

**KEEP MOVING TO PREVENT AND RELIEVE  
BACK PAIN**

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## GLOSSARY

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## **BACK ANATOMY**

Men and women are equally affected by lower back pain, and most back pain occurs between the ages of 25 and 60. However, no age is completely immune. Approximately 12% to 26% of children and adolescents suffer from low back pain. Fortunately most low back pain is acute, and will resolve itself in three days to six weeks with or without treatment. If pain and symptoms persist for longer than 3 months to a year, the condition is considered chronic.

Humans are born with 33 separate vertebrae. By adulthood, most have only 24, due to the fusion of the vertebrae in certain parts of the spine during normal development. The lumbar spine consists of 5 vertebrae called L1 through -L5. Below the lumbar spine, nine vertebrae at the base of the spine grow together. Five form the triangular bone called the sacrum. The two dimples in most everyone's back (historically known as the "dimples of Venus") are where the sacrum joins the hipbones, called the sacroiliac joint. The lowest four vertebrae form the tailbone or coccyx.

The anatomy of the spinal column is extremely well designed to serve many functions. All of the elements of the spinal column and vertebrae serve the purpose of protecting the spinal cord, which provides communication to the brain, mobility and sensation in the body through the complex interaction of bones, ligaments and muscle structures of the back and the nerves that surround it. The back is also the powerhouse for the entire body, supporting our trunks and making all of the movements of our head, arms, and legs possible.

Almost everyone experiences acute back pain at some point in their life. Most sudden attacks of acute back pain are the result of overstretched muscles (sprains) or ligaments (sprains). The pain may be most severe immediately after injury, or it may worsen gradually over a few hours. In most instances, back pain as a result of strain or sprain can be resolved following a conservative course of treatment—usually within two to six weeks—provided there are no serious underlying medical conditions. Identifying the cause of the pain, alleviating the pain— either at home or with physician's help—and avoiding re-injury are key to the healing process.

## MUSKULOSKELETAL INJURY

Back pain is most likely to occur when the muscles in the back are not up to the task of protecting the spine. This can happen because a person is out of shape, fatigued or when they subject their back to sudden forces or heavy loads.

For the lower thoracic and lumbar spinal regions the most important muscle groups are:

### **Quadratus Lumborum**

Originates from the last rib (12<sup>th</sup>) and transverse processes of L1-L4 and inserts at the iliac crest.

### **Psoas Iliacum**

Composed of the psoas major and the iliacus.

### **Psoas Major**

Origins at the transverse processes and vertebral bodies of T12-L5 and insertions at the lesser trochanter of the femur.

### **Iliacus**

Originates at the anterior margin of the iliac crest and inserts at the lesser trochanter of the femur.

Muscle spasms usually signal irritation of the lower back, and often the injury can be treated conservatively with rest, ice and over-the-counter pain medicine. Muscle spasms are a reaction to both muscle injury and ligament injury, so it can be hard to differentiate at first.

When there is a musculoskeletal injury, most often the muscle is torn to some degree. Because the muscles in the body have ample blood supply, they usually repair quickly and easily within a few days.

Muscle injuries often induce swelling to prevent further movement that could cause more injury. When muscles cease to move, they eventually atrophy and weaken, so it's important to get the swelling down as soon as possible, so you can begin to move the injured muscle more quickly.

Treatment for a musculoskeletal injury with accompanying inflammation calls for ice to reduce the swelling and to relieve the spasm.

## WHAT CAUSES ACUTE BACK PAIN?

Common causes of strains and sprains that can trigger acute back pain include:

- Improper lifting
- Sudden, strenuous physical effort
- Accident, sports injury or fall
- Sleeping position and/or pillow positioning
- Poor sitting or standing posture
- Bending forward too long
- "Hiking" your shoulder to hold the phone receiver to your ear
- Carrying a heavy purse, briefcase or backpack
- Stress and muscle tension

Physical conditions that can possibly contribute to the onset of acute back pain include:

- Lack of muscle tone
- Excess weight
- Pregnancy

Most back pain develops suddenly after lifting a heavy object or spraining the muscles in the back during vigorous exercise. Another common cause of back pain is poor posture at work or during prolonged periods of sitting. This type of back pain is often the result of the muscles that support the spinal column becoming weaker over time. Doctors refer to this type of weakness as "deconditioning" which describes the body's natural response to inactivity and little exercise. As the muscles that support the spine and trunk become weaker, they are less able to withstand heavy lifting, or support the spine in its normal position, and as a result, the entire back becomes sore and tired. Exercise is the best way to prevent this type of pain from occurring.

