

# **Degenerative Disc Disease**

## **A Patient's Guide to Degenerative Disc Disease**

### **Introduction**

Many of the problems in the spine are caused because of the process of degeneration of the intervertebral disc. Everything you do during the day - once you stand upright - begins to test the spine's ability to support your body weight.

Over time, these repeated daily stresses and minor injuries can add up and begin to affect the discs in your spine. Minor injuries to the disc may occur and not cause pain at the time of the injury.

However, as they add up, the disc eventually begins to suffer from the wear and tear - it begins to degenerate.

The purpose of this information is to help you understand:

- The anatomy of the spine relating to degenerative disc disease
- The causes and symptoms of lumbar degenerative disc disease
- How the condition is diagnosed
- The treatments available for treatment of the condition

### **Anatomy**

In order to understand your symptoms and treatment choices, you should start with an understanding of the general anatomy of your lumbar spine (lower back). This includes becoming familiar with the various parts that make up the spine and how these parts work together.

### **Causes**

With degenerative disc disease, the main problem lies within one or more of the intervertebral discs. There is a disc between each of the vertebra in your spine. The intervertebral discs are designed to absorb pressure and keep the spine flexible by acting as cushions during body movement. The discs are similar to shock absorbers. Without the cushion effect of the discs, the vertebrae in your spine would not be able to absorb stresses, or provide the movement needed to bend and twist. Bones cannot sustain high stress repeatedly without being damaged. Much of the mechanical stress of everyday movements is transferred to the discs.

A healthy intervertebral disc has a great deal of water in the nucleus pulposus - the center portion of the disc. The water content gives the nucleus a spongy quality and allows it to absorb spinal stress. Excessive pressure or injuries to the disc can cause the injury to the annulus - the outer ring of tough ligament material that holds the vertebrae together. Generally, the annulus is the

first portion of the disc that seems to be injured. Small tears show up as in the ligament material of the annulus. These tears heal by scar tissue. The scar tissue is not as strong as normal ligament tissue. Over time, as more scar tissue forms, the annulus becomes weaker. Eventually this can lead to damage of the nucleus pulposus. The nucleus begins to lose its water content due to the damage - it begins to dry up.

Because of water loss, the discs lose some of their ability to act as a cushion. This can lead to even more stress on the annulus and still more tears as the cycle repeats itself. As the nucleus loses its water content it collapses, allowing the two vertebrae above and below to move closer to one another. This results in a narrowing of the disc space between the two vertebrae. As this shift occurs, the facet joints located at the back of the spine are forced to shift. This shift changes the way the facet joints work together and can cause problems in the facet joints as well.

Bone spurs, sometimes called osteophytes, may begin to form around the disc space. These bones spurs can also form around the facet joints. This is thought to be due to the body's response to try to stop the excess motion at the spinal segment. The bone spurs can become a problem if they start to grow into the spinal canal and press into your spinal cord and nerves. This condition is called spinal stenosis.

## **Symptoms**

The most common early symptom of degenerative disc disease is usually pain in the back that spreads to the buttocks and upper thighs. When back specialists refer to degenerative disc disease, they are usually referring to a combination of problems in the spine that "start" with damage to the disc, but eventually begin to affect all parts of the spine.

For now, we will discuss problems thought to arise from the degenerating disc itself.

## **Discogenic Pain**

Discogenic pain is a term back specialists use when referring to pain caused by a damaged intervertebral disc. A degenerating disc may cause pain of the mechanical type. As the disc begins to degenerate, there is some evidence that the disc itself becomes painful. Movements that place stress on the disc can result in back pain that appears to come from the disc. This is similar to any other body part that is injured, such as a broken bone, or even a cut in the skin. When these types of injuries are held still there is no pain. However, if you move a broken bone, or the skin around a cut, it causes pain.

Discogenic pain usually causes pain felt in the lower back. It may also feel like the pain is coming from your buttock areas and even down into the upper thighs. The experience of feeling pain in an area away from the real spot causing the pain is common in many areas of the body, not just the spine. Examples include: a person who has gallstones may feel the pain in their shoulder; or a person experiencing a heart attack may feel pain in the left arm. This is referred to as radiation of the pain. It is very common for pain produced by spine problems, such as disc problems, to be felt in different areas of the body, including the back itself.

