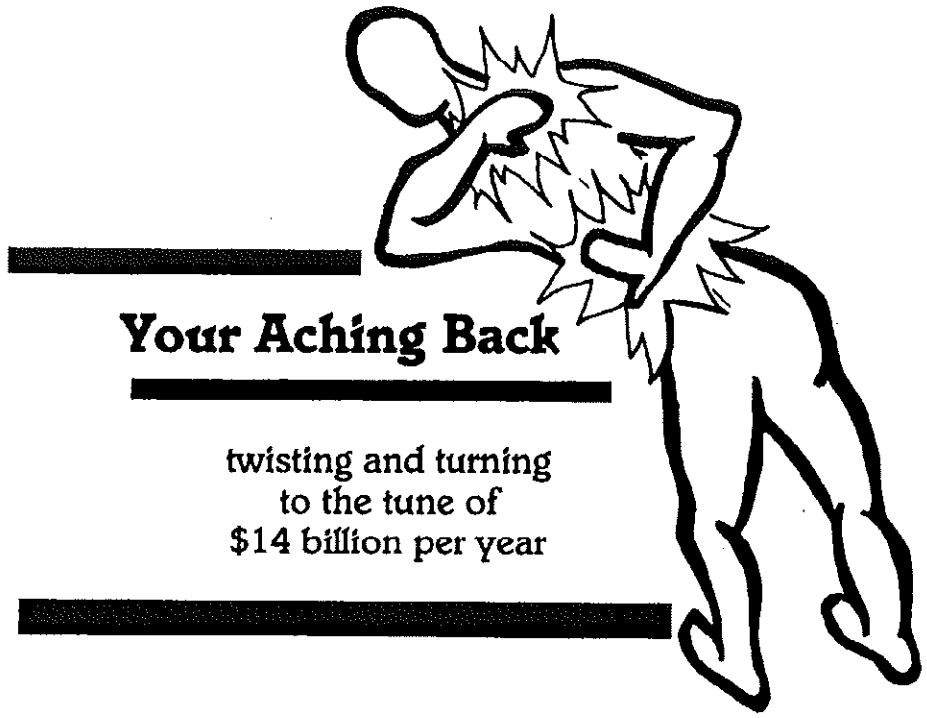

# Your Aching Back

twisting and turning
to the tune of
$14 billion per year

Protecting the physical integrity of the back is a vital yet often neglected part of achieving good health. Consider that, at one time or another, everyone will experience some form of back discomfort. You might feel that certain twinge that comes from bending the wrong way to pick up a book or tie a shoe; you might wake up with that nagging ache that takes a few minutes, every morning, to work itself out; or perhaps you will suffer an assault to the back that requires professional attention.

Back injuries and back pain are one of the oldest and most recognized occupational health problems in the world. In the United States today, it is also one of the most common. It has been estimated that over 50% of working people will have some low back pain at some point in their working lives. As a result back pain is the second most popular medical reason to miss work; the first is the common cold.

Back problems not only decrease worker productivity and effectiveness, but also they can severely alter daily activities away from the job. Nothing can be more frustrating than not being able to perform simple household tasks or engage in even limited recreational activities because of chronic back pain. There's no doubt that working to avoid a problem back makes sense.

One out of three job-related injuries are to the back, making back problems the most frequently reported injury. This means that there are about 400,000 occupational back injuries each year. The cost in Workers' Compensation, medical treatment, and disability payment in 1976 was over $14 billion. And we can't put a dollar amount to the pain and suffering experienced from an injured back.

## WHO GETS HURT?

Many types of workers are at risk. Basically, anyone who has to move heavy objects, do their job in an awkward position, like bending forward and reaching out, hold one position for a long time, or do certain tasks repeatedly at a fast pace. Truck drivers have the highest incidence of back injuries. But any workplace, from construction sites to factories to hospitals to offices, can pose a hazard to workers.

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. . . WE BELIEVE THAT THE MOST EFFECTIVE WAY TO PREVENT BACK INJURIES IS TO DESIGN THE JOB AND THE WORKPLACE BETTER TO FIT THE PEOPLE DOING THE WORK.

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Although about 25% of workplace back injuries seem to be caused by lifting and lowering heavy objects, other motions such as carrying something in an awkward way can be just as dangerous. What you are doing when you hurt your back is either twisting, stretching or pulling the muscles or ligaments or weakening the discs. Once this happens your back is weakened making future problems more likely. However, when you do get hurt the cause is often difficult to identify. In fact, it may be due to a complicated mixture of forces and stresses. You may not feel the pain until some time after your back was actually injured.

Because of the huge price tag attached to back injuries, industry is very concerned with preventing this problem. Compensation claims and worker injuries need to be reduced. For this reason a number of programs have been developed for industry that teach workers back exercises and how to lift and carry heavy loads properly. In fact, this is the most common type of training offered to workers. In addition, there have been some attempts to screen potential employees before they are hired to find out who would most likely hurt their back. All of these programs have been tried in hopes of preventing back injuries.

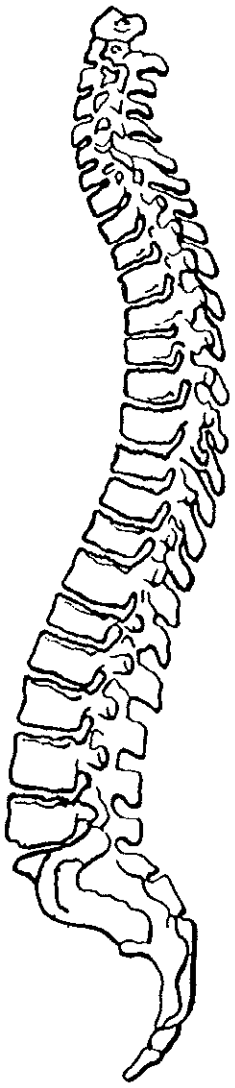
While training programs can be very helpful we find that knowing correct lifting techniques alone is a poor solution to the problem of back injuries. Often the right procedure cannot be used because the load is too awkward, there aren't enough people around to help, equipment is not available, or the problem is not caused from lifting. For this reason, we believe that the most effective way to prevent back injuries is to design the job and the workplace better to fit the people doing the work.