Several studies have shown that regular cardiovascular exercise, like swimming, bicycling, jogging, or hiking, is the most beneficial form of exercise for treating and preventing back pain. This type of exercise, which promotes good health in general, has been shown to be as effective as nearly every other type of physical therapy program or exercise regime. In addition, this is the type of exercise that is easy to do, enjoyable, and definitely good for everyone.

## **KEEP MOVING TO PREVENT AND RELIEVE BACK PAIN**

The spinal column is one of the most vital parts of the human body, supporting our trunks and making all of our movements possible. When the spine is injured and its function is impaired the consequences can be painful and even disabling. According to estimates, 80 percent of Americans will experience low back pain at least once in their lifetime. A small number of patients will develop chronic or degenerative spinal disorders that can be disabling.

If you have troubling symptoms, such as back pain, you aren't alone. Between 75 and 85% of all people will experience some form of back pain during their lifetime.

In fact, back pain is the second most frequently reported reason for visiting a doctor, and after the common cold, is the next leading reason for missed workdays for people under 45.

These are some common symptoms:

Back Pain

Acute Back Pain (short-term back pain)

Chronic Back Pain (long-term back pain)

Radiating Pain/Sciatica

Numbness and Weakness

Stiffness and Tightness

Bowel and Bladder Dysfunction

## **EXERCISE**

Regular exercise is an essential part of having a healthy back. In the treatment of back pain, manual osteopaths and every other healthcare provider agree that exercise plays an important role in recovery. Every day we make demands on our bodies that can stress our backs. It's a well known fact that the more fit you are, and the stronger your back is, the more easily your body can deal with the stress and strain of every day activity.

Unfortunately, when most people start to experience back pain, they become less active. As a result, the muscles that support the spinal column become weaker and have less endurance. If your back loses enough muscle tone, the muscles can shrink, contract and tighten. Your back may feel tight much of the time, tire easily, and start to feel uncomfortable even when you are sitting in a chair. The feelings associated with chronic back pain and spinal fatigue, make most people feel drained, tired and depressed. It becomes harder and harder to break the cycle of pain causing inactivity, which causes more pain, which then causes more inactivity. Eventually, this scenario can lead to other health problems that are the direct result of inactivity, such as heart attacks, strokes and obesity.

Therefore, exercise is an important part of the "use it or lose it" theory of overall spine health. Patients with chronic low back pain are particularly susceptible to suffering from the ill effects of too little exercise. If it hurts when you move your back, and is less uncomfortable when you don't, then you have the perfect incentive to become less active with time. Although this may seem like a logical reaction to pain, it is almost certain that avoiding physical activity will make the pain become even worse over time. This knowledge comes from the unhappy experience that doctors have had in the past with prescribing prolonged bed rest and inactivity for back pain, which over time, only aggravated the situation and made it more difficult to treat in the long run. We now know that if you want to relieve the physical pain of many types of back pain while also making yourself stronger both mentally and physically, you need to get moving.

A commitment to a physical conditioning program that is approved by your physician is important to everyone, but it is especially important to those with chronic back pain. Exercise has many benefits, and has even been called a healthy "non-chemical tranquilizer," because the process of stretching and strengthening the muscles of the back produces a feeling of relaxation and well being similar to that produced by many muscle relaxants and pain relievers. Low back pain is often described as a "psychobiological" problem, meaning that it includes both physical and psychological components. Exercise can help treat both parts of this problem, by providing ourselves with a healthy means of relieving some of the frustration and sense of helplessness associated with low back pain, in addition to treating the problem at its very heart.

## **WHY IS EXERCISE GOOD FOR THE SPINE?**

While many manual osteopaths recommend exercise as an important part of our overall good health and well-being, many people who have a sore back think of exercise as the last thing that they would want to do, and they often wonder how exercise would make a painful back feel better. Think of the muscles of the trunk and spine as being analogous to the supporting wires of a sailboat mast. If the mast does not have any supporting wires, it is very flimsy and likely to topple over. Without any support, it will be unable to withstand the forces of the wind in the sails and the entire structure is likely to fail. The muscles that surround the spinal column serve a similar purpose. They help to balance the spine during normal activities and athletic exercise and prevent the weight of the body from being carried by the spine in a harmful way. The stronger and better conditioned these muscles are, the more support there is for the spine, which results in better balancing of the loads that the spine must carry during daily life.