## **Bulging Disc**

Bulging discs are fairly common in both young adults and older people. They are not cause for panic. In fact, abnormalities that show up on MRIs, such as bulging or protruding discs, are seen at high rates in patients both with and without back pain. Most likely, some discs begin to bulge as a part of both the aging process, and the degeneration process of the intervertebral disc. A bulging disc is not necessarily a sign that anything serious is happening to your spine.

A bulging disc becomes important when it bulges enough to cause narrowing of the spinal canal. If there are bone spurs present on the facet joints behind the bulging disc, the combination may cause narrowing of the spinal canal in that area. This is sometimes referred to as segmental spinal stenosis.

## **Diagnosis**

Before a health care professional can diagnose your condition and design a treatment plan, a complete history and physical examination are necessary. There are so many possible internal causes of pain; it is important to determine what is and is not the root of the problem. After the physician has a better idea of what is causing your discomfort, diagnostic tests of some sort may be recommended.

## **History**

First, you will be asked for a complete physical history of your condition. This may begin by filling out a written form that asks you a number of questions relating to your pain. The more information you share with your provider, the easier your problem will be to diagnose. Your physical history is important because it helps your doctor understand: when the pain began, anything that could have caused an injury, your lifestyle, physical factors that might be causing the pain, and any family history of similar problems. After reading through your written history, your physician will ask more questions that relate to the information you have given. Some typical questions include:

- When did the pain begin?
- Was there an injury that could be related to the pain?
- Where do you feel the pain? What is the intensity?
- Does the pain radiate to other parts of the body?
- What factors make the pain feel better or worse?
- Have you had problems with your bladder or bowels?
- Is there a history of osteoporosis in your family

## **Physical Examination**

After taking your history, the doctor will give you a physical examination. This allows the doctor to rule out possible causes of pain and try to determine the source of your problem. The areas of your body that will be examined depend upon where you are experiencing pain - neck, lower back, arms, legs, etc. The following are some of the things that are checked in a typical exam:

- Motion of Spine and Neck - Is there pain when you twist, bend, or move? If so, where? Have you lost some flexibility?
- Weakness - Your muscles will be tested for strength. You might be asked to try to push or lift your arm, hand, or leg when light resistance is put against them.
- Pain - The doctor may try to determine if you have tenderness of certain areas.
- Sensory Changes - Can you feel certain sensations in specific areas of the feet or hands?
- Reflex Changes - Your tendon reflexes might be tested, such as under the kneecap and under the Achilles tendon on your ankle.
- Motor Skills - You might be asked to do a toe or heel walk.
- Special Signs - The physician will also check for any "red flags" that could indicate something other than spinal/vertebrae problems. Some signs of other problems include: tenderness in certain areas, a fever, an abnormal pulse, chronic steroid use (leads to loss of bone mass), or rapid weight loss.

## **Diagnostic Tests**

You may be asked to take a variety of diagnostic tests. The tests are chosen based upon what your physician suspects is the cause of your pain. The most common diagnostic tests used to diagnose degenerative disc disease are probably ordinary X-rays and the MRI scan.

### **X-rays**

An X-ray is a painless process that uses radioactive materials to take pictures of bone. If your doctor suspects vertebral degeneration, X-rays can be used to verify: a decrease in the height of space between discs, bone spurs, nerve bundle sclerosis (hardening), facet hypertrophy (enlargement), and instability during flexion or extension of limbs. X-rays show bones, but not much soft tissue, so they will definitely be used if fractures, infections, or tumors are suspected.

During X-rays, you will be asked to lie very still on a table and hold certain positions while pictures are taken of your spine.

