

Back Pain

A Guide for Patients

By

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The Health Information Network
231 Market Place, No. 331
San Ramon, CA 94583

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Introduction

Almost everybody has had back pain at one time or another. Pain in the lower back is especially common. Four out of five people in the United States experience lower back pain at some time in their lives.

- Back pain is one of the leading reasons that people go to the doctor.
- It's the number one cause of lost work time in people under 45 years of age.
- Back pain costs more than \$30 billion annually in medical bills and lost work time.

This information has been written mainly for people with **acute** attacks of low back pain. Acute back pain is short-term. It affects your normal activity for less than three months. If the pain continues for more than three months, it is considered **chronic** back pain.

This material will give you information about:

- How the back works.
- Some of the causes of back pain.
- When to see your doctor.
- Treatment at home.
- When additional tests or surgery may be necessary.
- How to keep your back healthy.

This information uses the recommended guidelines for the treatment of acute low back pain from the U.S. Dept. of Health and Human Services, Public Health Service, Agency for Health Care Policy and research (AHCPR).

If your pain is chronic, or in another area of your back, you will also find useful information here.

Nine out of ten people with acute back pain - even severe pain - recover within 8 weeks without medical treatment. Many people find the pain is gone in a much shorter amount of time.

Leaning, lifting, and carrying correctly can help you to prevent back injuries.

Hold packages and children close to your body. When lifting, bend your knees, keep your back straight, and use your thigh muscles to bear the weight.

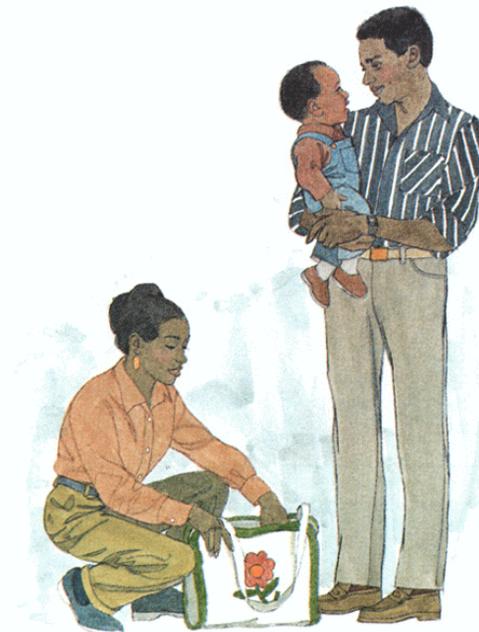


Figure 1

How the Back Works

The spine consists of 24 separate bones called **vertebrae**. They are stacked to give the spine three gentle curves: the **cervical**, **thoracic**, and **lumbar** curves.

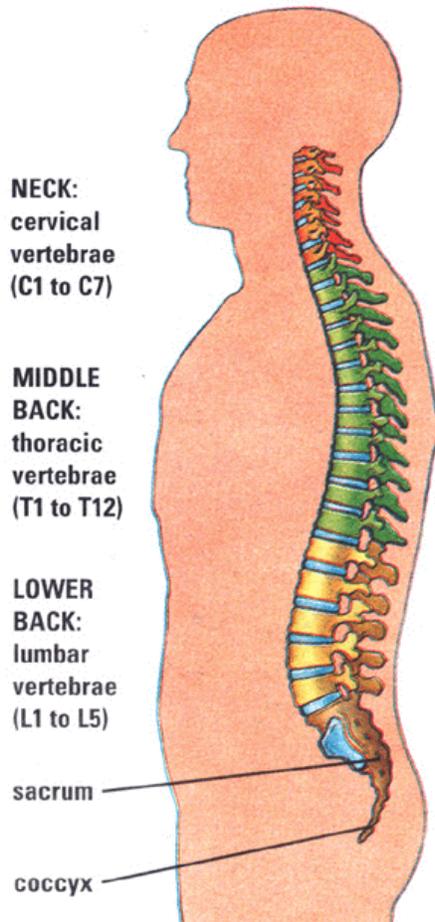


Figure 2

The vertebrae are supported by ligaments and muscles that run down the front and back of the spine to maintain the alignment of the back.

Most back pain occurs in the lower back. The 5 lower vertebrae are called the lumbar vertebrae. The disks between the lumbar vertebrae are under the most pressure when you are sitting or lifting, so they can be easily damaged.

Below the lumbar vertebrae are nine vertebrae that are fused together to make the **sacrum** and the **coccyx**.

The vertebrae surround and protect the **spinal cord** - a column of nerve tissue that runs from the brain to the lower back.