Unfortunately, when people develop back pain, they have a tendency to want to avoid all types of exercise, and become more sedentary rather than more active. This can become a bit of a vicious cycle, because avoiding exercise when your back hurts causes the muscles of your back to become weaker and weaker, which makes them even more susceptible to injury.

This is not to say that you need to run a marathon the day after you strained your back while moving into your new home. However, as manual osteopaths have learned more and more about the causes and treatment of acute back pain, they have prescribed shorter and shorter periods of rest immediately after developing a back strain. In the past, people used to be advised to spend a significant amount of time in bed, waiting for their back to feel better. Today, manual osteopaths recognize that the best treatment for a back sprain or strain is early mobilization and a relatively rapid return to normal activities. Most doctors of osteopathy recommend a brief period of rest, generally one or two days, during which most patients are advised to take a course of anti-inflammatory medications in order to help reduce the pain and inflammation. After this period of rest, it is generally advisable to return to your normal activities and also begin gently exercising, especially walking or swimming, in order to stretch out your muscles and help them to recover. As soon as possible, you should restart your regular exercise regime, especially those exercises that have been specifically designed to help stabilize the trunk and spine.



## EXERCISES FOR THE SPINE

In addition to regular cardiovascular exercise, the American Academy of Orthopaedic Surgeons has also recommended a series of exercises that have been specifically chosen in order to help strengthen and condition the muscles that support the spinal column. These exercises can be done at home, and they do not require any special exercise equipment.

The primary goals of an exercise program for your spine are to make the muscles of your back, stomach, hips and thighs strong and flexible. These exercises should be incorporated into an overall program of aerobic conditioning such as walking, bike riding, swimming, or jogging. Before beginning any exercise program, check with your doctor to make sure that there are no other medical considerations that would change your approach to the exercise program. If exercise is new to you, then consider working with a certified personal trainer who can help you develop an exercise program that will meet your goals.

Low Back Exercise Guide: Regular exercises to restore the strength of your back and a gradual return to everyday activities are important for your full recovery. Your manual osteopath may recommend that you exercise 10 to 30 minutes a day one to three times a day during your early recovery. They may suggest some of the following exercises. This guide can help you better understand your exercise and activity program, supervised by your therapist and orthopaedic surgeon.

<b>Initial Exercise Program</b>
<b>Ankle Pumps</b> —Lie on your back. Move ankles up and down. Repeat 10 times.
<b>Heel Slides</b> —Lie on your back. Slowly bend and straighten knee. Repeat 10 times.
<b>Abdominal Contraction</b> —Lie on your back with knees bent and hands resting below ribs. Tighten abdominal muscles to squeeze ribs down toward back. Be sure not to hold breath. Hold 5 seconds. Relax. Repeat 10 times.
<b>Wall Squats</b> —Stand with back leaning against wall. Walk feet 12 inches in front of body. Keep abdominal muscles tight while slowly bending both knees 45 degrees. Hold 45 seconds. Slowly return to upright position. Repeat 10 times.
<b>Heel Raises</b> —Stand with weight even on both feet. Slowly raise heels up and down. Repeat 10 times.
<b>Straight Leg Raises</b> —Lie on your back with one leg straight and one knee bent. Tighten abdominal muscles to stabilize low back. Slowly lift leg straight up about 6 to 12 inches and hold 1 to 5 seconds. Lower leg slowly. Repeat 10 times.
<b>Intermediate Exercise Program</b>
<b>Single Knee to Chest Stretch</b> —Lie on your back with both knees bent. Hold thigh behind knee and bring one knee up to chest. Hold 20 seconds. Relax. Repeat 5 times on

each side.

**Hamstring Stretch**—Lie on your back with legs bent. Hold one thigh behind knee. Slowly straighten knee until a stretch is felt in back of thigh. Hold 20 seconds. Relax. Repeat 5 times on each side.