## SELF EVALUATION

| | Poor | Fair | Good |
|---|---|---|---|
| 1. My posture while standing is: | ☐ | ☐ | ☐ |
| 2. My posture while sitting is: | ☐ | ☐ | ☐ |
| 3. I consider my weight: | ☐ | ☐ | ☐ |
| 4. The amount of exercise I get each day is: | ☐ | ☐ | ☐ |

| | Yes | No |
|---|---|---|
| 5. I usually twist my waist instead of turning my entire body: | ☐ | ☐ |
| 6. I carry all items as close to my body as possible: | ☐ | ☐ |
| 7. When lifting I bend my knees not my waist: | ☐ | ☐ |
| 8. I often carry loads I feel are really too heavy for me: | ☐ | ☐ |
| 9. I lift loads with smooth easy movements rather than using jerking movements: | ☐ | ☐ |
| 10. I already experience some degree of back pain: | ☐ | ☐ |
| 11. When driving I keep my seat forward bending my knees higher than my hips: | ☐ | ☐ |
| 12. I sleep on my back: | ☐ | ☐ |
| 13. I wear comfortable shoes when walking for prolonged periods of time: | ☐ | ☐ |

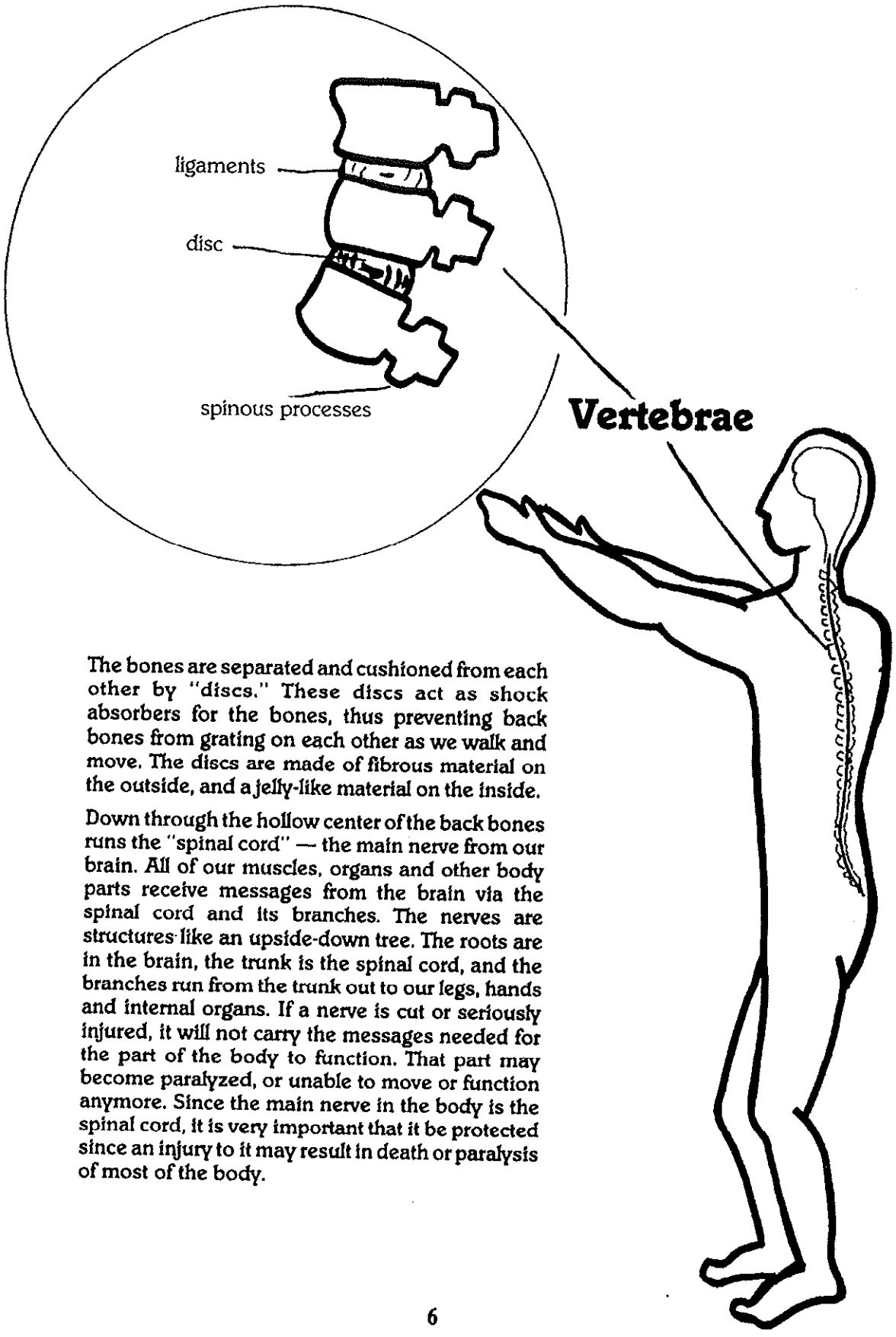
# Your Back



Human backs are made up of four basic structures: bones, muscles, nerves and discs.

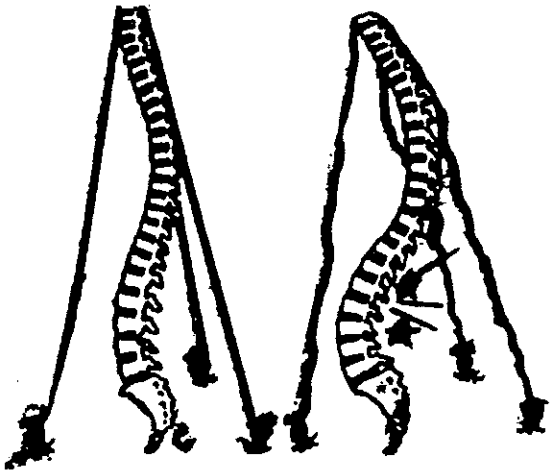
The "backbone" is actually a series of many small bones each slightly smaller than a donut. These back or "vertebral" bones make up the skeletal support structure for our bodies. Vertebral bones in the human back run from the base of our heads down to our hips. In order to understand back pain, it it important to have a general understanding of your back. The main function of your back is to support your upper body, protect your spinal cord, and allow flexibility. A healthy back is one that is properly supported by strong back, hip, and abdominal muscles.

The back bones are not smooth, like a donut, but actually have small projections or points sticking off them. These are called "spinous processes" and provide places to attach the back muscles to the back bones. The muscles are attached to the bones by pieces of cartilage material (like gristle in a chicken) called "tendons." In some places the bones are connected directly to each other by other pieces of cartilage called "ligaments."




The bones are separated and cushioned from each other by "discs." These discs act as shock absorbers for the bones, thus preventing back bones from grating on each other as we walk and move. The discs are made of fibrous material on the outside, and a jelly-like material on the inside.

Down through the hollow center of the back bones runs the "spinal cord" — the main nerve from our brain. All of our muscles, organs and other body parts receive messages from the brain via the spinal cord and its branches. The nerves are structures like an upside-down tree. The roots are in the brain, the trunk is the spinal cord, and the branches run from the trunk out to our legs, hands and internal organs. If a nerve is cut or seriously injured, it will not carry the messages needed for the part of the body to function. That part may become paralyzed, or unable to move or function anymore. Since the main nerve in the body is the spinal cord, it is very important that it be protected since an injury to it may result in death or paralysis of most of the body.



Countless times each day the spine is called upon to flex, extend, or rotate in order to adjust body balance as we walk, run, sit, stand, stoop or twist. Usually these actions will be accompanied by extra weight as we lift or carry loads. Unless steps are taken by each of us to reduce the amount of mechanical demands placed on the spine, we may exceed our limits of tolerance thus experiencing great pain.

The vast majority of back problems are explained by: (1) strains and sprains of the supporting muscles and ligaments, and (2) herniated discs – commonly described as slipped discs.