### **MRI Scan (Magnetic Resonance Imaging)**

The MRI scan is a fairly new test that does not use radiation. By using magnetic and radio waves, the MRI creates computer-generated images. The MRI is able to cut through multiple layers of the spine and show any abnormality of soft tissues, such as nerves and ligaments. The test also can be used to verify: loss of water in a disc, facet joint hypertrophy (enlargement), stenosis (narrowing of spinal canal), or a herniated disc (protrusion or rupture of the intervertebral disc).

During an MRI test, you lie on a table that slides into a machine with a large, round tunnel. The machine's scanner then takes many pictures that are watched and monitored by a technician. Some newer MRI machines, called Open MRIs, are likely to be more comfortable for patients who experience claustrophobia. The procedure takes 30-60 minutes. Additional tests are sometimes used to further understand what is causing your back pain.

## **Treatment**

On your first visit to a back specialist, the initial decision that must be made is exactly how serious the problem is. Some problems need immediate attention - possibly even surgery. However, the vast majority of back problems do not require surgery. Once the most likely cause of your problem has been determined (your diagnosis has been made), you and your health care provider can decide on a treatment plan.

A variety of treatment options exist for different types of back pain. In most cases, simple therapies such as mild pain medications and rest are effective in relieving the immediate pain. The overall goal of treatment is: to make you comfortable as quickly as possible, to design a program to reduce further degeneration, and to get you back to normal activity in a timely manner. The more you know about how your back works and what you can do to prevent further injury, the more effective your program will be. Below are descriptions of the most common forms of treatment, along with a brief explanation of what each is designed to do.

### **"Conservative" Treatment**

Back specialists often use the term "conservative treatment" to describe any treatment option that does not involve surgery. Therefore, you may hear, or read in your records, that your provider is recommending a course of conservative treatment for your back problem. Treatment for your back problem may be as simple as reassuring you that it is not a serious problem, and doing nothing but watching and waiting. However, usually anyone who has a back problem that becomes symptomatic should consider some preventive measures. This usually means that you need to learn more about how to protect your back and consider beginning exercises to strengthen your back. These exercises can be quick and easy to do, do not require any special equipment, and can help prevent future problems.

A variety of treatment options exist for back pain that results from degeneration (wear and tear) on the parts of the spine. In most cases, simple therapies such as mild pain medications and rest are effective. The goal of treatment is to make you feel comfortable, reduce further degeneration, and get you back to normal activity as quickly as possible. As a last resort, and only if all other conservative treatments fail, surgery might be considered.

### **Specific Rest**

Immediately after a back injury, rest is often all your back needs to feel better. Rest is used to take the pressure off your spine and the muscles around it. You should rest in a comfortable position on a firm mattress. Placing a pillow under your knees can also help relieve pain. Do not stay in bed for several days! Bed rest for more than two or three days can weaken the back

muscles, making the problem worse instead of better. Even though you may still feel some pain, a gradual return to normal activities is good for your muscles. In most cases of sudden back pain, the sooner you start moving again, the sooner your back pain will improve. If you are sent to see a physical therapist, the first few days may be spent educating you on ways to take stress off the back, while remaining as active as possible. Short periods of rest combined with brief exercises designed to reduce your pain may be suggested.

## **Medications**

Mild pain medications can reduce inflammation and pain when taken properly. Medications will not stop degeneration, but they will help with pain control.

### **Aspirin**

Aspirin compounds are over-the-counter pain relievers that can help relieve minor pain and back ache. The main potential side effect of aspirin is the development of stomach problems, particularly ulcers with or without bleeding. You should not take aspirin if you are pregnant. In fact, you should not take any medication unless you have discussed it with your obstetrician.

### **NSAIDs (Non-Steroidal Anti-Inflammatory Drugs)**

NSAIDs include over-the-counter pain relievers such as ibuprofen or naproxen. These medications were once only available by prescription. NSAIDs are very effective in relieving the pain associated with muscle strain and inflammation. They block the inflammatory response in joints. However, be aware that NSAIDs can decrease renal function if you are an older patient. Excessive use can lead to kidney problems. Again, do not take them if you are pregnant.