Nerve roots branch off the spinal cord and pass through small openings between the vertebrae on each side. In the lower back, the nerve roots merge together to form the **sciatic nerve**. The sciatic nerve is one of the main nerves that carry sensation and control the muscles in the legs and feet.

The Disks

The vertebrae are separated from each other by **disks** that consist of two parts:

- A soft pulpy core (**nucleus**).
- A tough outer covering of fibrous cartilage (**annulus**).

The disks act as shock absorbers, and they also add flexibility to the spine.

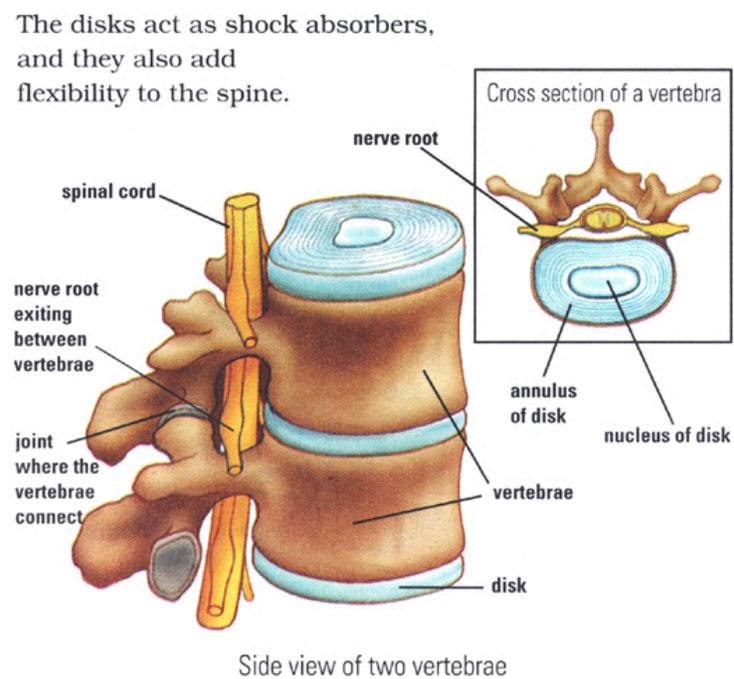


Figure 3

What Causes Back Pain ?

Most cases of acute back pain are due to strains or sprains in the muscles or ligaments that support the spine, not to problems with the bones of the spine.

However, there is the possibility that a disk may **prolapse** and press on a nerve (see Figures 5 & 6). A disk prolapses or herniates when a portion of the disk nucleus gets forced out through a tear in the annulus.

In other people, back pain may be the result of **arthritis, stenosis**, or some other condition (see page 9). These conditions are likely to become painful quite gradually. They don't usually cause sudden pain in the way that a muscle, ligament, or disk injury can.



Damage to Muscles and Ligaments

The muscles and ligaments that hold the spine upright may be strained or damaged if put under too much stress. Damage can also occur if heavier demands are put on one part of the back than on another.

- Sometimes, you may feel something snap or “give” in your back after twisting, falling, or bending over.
- On other occasions, you may feel nothing at the time of injury, but pain may develop later.

This pain is usually caused either by the tearing or stretching of a ligament or muscle fibers.

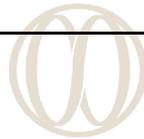
The first symptom may be a severe cramp or **spasm** that makes it nearly impossible to move. Although the pain may feel intense, this type of injury is seldom serious, and usually heals without difficulty.

Back Pain - Who Is at Risk?

You may have a greater risk of back pain if you:

- Lift objects incorrectly.
- Sit for long periods with poor posture.
- Have weak muscles in the abdomen (stomach) or back.
- Have a job that involves a lot of lifting, carrying, pulling, or vibration.

Some studies show that people who use tobacco products are at greater risk for experiencing back pain.



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Figure 4

Acute Disk Problems

A prolapsed disk may also be called a **herniated**, **ruptured**, or “**slipped**” disk.

- When a disk is prolapsed, the soft pulpy core (**nucleus**) has pushed out through the tough outer covering (**annulus**), making it bulge. It probably will cause pain in a leg if a portion of the disk is pushing against a nerve root.