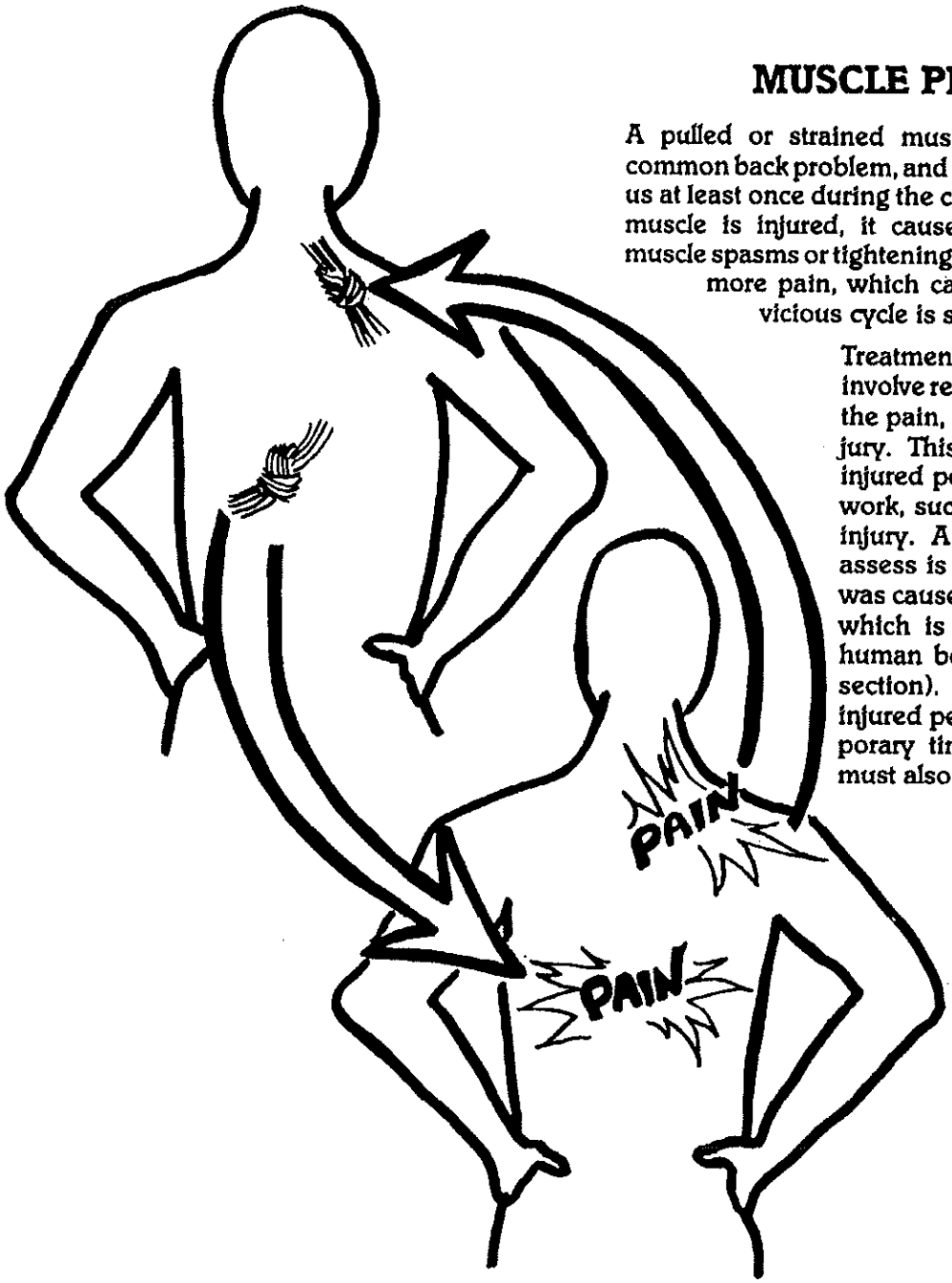
Some causes of lower back pain can be attributed to:

- Poor posture
- Lack of exercise
- Obesity (particularly a heavy "gut" that pulls the spine forward)
- Muscles contracted for a prolonged period of time
- Emotional tension and mental stress
- A trauma stemming from an injury or accident
- Moving too quickly or suddenly into an unusual position
- Holding an unusual position for too long, and getting out of it too quickly as well
- Stress and build-up of muscular tension from lifting a heavy object incorrectly and repeatedly

Lack of exercise may also cause the supporting muscles of the spine to become weak thus permitting the increased possibility of swayback.

# OCCUPATIONAL BACK PROBLEMS

There are many different diseases such as infections, injuries, cancer, and arthritis which can affect the back. We are going to discuss only those problems which can occur as a result of work — occupational back problems. However, it is often very hard to tell if you have work-related back problems or one of the other serious medical conditions which can affect the back that are not caused by work. A doctor's check up, including tests, like x-rays, are usually needed to determine what the cause of your pain is.




## MUSCLE PROBLEMS

A pulled or strained muscle is perhaps the most common back problem, and may occur to almost half of us at least once during the course of our lives. When a muscle is injured, it causes pain, which results in muscle spasms or tightening. This spasm in turn causes more pain, which causes more spasm, and a vicious cycle is set up.

Treatment of this condition must involve relaxing the muscle relieving the pain, and preventing further injury. This will require giving the injured person time away from the work, such as lifting, which causes injury. A major consideration to assess is whether or not the injury was caused by a job task or process which is poorly designed for the human body (See the ergonomics section). If this is true, then the injured person not only needs temporary time off, but the job itself must also be changed.

In addition to resting the injured muscle, the pain or spasm must be treated. Doctors traditionally prescribe pain killers, such as aspirin or codeine, with muscle relaxants such as valium and heat. Other kinds of treatment include massage, acupuncture, special machines to block the pain messages to the brain (known as "Transcutaneous Nerve Stimulators"), and stretching exercises. These latter forms of treatment are often more effective and cause less side effects, such as nausea, sleepiness, and dizziness, than medication.

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IF THE ACUTE OR IMMEDIATE PROBLEM IS NOT TREATED ADEQUATELY, A CHRONIC OR LONG TERM BACK MUSCLE PAIN/SPASM MAY DEVELOP. THIS MAY BE VERY DIFFICULT TO TREAT ONCE STARTED, AND MAY LEAD TO VERY REGULAR PAIN AND DISABILITY.

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## LIGAMENT AND TENDON INJURIES

If the force of the injury to the back is very great, the tougher ligaments and tendons may actually be ripped or hurt, in addition to the softer muscle fibers. Injuries to these structures may take a long time to heal, and may be difficult for a doctor to correctly diagnose. The same principles for treatment for muscle injuries apply here — rest, prevention of further injury, and pain and spasm relief.