### **Non-narcotic Prescription Pain Medication**

Non-narcotic analgesics (the term analgesics means "pain relievers") address pain at the point of injury. Analgesics are ideal in the treatment of mild to moderate chronic pain. Tylenol and aspirin are the most widely used over-the-counter analgesics. Analgesics that require a prescription from the doctor include NSAIDs such as: carprofen, fenoprofen, ketoprofen, and sulindac. To reduce any side effects: do not lie down for 15 to 30 minutes after taking medication, avoid direct sunlight, wear protective clothing, and use sun block. Avoid using these medications if you are pregnant, have recurrent ulcers, or liver problems.

### **Narcotic Pain Medications**

If you experience severe pain, your health provider might prescribe a narcotic pain medication such as codeine or morphine. Narcotics relieve pain by acting as a numbing anesthetic to the central nervous system. The strength and length of pain relief differs for each drug. Narcotics can cause related side effects such as nausea, vomiting, constipation, and sedation or drowsiness. These side effects are predictable and can often be prevented. Common preventative measures include: not taking sleeping aids or antidepressants in conjunction with narcotics, avoiding alcohol, increasing fluid intake, eating a high fiber diet, and using a fiber laxative or stool

softener to treat constipation. Remember that narcotics can be addictive if used excessively or improperly.

### **Muscle Relaxants**

If you are having muscle spasms, muscle relaxants can help relieve pain, but they are only shown to be marginally effective. They also have a significant risk of drowsiness and depression. Long-term use is not suggested; only three to four days is typically recommended.

### **Antidepressants**

Back pain is actually a common symptom of depression and could be an indicator of its presence. Antidepressants can relieve emotional stress that leads to symptoms of back pain. An important fact to note - it seems that the same chemical reactions in the nerve cells that trigger depression also control the pain pathways in the brain. Some antidepressant medications seem to reduce pain, probably because they affect this chemical reaction in the nerve cells. Some types of antidepressants also make rather good sleeping medications. If you are having trouble sleeping due to your back pain, your doctor may prescribe an antidepressant to help you get back to a normal sleep routine. Antidepressants can have several side effects such as: drowsiness, loss of appetite, constipation, dry mouth, and fatigue.

### **Epidural Steroid Injections (ESI) - Nerve Blocks**

An ESI can be used to relieve the pain of stenosis and irritated nerve roots, as well as to decrease inflammation. Injections can also help reduce swelling from a bulging or herniated disc. The steroid injections are a combination of cortisone (a powerful anti-inflammatory steroid) and a local anesthetic that are given through the back into the epidural space. Epidural steroid injections are not always successful in relieving symptoms of inflammation. They are used only when conservative treatments have failed.

### **Physical Therapy**

If physical therapy is recommended, your treatment plan could include one or more types of therapy:

- Modalities - alternating heat and ice, massage, ultrasounds, and electric stimulation
- Bracing - ranging from a simple corset to a rigid plastic body jacket
- Flexibility and Strength Training - this is achieved through exercises, posture retraining, stretching, etc.
- Pool Therapy - unloads spinal pressure because of the decrease in gravity provided by the water
- Posture Training - learning how to stand, sit, and move properly; incorrect posture can contribute to back pain

## **Exercise**

Exercise is vital to recovery and to maintaining a healthy spine. Consider it part of long-term health management and risk reduction. Regular exercise is the most basic way to combat back problems. However, if you already have an injury or damage to the spine, talk to your doctor or physical therapist before you start an exercise routine. You need to make sure the exercises you choose are effective and safe for your particular case.

Why exercise? Scientific studies have shown that people who exercise regularly have far fewer problems with their back. It helps strengthen the muscles in your back that correspond with your spine. It can reduce your risk of falls and injuries. It can strengthen your abdomen (your belly), arms, and legs, which reduces back strain. Stretching reduces risk of muscle spasms. In addition, weight bearing exercises help prevent loss of bone mass caused by osteoporosis, reducing your risk of compression fractures. Aerobic exercise, the type that gets your heart pumping and pulse rate up, has been shown to be a good pain reliever as well. The natural chemicals of the body that combat pain - called endorphins - are released during exercise and actually reduce your pain.