**Lumbar Stabilization Exercises with Swiss Ball**—Abdominal muscles must remain contracted during each exercise. See "Abdominal Contraction" exercise from initial exercise program. Perform each exercise for 60 seconds. The further the ball is from your body, the harder the exercise.

1. Lie on your back with knees bent and calves resting on ball.
2. Slowly Straighten one leg contracting your abdominal muscles at the same time.
3. Hold for 20 seconds.
4. Relax.
5. Repeat 5 times on each side.

**Standing with Ball between Your Low Back and the Wall**—Slowly bend knees 45 to 90 degrees. Hold 45 seconds. Straighten knees.

**Lie on your Stomach over Ball**

1. Slowly raise both legs.
2. Hold for five seconds.
3. Relax.
4. Repeat 10 times.

**Advanced Exercise Program**

**Hip Flexor Stretch**—Lie on your back near edge of bed, holding knees to the chest. Slowly lower one leg down, keeping knee bent, until a stretch is felt across top of the hip/thigh. Hold 20 seconds. Relax. Repeat 5 times on each side.

**Piriformis Stretch**—Lie on back with both knees bent. Cross one leg on top of the other. Pull opposite knee to chest until a stretch is felt in the buttock/hip area. Hold 20 seconds. Relax. Repeat 5 times each side.

**Lumbar Stabilization Exercises with Swiss Ball**—Lie on stomach over ball.

1. "Walk" hands out in front of ball until ball is under legs. Reverse to starting position.
2. "Walk" hands out in front of ball until ball is under legs and slowly raise alternating arms over head.
3. "Walk" hands out in front of ball and slowly perform push-ups.

**Aerobic Exercises**—Maintain spine in neutral position while stabilizing with abdominal

muscles to protect the low back during aerobic exercise.

1. Stationary bike for 20 to 30 minutes.
2. Treadmill for 20 to 30 minute.

## **LIFTING TECHNIQUES**

Lifting doesn't have to be a dangerous proposition, even when it's done regularly at work or at home. As long as we know the facts about correct lifting and bending techniques, you can protect your back from unnecessary added stress and possible injury.

Everyone puts a lot of stress on their backs every day from the process of bending and lifting, even those people who don't have a job that requires frequent heavy lifting. Think of how many times a day we bend down to pick something up: laundry, our pet, a piece of paper, etc. Continued bad form when lifting, even something small, can cause unneeded stress on your back and make it more prone to injury.

There are two common mistakes made in lifting. The first is using the wrong muscles, the back muscles, instead of the leg and buttock muscles. We should always bend our knees when lifting heavy objects so we have a solid foundation for our spine. We should keep our trunk vertical when bending down and lifting something. A horizontal trunk can put pressure on the lower back amounting to hundreds of extra pounds. This pressure can eventually compromise a disc or sprain or strain a back muscle.

The second common error is lifting an object too far from the body. Get close to what it is being lifted. It decreases the pressure on our spine. Try to start with the center of the weight no more than 8 inches from the body, then lift the object with a straight back using the leg and buttock muscles. These are simple principles that will help us minimize injury to our back when lifting.

The heavier the object, the shorter distance it should be lifted. If the object must be lifted higher, assistance or a machine should be utilized. In the case of mandatory occupational lifting, positions or loading platforms should be adjustable to the height of different people. Try not to reach when lifting items higher than chest level. Lifting objects higher than chest level puts considerably more stress on your lower back. When lifting items above the head, make sure to use a stool or a ladder.

Another important guideline to follow, is to limit twisting when lifting. This adds more force to your back. If you must turn when lifting, pivot your feet instead of twisting your back. In addition, always be sure of your footing. A sudden change in footing or a trip can cause enormous amounts of added stress on the back.

Another problem with lifting is fatigue. The more you bend and lift, the more fatigued your muscles become. When muscles are fatigued they are more prone to injury. Frequent breaks when lifting are preferable to help rejuvenate strength.

Always use both hands when lifting and lift slowly and deliberately. The ideal situation is to have someone or something to help you when lifting, but if that is not possible, follow all the above listed guidelines to minimize your risk of injury.