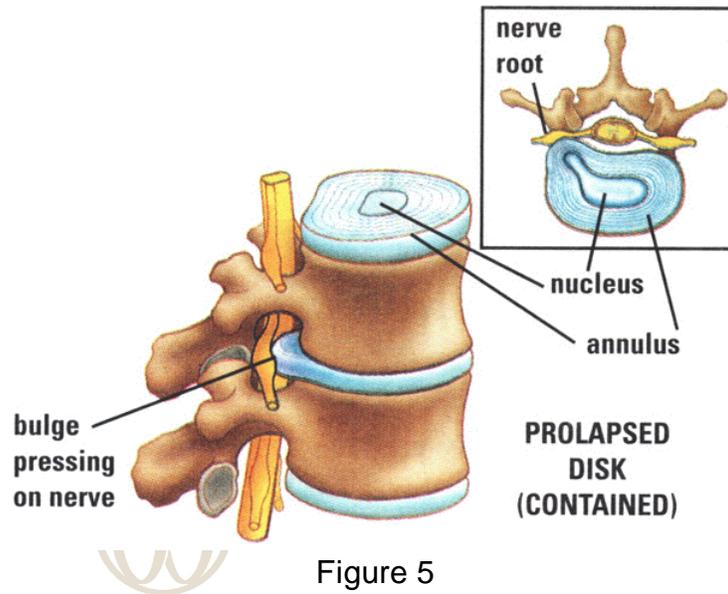


Figure 5

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- In some cases the **M E** annulus may tear, or rupture, and some of the pulpy material in the nucleus may be **extruded** - pushed out of the disk, like toothpaste out of a tube. This material, too, may press on a nerve root.
- Disk problems may develop gradually, or they may follow an injury. Disks are often damaged by a sudden twisting

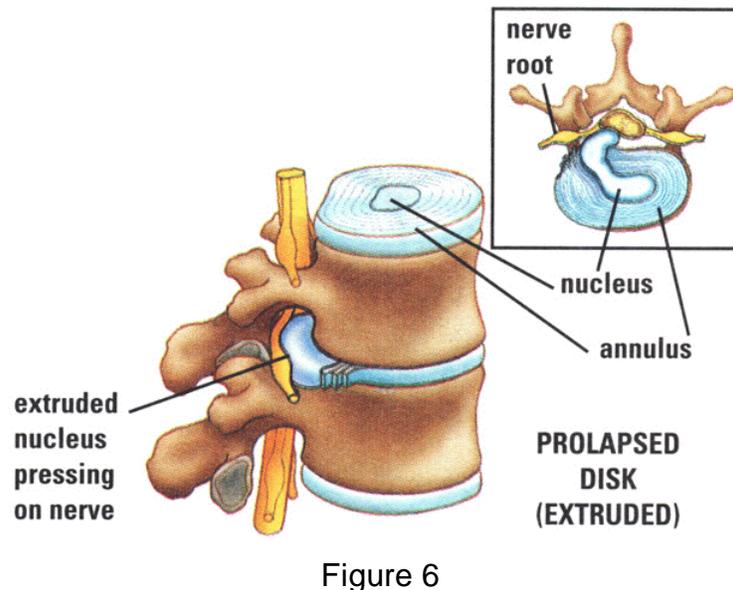


Figure 6

movement.

- In some cases, the annulus may be torn or weakened, and even a small additional strain can make it bulge or tear.

Sciatica

Most people with acute back pain will feel it in the back itself, but some patients will have **sciatica** - pain that radiates down the side or back of the leg, into the foot.

When pain is felt in the leg, it usually means that the covering of a disk or its pulpy nucleus is pressing against a nerve root in the lower back.

There may also be a feeling of tingling or numbness in part of the leg.

Depending on which disk and nerve roots are affected, the pain may extend down the front of the thigh into the lower leg.

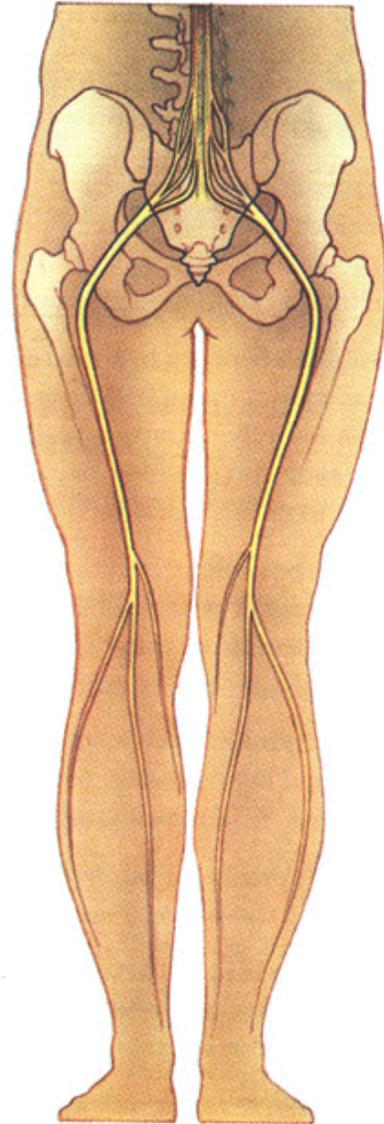


Figure 7

Other Causes of Backache

Other conditions tend to produce pain that builds up more gradually, over a period of weeks or months. These conditions should be evaluated by your doctor.