# BONE PROBLEMS

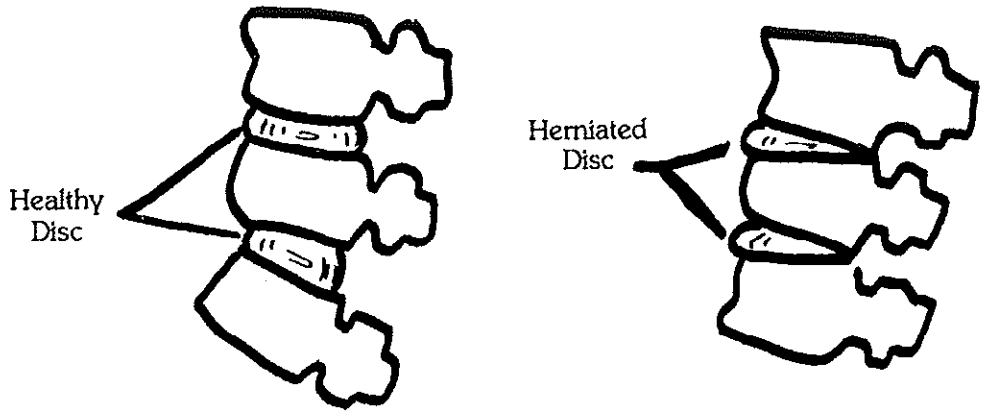
THERE ARE TWO BASIC KINDS OF BACK PROBLEMS WHICH CAN BE CAUSED BY OCCUPATIONAL INJURY — ACUTE PROBLEMS, WHICH HAVE AN IMMEDIATE, EASY TO RECOGNIZE CAUSE, INCLUDING FRACTURES OR CRUSHING OF BACKBONES, AND CHRONIC PROBLEMS THAT MAY DEVELOP OVER TIME, SUCH AS CERTAIN KINDS OF ARTHRITIS.

The acute injuries to the bones can result from severe injury to the back, as in serious falls, motor vehicle accidents, etc. Lifting objects that are too heavy, or moving in awkward positions will not usually cause this kind of problem. A broken back bone, like a broken bone anywhere else in the body, will need to be supported while it heals. This is done by putting the injured section in a cast, often for many weeks, and again treating the pain and surrounding muscle spasm with medicines and other treatments.

An acute injury to the bones can lead to a form of chronic or long term arthritis called "traumatic arthritis". A similar kind of condition called "degenerative arthritis" or "osteoarthritis" can result from low level injury to the back from much heavy lifting over a long period of time. You may not even be aware that this damage is occurring. In both of these conditions the normally smooth bones develop rough edges along the joints and/or boney "spurs" or points of bone which stick out of the sides of the backbones. These abnormalities can lead to pain and disability.

There is no cure for either of these kinds of arthritis. Both are treated with pain medications or other kinds of measures to relieve pain. Because there is no cure, the best way to deal with them is to prevent them in the first place.

# DISC AND NERVE PROBLEMS




IF THE DISC BETWEEN THE BONES IS DAMAGED, EITHER ACUTELY OR CHRONICALLY, THE TOUGH FIBROUS COATING OVER IT MAY THIN OUT AND THE JELLY-LIKE INNER MATERIAL SQUISH OUT. THIS IS CALLED A HERNIATED DISC.

If this happens, the disc may press against one of the nerve branches going from the spinal cord to the legs. Pressure on the nerve can cause both pain, numbness and eventual weakness of the muscles fed by the nerve. (This problem of nerve compression can also be caused by the bony spurs in degenerative arthritis.)

This is a serious condition, and is treated not only with pain medication but often also with traction to relieve the pressure of the disc on the nerve. In very serious cases, where the treatment of rest, traction and medication doesn't work, a person may have to undergo surgery to remove the disc. The back bones above and below the disc may possibly have to be fused together. A new form of treatment involves injecting a chemical into the disc to dissolve it. This has been successful in many cases, but, like surgery, also involves serious risks. The best form of treatment for a disc problem in a particular person needs to be determined on an individual basis by that person and his or her doctor.

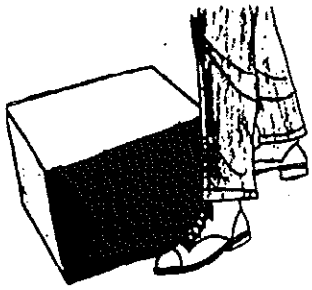
# PREVENTION

THE MOST IMPORTANT PREVENTATIVE MEASURE WE CAN TAKE IS TO REMOVE OR CORRECT THE HAZARDS THAT CAUSE BACK INJURIES. THIS MEANS MAKING THE WORKPLACE SAFE.

THE SECOND THING WE MUST DO IS TO PRACTICE THE PROPER WAY TO HANDLE HEAVY LOADS. THIS REQUIRES THAT WE RECEIVE TRAINING IN THE RIGHT PROCEDURES, HAVE THE MEANS AT OUR DISPOSAL TO DO THE JOB RIGHT, AND BE IN GOOD PHYSICAL SHAPE.

REDESIGNING THE JOB IN THE WORKPLACE USING ERGONOMIC PRINCIPLES SHOULD BE A PRIORITY SO WORKERS DON'T GET HURT. THIS MEANS THAT REPEATED LIFTING, HANDLING HEAVY MATERIALS, BENDING, TWISTING, AND QUICK RAPID MOTIONS SHOULD BE AVOIDED. OFTEN THE SOLUTIONS CAN BE VERY SIMPLE.

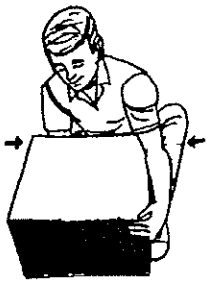
IMPORTANT FACTS ABOUT LIFTING:



1. Feet parted – one alongside, one behind object.

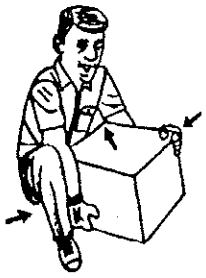
2. Chin tucked in.

3. Keep back straight, nearly vertical.



4. Grip the object with the whole hand. Remember there is no strength in the finger tips.

5. Elbows, arms tucked in.

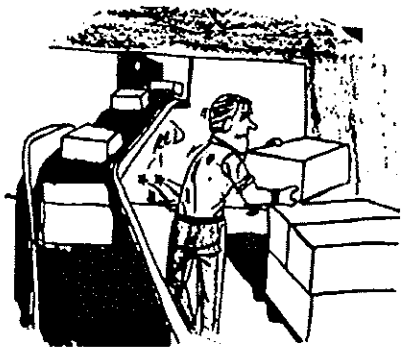


6. Pull the load as close as possible to your body. The body should be positioned so that the weight of the body is centered over the feet.

7. Start the lift with a thrust of the rear foot.

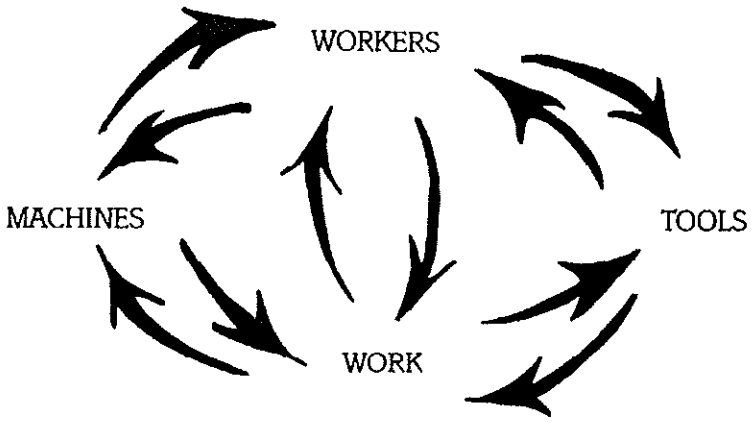
A Tip on Twisting . . .