## **HELPFUL DOS AND DON'TS**

### **Don'ts**

- Don't lift things when your feet are too close together. If your feet are closer than shoulder width you'll have poor leverage, you'll be unstable, and you'll have a tendency to round your back.
- Don't lift with your knees and hips straight and your lower back rounded. This is the most common and stressful bad lifting move. Twisting the trunk during this bad move compounds the problem.
- Don't tense and arch the neck when lifting. This crams your neck joints together and causes pain especially if maintained for a long period of time.
- Don't lift and/or carry an unbalanced load.
- Don't lift and bend too much in a short period of time.
- Don't lift objects that are too heavy for you.
- Don't lift heavy objects directly following a sustained period of sitting, especially if you have been slouching.
- Don't lift things overhead with your neck and back arched, if possible.

### **Dos**

- Do place your feet and knees at least shoulder width apart or front to back in a wide-step position. This will help you bend at the hips, keeping your back relatively straight and stress free.
- Do lean over or squat with the chest and buttocks sticking out. If you do this correctly, your back will be flat and your neck will balance in a relaxed neutral position.
- Do take weight off one or both arms if possible. When you squat down or push back up, use your hand or elbow as support on your thigh or any available structure. This takes some of the compression and strain off of the lower back.
- Do balance your load on either side if possible, or switch sides so that both sides are equally stressed.
- Do level the pelvis or tuck in your buttocks and suck in your abdomen, when reaching or lifting overhead. Keep your chest up and use a step stool to keep the low back and neck in neutral alignment.
- Do walk around and use backward-bending and/or stomach-lying positions before or after bending or heavy lifting, especially if you've been sitting for a while.

If you experience any of the following symptoms, contact a doctor immediately:

- Pain is worse when you cough or sneeze
- Pain or numbness travels down one or both legs
- Pain awakens you from sleep
- You are finding it difficult to pass urine or have a bowel movement
- Pain is accompanied by loss of control of urination or bowel movements

These important symptoms could signal nerve damage or other serious medical problems. There are many other conditions that could be causing these problems, but an early and accurate diagnosis is vital for successful treatment.

## TREATMENT OPTIONS

### Home Or Hospital?

The first step is to assess the severity and cause of your acute back pain to determine whether you need to see a physician. Consult a physician immediately if you:

- Are experiencing numbness in, or having difficulty moving, your extremities
- Experience bladder control loss or impairment
- Develop a fever or severe headache
- Are over 60 and have been taking steroids for a long period of time
- Experience chest pain or pain in the left arm
- Are pregnant
- Do not experience any improvement after 72 hours of self-treatment at home

### Home Remedies

If you're not experiencing any of the above symptoms, there are several things you can do at home to help soothe your sore back:

### Bed Rest Isn't Best

Going about your normal, everyday activities—but perhaps at a slower pace, and definitely avoiding what may have caused your pain in the first place—is a good way to start the healing process. A little "couch time" won't hurt, but light activity speeds recovery, so avoiding lying down for long periods of time.

### Hot And Cold

Heat and cold, in the form of a hot bath or hot and cold compresses, can help relieve sore and inflamed muscles and tissue. Remember—cold comes first! Wrap an ice pack (or a bag of frozen vegetables) in a thin cloth to avoid frostbite, and apply to the affected area for up to 20 minutes several times a day. Ice slows inflammation and swelling, numbs tissue and slows nerve impulses to the injured area.

Once the acute pain and muscle spasms subside (about 48 hours after the first onset of pain is recommended), you can apply heat—to loosen muscle tightness - by taking a warm bath or using a heating pad, heat pack or heat lamp.

### Pain Relief In A Pill

Non-steroidal anti-inflammatory drugs, such as aspirin, ibuprofen, acetaminophen or naproxen sodium, can ease pain, swelling and stiffness. There are a number of over-the-counter and prescription options. Your pharmacist can help you determine which is best for you.

### Support Yourself

If you must sit or stand for long periods of time, consider using a brace or corset. Worn properly, they can relieve pain and provide warmth, comfort and support. But, don't rely on this type of external support too long—allowing it to perform your muscles' job will eventually weaken them, making re-injury easier.

If your back pain hasn't improved noticeably after 72 hours of self-care, contact your manual osteopath.