Osteoarthritis is caused by wear and tear at the disk or joints. It is part of the normal aging process. In some cases people may not know they have arthritis, but in other cases it can be very painful.

Spinal stenosis is a narrowing of the channels (the spinal canal) that the nerves pass through. It is usually caused by arthritis. It may cause pressure on a nerve, resulting in pain, numbness, and tingling in one or both legs. It usually makes it difficult to walk long distances.

Osteoporosis occurs as the bones get thinner and weaker with age. This may cause fractures. Some fractures may not be detected at first, but others can be very painful.



Spondylolisthesis occurs if one vertebra slips forward over another. It may be caused by arthritis, trauma, or a developmental process.

Bone spur is an outgrowth of bone that can rub against the nerve, resulting in sciatica.

Rheumatoid arthritis and **ankylosing spondylitis** are other conditions in which the joints of the back can become inflamed and painful.

When To See The Doctor

Most back pain can be treated at home. Back pain is a common occurrence in healthy people. However, there are specific situations in which you should see a doctor.

When you have an acute attack of back pain, you should call your doctor immediately if:

- **You have difficulty with bowel and bladder control.**
- **You've had a fall or other accident, and might have fractured a bone.**
- **The pain is almost impossible to bear and is getting worse.**
- **There is some loss of sensation or weakness in your legs.**

Some questions your doctor may ask include:

- How did the pain start?
- What makes it worse - or better?
- Does it hurt when you are resting?
- Do you have pain in the buttocks or legs?
- Do you feel "pins and needles," weakness, or numbness?

The Examination

The doctor may examine you to check:

- The flexibility of your back.
- The reflexes, muscle strength, and sensation in your legs.
- How far your legs can be raised comfortably, if you have lower back pain.

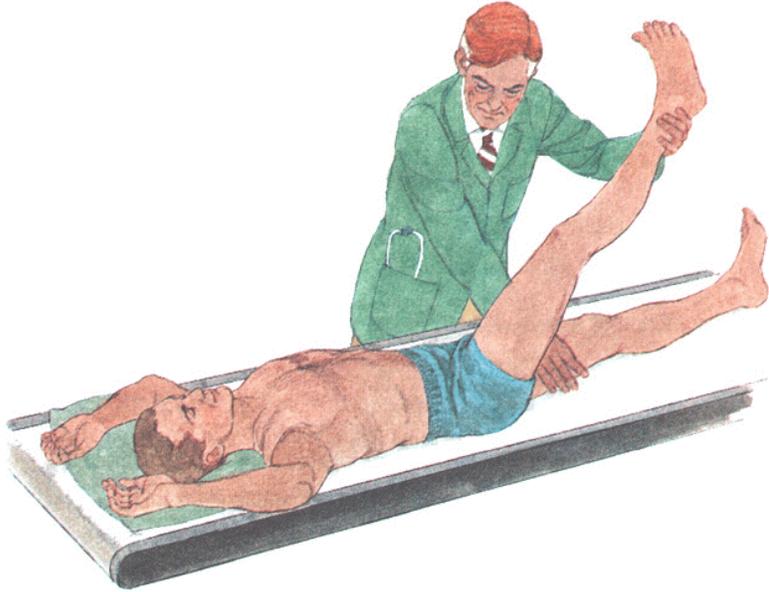


Figure 8

In most cases, this physical examination and information on your medical history are enough to rule out any serious conditions.

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If this “straight leg test” causes pain in the leg, there may be pressure on a nerve root.

What about X-rays?

X-rays and other diagnostic tests help your doctor to determine the exact cause of the problem and to suggest the treatment that is most appropriate for your back problem.

X-rays and other diagnostic tests are usually not performed unless the pain continues for more than one month.

X-rays and other diagnostic tests may be needed sooner if:

- You have had a previous fracture or surgery.
- You have had a recent fall.
- You are in an age group in which osteoporosis is a risk.
- You are an adolescent with back pain.
- You have had repeated episodes of back pain.
- You have weakness in