Twisting during a lift is one of the most common causes of back injury. By simply turning the forward foot out and pointing it in the direction of the eventual movement, the greatest danger of injury by twisting is avoided.



# Ergonomics

IF BACK INJURIES ARE TO BE PREVENTED, AN ERGONOMIC EVALUATION OF THE WORKPLACE SHOULD BE DONE IN ORDER TO DECREASE AREAS OF PHYSICAL STRESS. THIS IS THE EMPLOYERS RESPONSIBILITY. GOOD ERGONOMIC DESIGN SHOULD PROVIDE COMFORTABLE AND SAFE WORK.

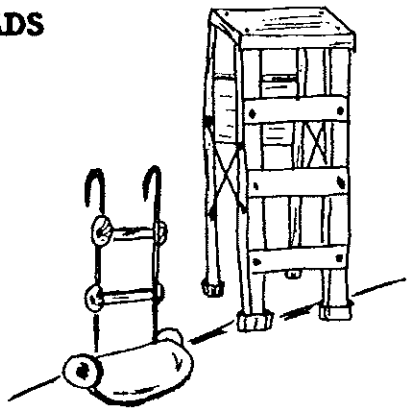



Ergonomics is a special science that studies people at work. By viewing the workers and the workplace as a system that works together, ergonomics focuses on the interaction between people and machinery, tools, and work processes. This means that how well "person and machines" and "person and process" fit together is studied. In other words, ergonomics looks at how well the human body, both mentally and physically, interacts with what has to be done at work.

As far as back problems go, ergonomics emphasizes preventing disease and disorder of the musculoskeletal system.

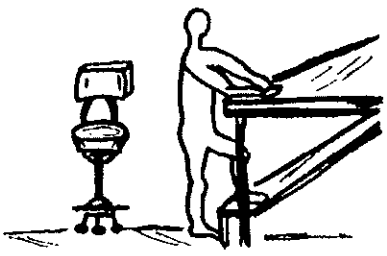
## HANDLING HEAVY LOADS

For handling heavy loads mechanical aides such as conveyor belts, hand trucks, mechanical lifts, hoists, dollies, and ladders should be available. There should be enough people around to help with the job. Team moving is the way to go when the load is too heavy, bulky, long, awkward to hold, or placed too high up for one person to handle alone. Any path that materials are to be moved on must be clear without obstacles or slippery surfaces.



## STORING MATERIALS

Storing materials is another important consideration. Lifting from the floor is to be avoided, so loads should be kept on platforms or shelves at least 18 inches off the floor. Heavy objects should not be kept on top shelves either. Your strength is best for movements between your knees and shoulders, not over your head. Objects should be stored in containers that are small enough to hold with both hands easily. When possible, loads that are too heavy should be broken down into lighter loads.



## WORK SURFACES

Work surfaces should be constructed at the right level to encourage good posture and avoid stooping, bending, stretching, or long forward reaches. If the surface is too low, chairs or stools to sit on should be provided. Such chairs should be designed for your body, with proper support for your back.

If workers must stand, a foot rest about 8 inches off the floor should be provided where one foot can be rested, which eases back tension. Job rotation might be called for so workers can vary their postures and no one has to be in one position for too long. Heavy lifting work should also be rotated among workers. Repetitive lifting can increase the risk of back injuries.

# Plan for Action

## WHAT CAN BE DONE?

MACHINERY AND WORK STATIONS MUST BE REDESIGNED TO AVOID THEIR HAZARDOUS MOVEMENTS.

THE WORK SHOULD BE KEPT CLOSE TO THE BODY SO THAT THE ARMS CAN BE USED LOW IN FRONT OF THE BODY.

STRETCHING ABOVE THE SHOULDER AND STRAINING SHOULD BE AVOIDED OR LESSENED.

EXTENDED REACHES, IF DONE AT ALL, SHOULD BE DONE SLOWLY.

IF A MOTION HAS TO BE DONE, MANY, MANY TIMES, IT SHOULD BE DESIGNED SO YOU CAN CHANGE USE OF YOUR HANDS AND ARMS.

THE KEYS, THOUGH, ARE ALWAYS TO REDUCE THE FREQUENCY OF THE TASK; AND KEEP MOVEMENTS CLOSE TO THE BODY.

HOWEVER, THE WAYS TO PREVENT THE PROBLEMS ARE SOMETIMES RESISTED BECAUSE THEY ARE THOUGHT TO INTERFERE WITH PRODUCTION. BUT A SAFE AND WELL DESIGNED WORKPLACE IS USUALLY MORE PRODUCTIVE.

## WHAT CAN YOU DO?

Workers can do their own inspections of their workplaces. You do not need a degree in ergonomics in order to spot many obvious hazards on the job. You know your job better than anyone else, and you have seen the injuries; this makes you an expert. You can do a walk-around inspection and look for trouble spots, keeping your eyes and ears open. The following checklist will give you an idea of what to look for. Take it with you and look at your workplace.

Once you become aware of any hazards, discuss them with other workers, your union and your employer. A healthy and safe workplace is your right. Action should be taken to correct any problems you might find. Some solutions may be relatively simple, such as clearing floors and installing platforms off the floor. Others may be more complicated, take more time and cost more money. However, knowledgeable workers are the first step to these more long-term preventive actions.

## ERGONOMICS QUESTIONNAIRE

| Yes | No | |
|---|---|---|
| ☐ | ☐ | DOES THE WORK REQUIRE REPETITIVE MOTIONS? |
| ☐ | ☐ | DOES THE WORK REQUIRE TWISTING MOTIONS? |
| ☐ | ☐ | DOES THE WORK REQUIRE REACHING MOTIONS? |
| ☐ | ☐ | DOES IT REQUIRE WORKING WITH BENT NECK OR SPINE? |
| ☐ | ☐ | DOES IT REQUIRE UNNATURAL OR UNCOMFORTABLE POSITIONS OR MOTIONS OF THE BACK, NECK, ARMS, LEGS, SHOULDERS? |
| ☐ | ☐ | DOES IT REQUIRE SUBSTANTIAL FLEXIBILITY, STRENGTH AND ENDURANCE? |
| ☐ | ☐ | CAN THE WORK BE DONE WITHOUT UNUSUAL PHYSICAL EFFORTS? |
| ☐ | ☐ | ARE THOSE WORKERS WITH A HISTORY OF BACK PROBLEMS GIVEN LIGHT-DUTY WORK TO MINIMIZE BACK STRESS? |
| ☐ | ☐ | ARE JOBS ROTATED TO AVOID LONG PERIODS OF TIME IN ONE POSITION OR CONSTANT REPETITIVE MOTION? |
| ☐ | ☐ | IS THE WORKPLACE DESIGNED FOR COMFORT AND EASE OF MOTION? |
| ☐ | ☐ | DOES THE WORK CAUSE MUSCLES TO GET TIRED, WEAK OR SORE? |
| ☐ | ☐ | IS THERE A BETTER LAYOUT OF MACHINES, STOCK AND WORK AREA? |
| ☐ | ☐ | IS THERE ENOUGH ROOM? |
| ☐ | ☐ | IS THERE ENOUGH LIGHT? |
| ☐ | ☐ | IS THERE GLARE? |
| ☐ | ☐ | IS IT NOISY? |
| ☐ | ☐ | ARE THE CHAIRS, WORKBENCHES, DESKS OR OTHER EQUIPMENT ADJUSTABLE TO ALLOW A BETTER FIT FOR DIFFERENT PEOPLE? |
| ☐ | ☐ | IS TRAINING PROVIDED ON SAFE HANDLING PROCEDURES? |