## **PREVENTING RE-INJURY**

To prevent re-injury of your back—and hopefully avoid any recurrence of acute back pain—it's important to build and maintain the strength and flexibility of those muscles, tendons and ligaments that support your back and spine. You can do this through:

### **Exercise**

- Regular, low impact cardiovascular exercises that don't jar your back and are easy on the joints, such as bicycling, walking or swimming. If exercising outdoors is not option, consider using a treadmill, elliptical trainer or stationary bicycle. These can be found at almost any exercise studio, or you can buy a home version at your local sporting goods store.
- Core strengthening exercises. By conditioning your abdominal and back muscles, you can develop a "natural corset" to support your spine.
- Gentle stretching to improve and maintain flexibility.

### **A Healthy Lifestyle**

- Eat a nutrient-rich, balanced diet, with sufficient intake of calcium, Vitamin D and phosphorus. (Phosphate makes up more than half the mass of bone mineral; Vitamin D helps maintain appropriate calcium/phosphorus levels. When phosphorus is too high, the body takes calcium out of the bones to bind with the phosphorus and remove it from the blood. Bones become brittle as a result.)
- Avoid smoking and excessive alcohol use.
- Maintain a healthy weight— additional pounds place excess strain on spinal vertebrae and discs.
- Stay well-hydrated. The body is 70% water, and sufficient hydration contributes to intervertebral disc health and that of other back related structures and functions.
- Get your vision checked. Poor vision can affect the way you carry yourself, which can contribute to back problems.

### **Proper Body Mechanics**

#### **When Standing**

- Place feet shoulder width apart, don't lock your knees;
- Avoid arching your lower back or slumping your upper back and shoulders;
- Keep your breastbone up, shoulder blades down;
- Keep your chin level, relax jaw and neck muscles.



## **When Sitting**

- Rest your feet on floor with knees and hips bent 90 degrees;
- Maintain a neutral arch in your lower back;
- Keep your breastbone up, shoulder blades down;
- Keep your chin level, relax jaw and neck muscles.

## **When Driving**

- Adjust your seat so that the back is vertical. Your back should be supported by the seat back and your head should rest against headrest with your chin level;
- Knees should be bent, and at least at the same height as your hips;
- Elbows should be slightly bent and relaxed, with your shoulders down.

## **When Sleeping**

- Use a firm mattress. Placing a board between the mattress and box spring can provide a temporary fix for one that is sagging.
- Lie on your back or side. When lying on the side, a pillow between the knees helps maintain a neutral spine.
- Use a cervical roll (a foam roll approximately 3 inches in diameter and 18 inches long) to support the natural curves in your neck or low back.

## **HOW TO AVOID GIVING UP?**

Most people who start a regular exercise program give it up after a short period of time. While there are a lot of reasons that they choose to stop exercising regularly, they often boil down to a few simple reasons. It is often hard to find the time to exercise, the motivation to get out there starts to slip after a while, and it's easy to slip back into old routines. In order to avoid this from happening to you, here a few simple suggestions:

### **Find ways to incorporate exercise into your daily routine.**

Ride your bike to work once a week. If you can't ride your bike to work, park in the farthest parking spot possible and walk around the building once before starting your day. Take the stairs. The amount of exercise that simple modifications to your daily routine like these add up to over the course of a year can be very impressive. Once you start this type of a routine, it is often easier to stick with than the idea of driving to the gym for half an hour everyday after work.

### **Find a partner and create common goals.**

When your motivation starts to slip, having a partner who will drag you outside can be a lifesaver. This type of a partnership is often better if you have similar goals in terms of

weight loss, healthy eating habits, and the amount of exercise that you want to work up to. Chose someone who lives close by, perhaps even your spouse, and write your goals down. Put specific dates and amounts in your plan for increasing the amount of exercise that you want to do together. Think of ways to reward yourselves when you meet your goals, and write them down.

**If all else fails, pay someone else to motivate you.**

Personal trainers have become very popular, and the primary reason is that they keep track of your progress, give you lots of encouragement, and they schedule your workouts for you. While they can be intimidating at first, since many of them are impossibly fit young specimens in tight shorts and a tank top, they can be an incredible resource. Find one that you like, pay for a couple of months up front, and you'll be amazed at how much progress you'll make over time.

OUTLINES FOR BIOMECHANICS OF BACK PAIN AT National Academy of Osteopathy: by  
Dr. Abazar Habibinia, MD. Feb 2011

THE BIOMECHANICS OF BACK PAIN by Michael Adams, Nikolai Bogduk, Kim Burton,  
Patricia Dolan