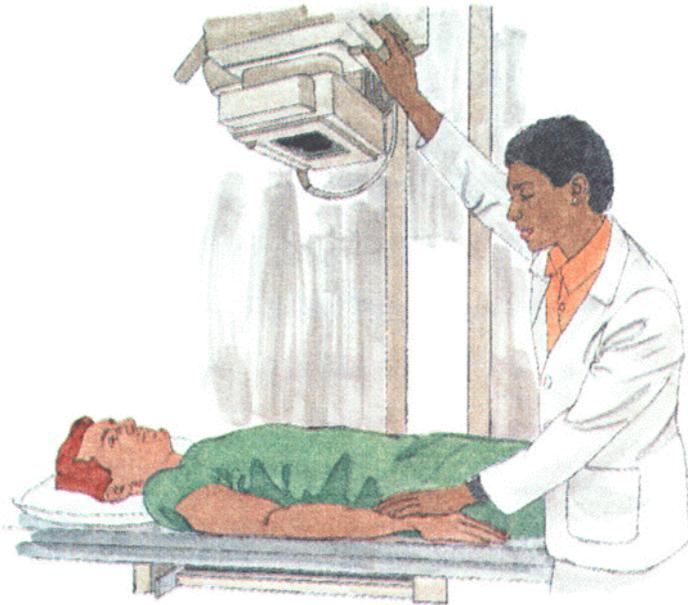


Figure 9

- the legs, or a lack of bowel or bladder control, which may be the result of nerve damage.
- The doctor's examination suggests something more serious.

Treatment At Home

Whether you've already seen the doctor, or you've taken care of your back at home, you should return to your regular activities as quickly as possible. When you treat your back at home, remember these facts:

- People with muscle and ligament damage can usually get back to their normal routines in about a week. Some people may need more time, especially if their jobs involve lifting or long periods of sitting or standing.
- Most people with prolapsed disks regain function within a month. Many people recover even sooner.

Steps for Back Pain Treatment at Home

1. Rest your back for a couple of days in the very early stages. Most people with back pain will not need bed rest, only those with severe pain.
2. Use ice, heat, or over-the-counter medications, such as acetaminophen, aspirin, or ibuprofen, to relieve the acute pain.
3. Get back to normal activities as soon as the pain permits. If you overprotect your back for too long, you may slow down your recovery by weakening the muscles that support your back.
4. As your back recovers, start taking measures to strengthen it. Stronger back and abdominal muscles can help prevent future attacks of back pain.

How Much Rest Does Your Back Need?

The pain in your back will be your best guide. If all positions hurt except lying down, then lie down for a day or two. Lie on your side or your back, whichever is more comfortable.

**Don't spend any longer in bed than you have to - not more than 1 or 2 days.
Spending more than 4 days in bed is not recommended.**

**Too much rest can cause the bones to lose calcium. It can also weaken
muscles and make your back problems worse.**

Getting Yourself Moving

- When you can tolerate it, return to your normal routine, but avoid sitting upright for long periods. Sitting is much harder on your back than standing, walking, or lying down. See the following sub-section titled "Sitting" under the section "Changing Your Routine" for ways of sitting and standing that cause the least strain.
- Do everything very gently and slowly for the first few days. Stop doing any activity that makes your back hurt.
- Take short walks just as soon as you can do so without sharp pain or muscle spasms.
- Within a week or so, you should be able to start an exercise program, such as walking or swimming.

For The Pain

The vast majority of people with back pain will quickly respond to a short period of resting in bed and taking anti-inflammatory pain medications.

Some over-the-counter medications, including acetaminophen, aspirin, and ibuprofen are helpful. There is usually no advantage to prescription pain medications or muscle relaxants, which can cause drowsiness. Be careful to not take more than the recommended doses of these medicines to prevent damage to your internal organs.

Cold and Heat

Ice may not always speed recovery, but it can help relieve the pain. Especially right after an injury, ice reduces **inflammation** (swelling) and decreases muscle spasm.

- Press a plastic bag of ice, a gel-filled ice pack, or even a large bag of frozen vegetables against the sore area. You can strap the bag on if you are moving around.
- For comfort, you may want to wrap an ice pack in a damp towel before putting it next to your skin.
- Cycle the ice on and off in 20 minutes intervals.

Don't use heat until the swelling has gone down, which usually takes a couple of days. When all you feel is a dull ache, moist heat can be soothing.

If you use a heating pad (dry heat), be very careful to avoid burns. Do not fall asleep while using a heating pad.

The chart below summarizes information on the treatment of acute low back pain. The information is from the Agency for Health Care Policy and Research. Treatment options are listed in alphabetical order.

Treatment	Effectiveness
Acetaminophen	Good, few side effects, low cost.
Acupuncture	Not usually very helpful.
Aspirin	Good, but can cause stomach irritation or ulcers.
Heat	May be soothing after the first 48 hours.
Ibuprofen	Good, but can cause stomach irritation or ulcers.
Ice	Can help reduce pain and spasm.
Injections of drugs into the back	Not usually found helpful.
Muscle relaxant drugs Physical therapy: ultrasound, electrical stimulation, massage, back corsets, spinal traction.	Good, but may cause drowsiness. These drugs require a prescription. These methods may be effective for short-term relief, but they do not speed recovery or prevent pain from returning.
Spinal manipulation	May be effective for acute back pain, but should not be used if there is evidence of neural compression.