| Yes | No | |
|---|---|---|
| ☐ | ☐ | MUST MATERIALS BE MOVED? |
| | | WHAT KINDS OF MATERIALS ARE TO BE MOVED?_____ |
| ☐ | ☐ | CAN MATERIALS BE EASILY GRIPPED OR HELD? |
| | | HOW MUCH DO THEY WEIGH?_____ |
| ☐ | ☐ | ARE THEY AWKWARD? |
| | | WHAT IS THEIR SHAPE?_____ |
| | | WHAT IS THEIR SIZE?_____ |
| | | WHERE ARE THEY STORED?_____ |
| ☐ | ☐ | DOES IT REQUIRE LIFTING TO AND FROM HIGH SPOTS? |
| ☐ | ☐ | DOES IT REQUIRE LIFTING TO AND FROM LOW SPOTS? |
| ☐ | ☐ | DOES IT REQUIRE PUSHING OR PULLING? |
| | | HOW FAR MUST THEY BE MOVED?_____ |
| ☐ | ☐ | IS THE HOUSEKEEPING GOOD? |
| ☐ | ☐ | IS THE WALKWAY CLEAR OF TRIPPING HAZARDS? |
| ☐ | ☐ | IS THE WALKWAY CLEAR OF BUMPING HAZARDS? |
| ☐ | ☐ | IS THE WALKWAY CLEAR OF SLIPPING HAZARDS? |

| Yes | No | |
|---|---|---|
| ☐ | ☐ | DO THE WORKERS HAVE A CLEAR, UNOBSTRUCTABLE FIELD OF VISION? |
| ☐ | ☐ | CAN THEY SEE WHERE THEY MUST GO? |
| ☐ | ☐ | ARE THEY ALLOWED ENOUGH TIME TO DO THE JOB SAFELY? |
| ☐ | ☐ | IS EXTRA HELP AVAILABLE? |
| ☐ | ☐ | ARE THE NECESSARY EQUIPMENT AND MECHANICAL DEVICES USED? |

- ☐ DOLLIES, HANDTRUCKS, CARTS
- ☐ HOISTS, WINCHES
- ☐ SLINGS, HANDLES, GRIPS

| | | |
|---|---|---|
| ☐ | ☐ | ARE INJURIES REPORTED IMMEDIATELY? |
| ☐ | ☐ | ARE THE CAUSES OF INJURIES DETERMINED TO CORRECT HAZARDS AND PREVENT FUTURE ACCIDENTS? |
| ☐ | ☐ | ARE THERE BETTER WAYS TO DO THE JOB? |

# New Problems

Many new tasks and automated machinery in light assembly work and clerical work have been developed recently. These require fast repetitive motions and/or awkward positions. Problems such as muscle spasms/pain, tendon irritation, fatigue and stiffness can result. Often it is the upper back, neck, shoulders and even the arms that are affected.

While back problems have been researched extensively, it is amazing how few studies have been done in this area. Little information exists on the effects of certain work movements on the upper part of the body. You know by talking with other workers that people are in pain. Occupational health professionals are also seeing more of this type of injury from using machines that pose such hazards.

The new technology allows for more motions and repetitions per hour in order to increase production. Examples of such movements are reaching out many times with the arms above shoulder height and twisting the torso. These actions put more stress on the spinal column, causing tension, tightness and pinching.

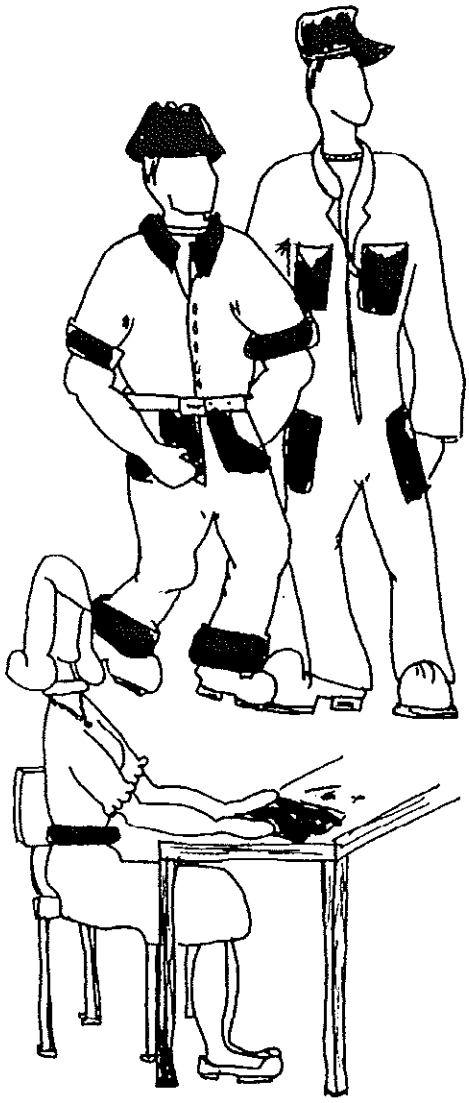
# NOBODY'S AVERAGE

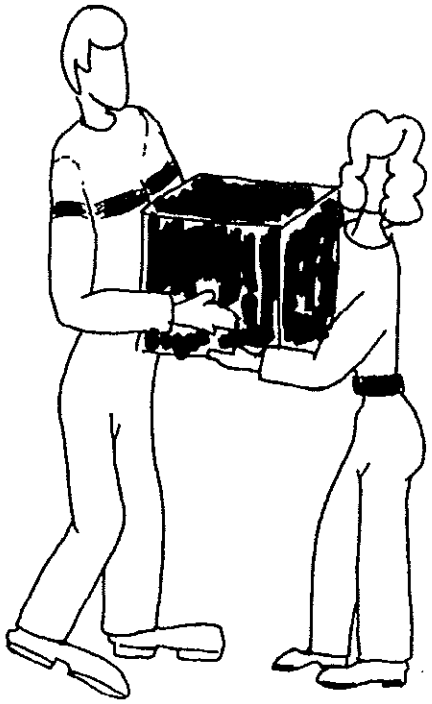
Many times workplaces are designed to fit the so called "AVERAGE" worker. Just by looking around you can see that hardly anyone is average, in fact no none is. All of us have our own particular characteristics, we are tall, short, slim, husky, or a combination of the above. Some of us have big feet, short legs, long arms or other things that make our body different from any other body.