Changing Your Routine

As you return to your normal activities, you should make a conscious effort to treat your back in a way that will make re-injury less likely.

The sleeping, sitting, standing, and lifting positions that are comfortable now are probably the ones you should learn to use permanently in order to help prevent future back problems.

Lying Down

Use a mattress that is firm enough to allow your body to lie flat. If your bed has too much “give” in it, put a sheet of half-inch plywood under the mattress.

When you lie down, try one of the following positions:

- Lie on your side (a pillow between your knees and a rolled towel under your waist can be helpful).
- Lie on your back with a pillow under your knees. A rolled towel under your waist and under your neck can also be helpful.

Getting Up

When you get up, first roll onto your side. Then bend your knees toward your chest to bring your feet off the bed. Use your arms to push yourself up to a sitting position, keeping your back straight.



Figure 10

Sitting

- Sit in a relaxed, but not slouched, position that allows your spine to keep its natural curves.
- Sit with your back supported. If your chair or the seat of your car does not provide good support for the lower back, use a small cushion or rolled-up towel to maintain the normal lumbar curve.
- Sit with your thighs parallel to the floor. Keep your feet flat on the floor, or on a footrest.
- Stand up and walk around at least once an hour.
- In the car, pull the seat forward so your knees are a little higher than your thighs.

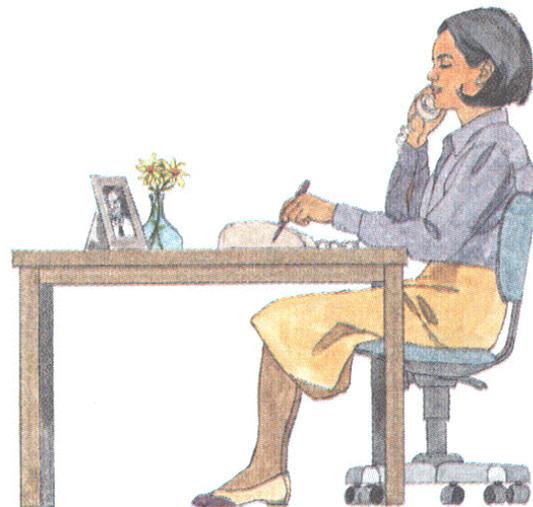


Figure 11



Standing

- Stand straight, with your stomach in. There should not be an exaggerated curve in your lower back.
- Try not to stand for long periods of time. Walking may put less of a strain on your back than standing still.
- If you must stand in one place, put one foot on a block or stool. Alternate your feet now and then.

Lifting and Moving

For at least a month after hurting your back, you should not lift anything weighing more than a few pounds. You should also take great care even when picking up objects that are quite light, such as a grocery bag or a small baby.

Even just bending over can hurt your back if you don't use the right technique.

Let your legs do the work, not your back.

- When lifting, stand as close to the object as possible, so that you don't bend your back.
- If you are picking up something from the floor, squat down close to the object. keep your back straight and push up with your thigh muscles.
- When you are carrying anything, hold it close to your body.
- If you need to move, roll, or slide something along the ground, push it - don't pull it.
- When carrying a load, don't lean forward, and don't twist your back to turn around. If you need to turn, move your feet and legs rather than twisting your back.
- If you have to bend over - for example, when you are making a bed - bend your knees slightly.
- Avoid activities that involve a lot of bending, twisting, or lifting - like shoveling and sweeping.

Building Your Back Strength

Whether the backache can be traced to ligaments, to muscles, or to a damaged disk, part of the underlying problem may be a lack of exercise. When muscles become weak, there is more strain on disks and ligaments.

As soon as you can manage it without pain, you should start getting more exercise of the type that uses your whole body. Mild exercise could start as soon as one or two weeks after you injure your back, depending on your doctor's advice.

Regular exercise will strengthen your muscles and will also help you to achieve a desirable weight - one of the best things you can do for your back.

- **Walking** is a good activity to begin your program. Use sensible shoes with cushioned soles.
- **Swimming** is also good, but avoid the breast stroke and butterfly, which can strain the back.
- **Bicycling** is excellent, but not if you have to be hunched over the handlebars. Choose a bike that lets you sit more upright.

Start all types of exercise slowly. Increase your speed gradually as your muscles warm up.

In a few weeks, you can also start specific flexibility or muscle-strengthening exercises, following your doctor's advice. he or she may refer you to physical therapy, a back education program, or a health club.

What If The Pain Persists?

Only one person in ten may still have significant pain after a few weeks of home treatment. If pain persists, you should be seen by a doctor, who may suggest some tests to find out more precisely what is causing your pain. Prior to any of these tests, you should let your doctor know if there is a chance that you may be pregnant.

In addition to x-rays - which are useful to show any problems in the bones themselves - your doctor may arrange for you to have one or more of the following tests:

Magnetic resonance imaging (MRI):

During an MRI, a magnetic field and radio waves are used to produce signals that are then converted into images by a computer.

MRI is not usually needed for most cases of back pain, but doctors may use it before surgery.

Let your doctor know if you have a fear of being in tight spaces.

Lumbar myelography:

A special dye is injected into the spinal canal. The doctor then takes x-rays, which can show damage of tissues within the spinal canal.



Figure 12

Computed tomography (CT) scan:

A CT Scan is similar to an MRI except that x-rays are used to produce the computer image. This scanning method is useful if a bone problem is suspected, for example, a fracture or spondylolisthesis. A CT scan may be performed after myelography.

Electromyography (EMG):

This test involves checking on nerve function by inserting a needle into a muscle. The needle is connected to a machine that records electrical activity. The doctor reads the EMG to find out about possible nerve injury.

Is Surgery Needed?

Surgery is usually not necessary. However, it has a high rate of success in the following circumstances:

- If you have severe sciatica - pain in the leg - that doesn't clear up after six weeks or more of home treatment, and if you have also had an imaging test (MRI or CT scan) that shows a disk pressing on a nerve root.
- If you have progressive muscle weakness in the leg, or if tests show that the nerve have been affected.

Timing of Surgery

If you and your doctor feel that surgery is the best option for you, it will usually be done between six weeks and six months after your back pain started.

Surgical Procedures

The most common operation for a prolapsed disk is **diskectomy** - removal of the part of the disk that is putting pressure on a nerve root.

It involves a two to three-inch incision in the back. The hospital stay is usually about 1-2 days.



Figure 13

Your surgeon will discuss with you the element of risk that is involved with all surgery.

Generally, the chance of complications, such as bleeding, infection or nerve injury is low with this type of operation.

After surgery, leg pain is usually reduced, although there is no guarantee that it will not return. Relief of back pain after surgery usually takes a little longer than relief of leg pain.

Other Types of Back Surgery

Different procedures may be done for other conditions affecting the back.

A **spinal fusion** involves fusing one vertebra to the one above or below it. This operation is not used for routine low back pain. Instead it is used when the spine is

unstable due to fracture, spondylolisthesis, or some other condition. Sometimes with severe back pain due to arthritis, a fusion may reduce this pain.

Decompressive surgery for spinal stenosis may be used if bone or other material that is pressing on nerve roots produces pain in the legs. This involves removing some of the bone to give the nerves more space.

Alternative Procedures

Sometimes it is possible to relieve the pressure on a nerve with alternative procedures.

Chemoneurolysis involves the injection of an enzyme (**papain**) directly into the disk. Papain dissolves the nucleus of the disk. It can be helpful in some cases because it can relieve pressure on a nerve. This procedure is not an option for patients who are allergic to papain.

Percutaneous discectomy involves an incision in the back about one-quarter inch long. A special tube is inserted directly into a disk, and damaged disk material is extracted. This procedure can be useful if the disk is prolapsed but disk material is not extruded.

Returning to Normal Activity

With a little time, your back will heal, and you won't need to treat it as if it is fragile. To avoid another painful episode, you will need to get into the habit of living in a way that protects your back.

- Walk, bike, or do some other form of exercise to maintain or achieve your ideal weight and to keep the muscles of your back and abdomen strong.
- Do the exercises that have been recommended for you. Be sure to do them regularly.
- Use techniques of lifting, sitting, standing, and lying down that help you avoid straining your back.

With practice, protecting your back will become second nature.



Figure 14

Exercises For Your Back

When you are more comfortable, the focus of your treatment will shift to improving physical conditioning and strengthening the muscles that support your back.

- Begin with low-stress aerobic activities such as walking, cycling, or swimming.
- After a couple of weeks, begin exercises to strengthen the muscle of the abdomen and back. Your doctor can tell you how many times to repeat each exercise.

Your doctor or physical therapist should tailor your exercise program to your needs. If any exercise increases your pain, you should stop.

Pelvic Tilt



1. Lie on your back with your knees bent and your feet flat on the floor. Pinch your buttocks together and pull your stomach in. **ENTER**
2. Push the small of your back down to the floor. Then lift the buttocks slightly off the floor.
3. Rest.
4. Repeat: _____ times.