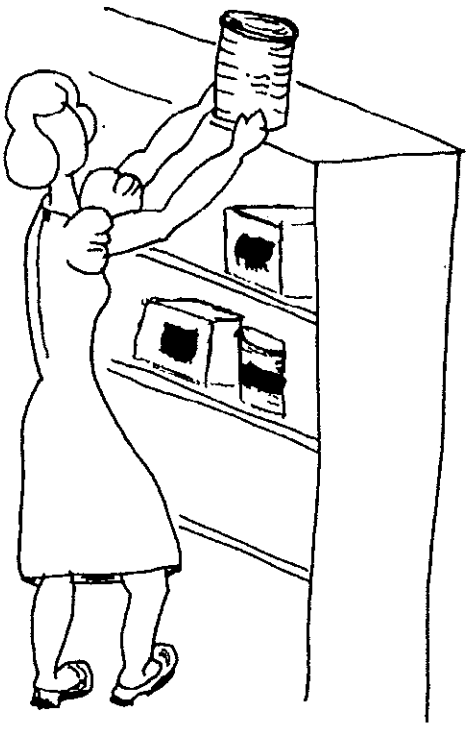
Workplaces that are not designed to fit all of our differences are poorly designed and can cause injury. Better designed workplaces, tools and equipment would make jobs safer and better for everyone. A well designed workplace provides adjustable equipment, or a choice of equipment. A well designed workplace fits the worker. Workers must be taken as the unique individuals they are. Generalizations and averages create uncomfortable, unsafe and unproductive workplaces.

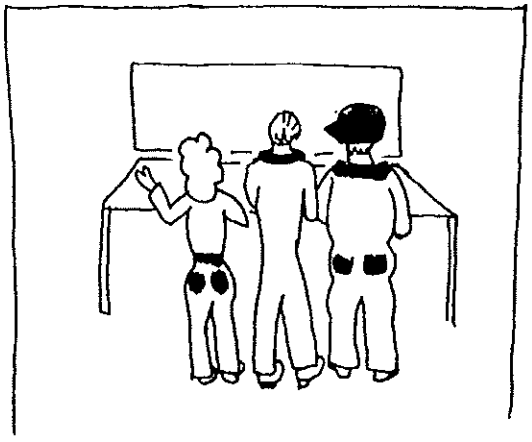
Jobs and workplaces should be designed with an understanding that all of us are different, no two alike, some are tall, others short, some strong, others weak, some perfectly fit, others handicapped.

Guidelines for industry have been established to determine how heavy a load most of the working population can handle. There are charts for pushing, pulling, lifting, carrying, and lowering. They usually include different guidelines for men and women. There is some disagreement among occupational safety and health professionals about these guidelines. Some believe that the load levels considered acceptable are too heavy. Load levels that are acceptable for most workers may not be acceptable for particular individuals.



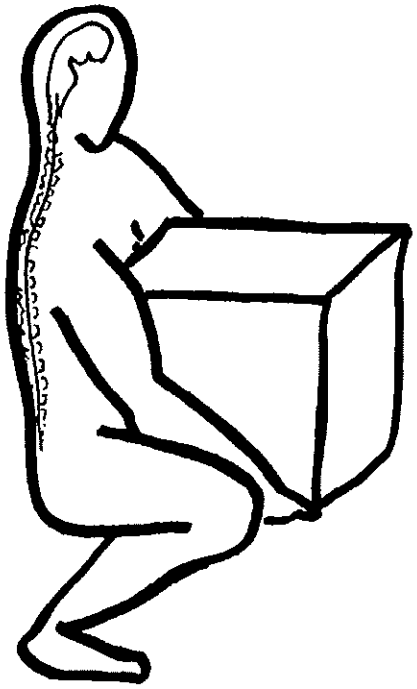






# LEARN TO LIFT

It is the employer's responsibility to train workers in proper lifting procedures and to provide the equipment needed to do the job safely. However, "Safe," "Correct" lifting is not always easily defined nor easily carried out. The worker might be very aware of how to do the job right, but if the means are not available, it can't be done. With this in mind, there are a few basic principles that should be remembered at all times.



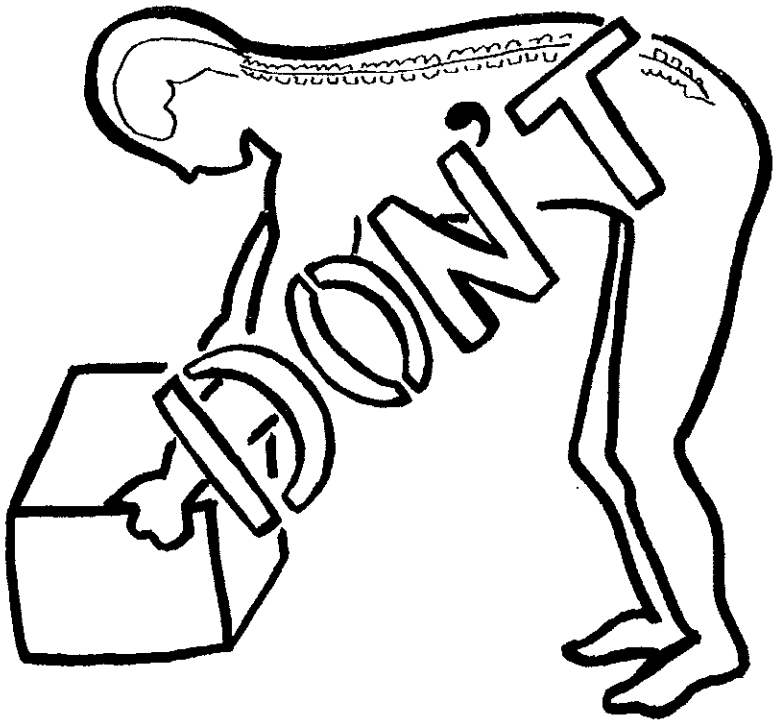
FIRST — Look at the path you'll be walking on before you carry the load. Are the floors clear of hazards? Is there a place to rest? Is there room to set the load down in place? Make sure there is good foot traction.

NEXT — Look at the object. Is it so big that it blocks your vision while you are carrying it? Decide where and how to hold it. Check for sharp edges, or slippery, greasy spots. Make sure you can firmly grip the object with both hands.

NOW — You should be ready to lift the load. Bring your body in as close as possible to the object. Start with your feet parted, one foot slightly ahead of the other for balance and leverage. Squat down, bending at the knees, not with your back. The idea is to keep your back straight. Keeping your chin tucked in helps. Keep your elbows and arms close to your body. The more extended your arms are the less strength you have. Use both hands and keep your chest facing the object. Lift the load between your knees slowly and smoothly.

You are now lifting with your legs, not your back. Try not to twist or jerk while lifting, which will put more pressure on your back. Avoid arching your back, because this motion can pinch a nerve. Don't lift a load alongside your body. Asymmetric or uneven lifting puts uneven pressure on your spine and muscles. Keep the load as close to your body as possible. If you must turn while carrying the load, pivot with your feet. Do not twist at the waist.

WHEN LOWERING THE LOAD, JUST REMEMBER ALL OF THE PREVIOUSLY MENTIONED RULES. USE SLOW, WELL-CONTROLLED MOTIONS, NOT JERKY ONES. BEND WITH YOUR KNEES, NOT WITH YOUR BACK. KEEP THE LOAD CLOSE TO YOUR BODY.




In reality, objects are often too bulky to pass easily between people's knees. That's why the size of the load should always be reduced when possible. Workers should be allowed the time needed to break down loads, or ask for help from other workers.

If you must carry something that is too big to lift between your knees, start with your feet as close to the object as possible, with your legs slightly flexed. You will have to lift with a stooped back, but doing it slowly and smoothly, without jerky motions, is the safest way possible. Learning to lift this way uses the strength in your legs, not your back. Therefore, your leg muscles must be strong and flexible enough to use to lift heavy loads. If strength is not there, when you lift you tend to lean forward at the waist, thus putting all the pressure on your back. Exercise to develop these muscles is recommended.

As far as pushing and pulling goes, pushing is better for your back than pulling. Two hands should always be used for pulling, to lessen the chance of twisting. Whatever the motion is, it should be in and out from the body, and not across the torso.

# EXERCISES FOR YOUR BACK

The muscles of both the back and the abdomen provide the key structural support framework for the backbones and the discs. In the back, the muscles run in several directions, encasing the spine in a strong, but flexible, support system. Strong abdominal muscles are important because they provide increased pressure on the abdomen, like a tight balloon. Additional support is therefore available to the spine and back muscles. Weak muscles on the other hand act like a partly filled balloon, flabby, providing no real cushion to the back structures.

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THERE IS NO WAY TO STRENGTHEN THE BONES OR DISCS, BUT WE ALL CAN DO SIMPLE BASIC EXERCISES FOR OUR MUSCLES.

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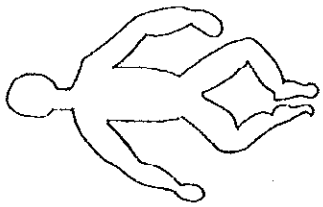
Unfortunately, many people have weak back and abdominal muscles. There is no way to strengthen the bones or discs, but we all can do simple basic exercises for our muscles. In addition, stretching exercises are important to relieve muscle tension from heavy lifting and from repetitive work, such as using a Video Display Terminal. Stretching will also prepare you for doing back strengthening exercises.

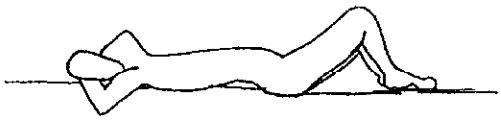
Prepare yourself for exercising by stretching slowly. Stretching will also increase your flexibility gradually. Move into each stretch slowly and steadily. Hold each position for 20-30 seconds at least. Avoid bouncing back and forth while exercising. This puts more stress on the muscle fibers. You should feel a mild tension, that will go away as you hold the stretch. You don't need to stretch to the point of pain. This will also cause too much stress. Try to continue to breathe slowly and steadily as you stretch.

The following are just a few of many possible simple, relaxing stretching and strengthening exercises for your back and neck. None need special equipment.

## EXERCISES DONE LYING ON THE FLOOR



This is a short, easy stretch to warm up with. Lie on the floor, with your knees bent out to the side. Put the soles of your feet together. Hold for about 30 seconds. The pull of gravity will stretch inner thighs.

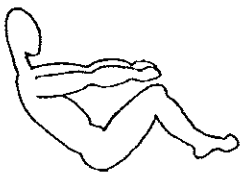


A variation on the previous exercise will work on your upper back and neck. With bent knees, interlace your fingers behind your head (not your neck). Using your arms, pull your head slowly forward until you feel the mild stretch in the back of your neck. Hold for 5-10 seconds, then relax. Do about 4 times.

Another good exercise for your neck uses the same position, but with your arms and hands out in front of you. With the back of your head on the floor, turn your chin toward your shoulder, keeping your head on the floor. You only need to feel an easy stretch. Hold for 5 seconds, switch to the other side, hold and repeat 3 times.

This one is for your legs, feet, and back. Lying on the floor, use your arms to pull your right leg toward your chest, keeping your head on the floor. You should feel a mild tension. Try not to strain and be sure to keep your lower back flat. Hold for 30 seconds. Switch to your left leg and hold. Repeat 3 times.

To strengthen the abdomen, lie on the floor with knees slightly bent. Place hands out in front of you and slowly curl up partly up toward your knees until you feel tension in your stomach muscles. Hold the position for a count of five seconds, and slowly relax flat again. Repeat 5 times at first, then work up to 25 times. Be sure to use your stomach muscles to raise yourself up, and not your arms.



## EXERCISES DONE STANDING UP

Stand up against the wall and press the small of your back flat against the wall. Slowly slide down the wall until your legs are partly bent. Hold position for a count of ten and then return upright again.

Stand against the wall and press the small of your back against the wall, tightening your buttocks and stomach muscles at the same time. Hold the position for a count of ten concentrating on holding the muscles tight. Repeat 5 times at first, then up to 25 times. This exercise can also be done lying on the floor, using the floor instead of the wall.

After standing or sitting for hours, squatting down really helps to release tension and loosen up your muscles. From a standing position, squat down with feet flat, toes slightly pointed out, heels 4-12 inches apart, depending on how limber you are. Keep your knees outside of your shoulders while squatting down. Knees should be over your toes. Hold as comfortably as you can for 20-30 seconds. As you stand up, tuck your chin in a little and keep your back straight. Use your legs to get up. Try to avoid dropping your head forward, because this puts too much pressure on your lower back. This squatting exercise is excellent for all parts of your legs and back.

## EXERCISES FOR YOUR SHOULDERS AND UPPER BACK

Touch your hand to the back of the opposite shoulder. Using the other hand, gently pull your elbow across your chest. Hold for 10 seconds. Switch arms.

This one is very good after sitting at a VDT or typewriter for a long time. It can be done anywhere! With arms raised, interlace your fingers above your head. With palms facing up, push your arms slightly back and up. Feel the pull. Hold for 15 seconds, and continue to breathe. Repeat 3 times.

THESE EXERCISES SHOULD BE DONE THREE TIMES A WEEK. THE WHOLE SET WILL TAKE ABOUT 10 MINUTES AT FIRST. AS YOU PROGRESS, YOU WILL BE HOLDING THE STRETCH LONGER, AND EXERCISING WILL TAKE MORE TIME. HOWEVER, IT WILL ALSO FEEL BETTER. IN TIME, YOU MIGHT WANT TO ADD OTHER KINDS OF EXERCISES.

## SPECIAL NOTE FOR REPETITIVE WORK

People doing jobs requiring repetitive motions many times a day need more than just stretching exercises 3 times a week. This will not be enough to relieve muscle tension. Employers should provide both time and place for exercising during work to prevent injury. Unfortunately, few do. Some of these exercises could be done at your work station.

We urge you to practice a few frequently, especially those for the upper back, shoulder, neck, and arms.