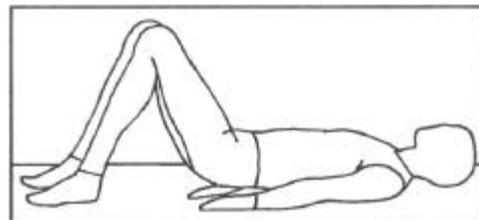


Figure 15

Curl Ups

1. Lie on your back with your lower legs and feet resting on a small, low stool.
2. Reach your hands toward your knees, raising your head and shoulders slightly off the floor, and curl your body forward.
3. Rest.
4. Repeat: _____ times.



Figure 16

Single Leg Raise

1. Lie on the floor with a small pillow under your lower back and hips. Keep arms at your sides.
2. With one knee slightly bent, raise that leg and hold for a count of five. Then lower the leg slowly and raise the other leg the same way. Alternate legs.
3. Rest.
4. Repeat: _____ times.



Figure 17

Hip Flexor

1. Lie on the floor with a small pillow under your lower back and hips. Keep arms at your sides.
2. Keeping knees slightly bent, lift both feet about 12 inches off the floor and hold for a count of 10.
3. Lower legs slowly.
4. Rest.
5. Repeat: _____ times.

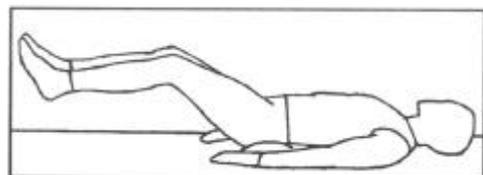


Figure 18

The Airplane

1. Lie face down with your stomach on a small pillow and your arms at your sides.
2. As you exhale, raise your upper body from the floor and hold for a count of five.
3. Return to the starting position.
4. Rest.
5. Repeat: _____ times.

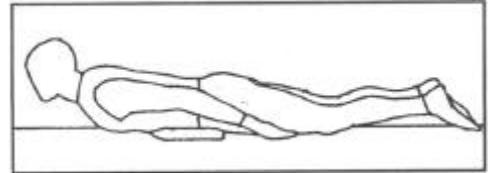


Figure 19

The Wall Slide

1. Stand with your back and shoulders against the wall. Your feet should be a 6 to 12 inches away from the wall and slightly apart.
2. Slowly slide your back and hips down the wall until you are in a partial sitting position.
3. Hold this position for 10 seconds or longer.
4. Slide back up to the standing position.
5. Rest.
6. Repeat: _____ times.

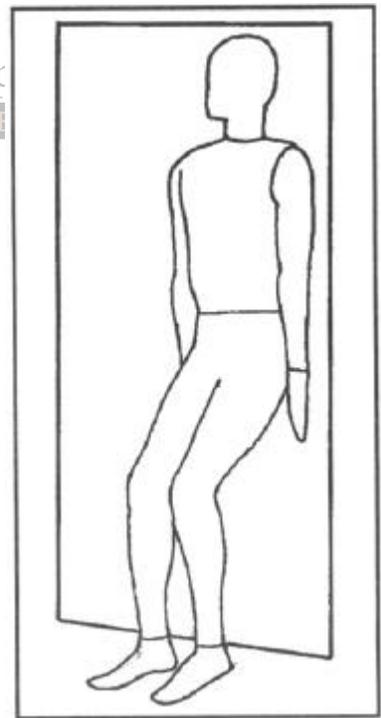


Figure 20

Glossary of Terms

Annulus

The tough outer covering of a disk.

Computed tomography (CT scan)

Procedure for providing cross-sectional views of bones, tissue, and organs.

Cervical vertebrae

The top seven vertebrae, which comprise the neck.

Chemonucleolysis

Use of the enzyme papain to dissolve the core of a disk.

Diskectomy

Surgical removal of part of a prolapsed disk.

Disks

The "padding" between the vertebrae of the back.

Electromyography (EMG)

A test that checks nerve function by inserting a needle into a muscle.

Herniated disk

See **Prolapsed disk**.

Lumbar vertebrae

The five vertebrae of the lower back, above the sacrum and the coccyx.

Magnetic resonance imaging (MRI)

A diagnostic test that uses a magnetic field and radio waves to produce an image of body tissues.

Nucleus

The soft, pulpy core of a disk.

Prolapsed disk

A disk that bulges out from its position between two vertebrae.

Sciatic nerve

The major nerve that serves the legs.

Spinal cord

The column of nerve tissue that runs from the brain to the lower back.

Stenosis

Narrowing of a portion of the spinal canal, usually because of bony overgrowth.

Thoracic vertebrae

The 12 vertebrae of the upper back.

Vertebrae

The 24 bones of the spine.



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