



Spine SECRETS

Is bedrest helpful for degenerative disc disease?

Bed rest in the past was the mainstay, but recent literature suggests patients are better off doing as many activities as tolerable.

What is the most important tool to assess lower back pain?

The history provides the best avenue to a diagnosis of degenerative disc disease.

Be aware of the **red flags**: fever, unexplained weight loss, significant trauma, severe osteoporosis, cancer history, or alcohol or drug abuse.

Back TALK

Physical therapy can be effective as a conservative treatment for degenerative disc disease.

- Increasing core stability through lumbar and abdominal strengthening is an essential component.
- Aqua therapy and physio balls provide excellent means for increasing strength while having less weight bearing through an already sore back.
- Lumbar range of motion should also be addressed. Typically, the patient performs exercises in the direction opposite of the aggravation.
- Gentle mobilizations and manual therapy may be incorporated to help with any hypomobility issues the patient may have.
- Modalities, such as ultrasound or electrical stimulation, can also help decrease any soft tissue dysfunctions that may be involved.
- Hamstring and iliopsoas flexibility should also be assessed.

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Degenerative Disc Disease



Back pain is the second leading cause for individuals to visit health care professionals. The debilitating result of symptomatic back pain is the primary reason for limited activity in people younger than 45 years old and is evident in 60% of people performing heavy labor and 50% of people involved in light physical activity. The annual incidence of back pain is 5% and has a prevalence of 60% to 90% throughout the life span. Furthermore, back pain results in \$30 to \$50 billion in medical costs annually in the United States. Although the statistics of back pain are overwhelming, the most important statistic is that less than 1% of patients with low back pain require surgery. Therefore, with the proper diagnosis and treatment plan, patients will recover successfully.

How does degenerative disc disease occur?

The intervertebral discs are essential for the proper movement and stability of the spine. The discs represent 30% of the entire height of the spine and consist of an outer annulus fibrosus, an inner annulus fibrosus, and a central nucleus pulposus. The discs are composed of collagen, proteoglycans, connective tissue, and water. As the body ages and is continually stressed, the discs begin to wear. Metabolic changes around the disc cause a decrease in blood supply and diffusion, resulting in a loss of water content. The loss of water and proteoglycan content causes abnormal pressure on adjacent components of the spine. The facet joints, sacroiliac joints, and adjacent disc levels can all begin to deteriorate with the advent of disc degeneration. Another portion of the degeneration cascade is the inflammatory response of the nucleus pulposus. Recent studies have discovered high levels of proinflammatory mediators in degenerated discs. These biochemical factors of degenerated discs can be accelerated by the risk factors of patients.

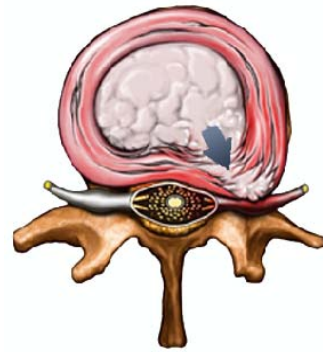
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Leading Cause of Back Pain

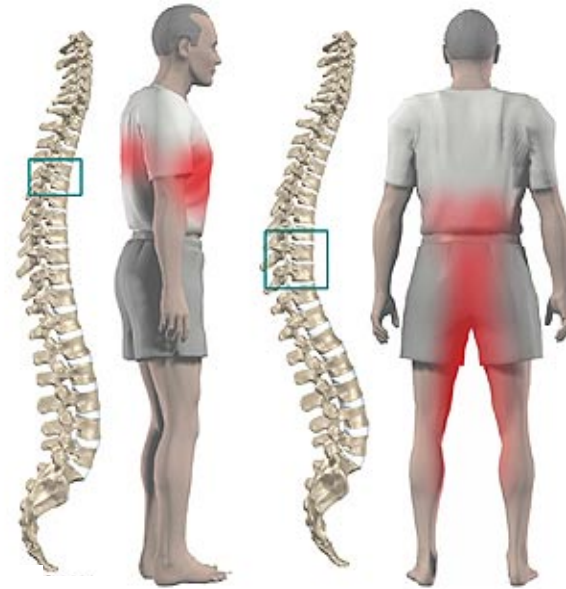


Degenerative disc disease has been linked to three major risk factors. The most important factor in the development of the disease is genetics. One study concluded 74% heritability in twins and other studies have discovered genes encoding polypeptide chains for the collagen IX produced in

discs. Obesity is another known risk factor because of the increased compressive stress on the intervertebral discs. Lastly, smoking increases the risk of degenerated discs because nicotine limits oxygenation to the tissues of the disc, inhibits osteoblastic function, slows bone metabolism, and limits cellular exchange. In addition, although weight-bearing exercises have been speculated to be a risk factor, recent studies have concluded that exercise alone is not a risk factor and may actually protect the discs from degeneration.

How is degenerative disc disease diagnosed?

The multitude of symptoms and disease patterns associated with back pain can make diagnosis difficult. The patient with degenerative disc disease will present with pain that occurs daily and is exacerbated by weight bearing in the standing or sitting position and is relieved by bed rest. Transient radicular symptoms may be present, but is not consistent with all patients. Neurological examinations are generally normal with no deviations in motor, reflex, or sensory tests. Range of motion may be limited in extension and flexion because of stress on the disc. One simplistic, diagnostic question for patients to answer is the length of comfortable standing or sitting without fidgeting. The physical examination and clinical history of a patient with back pain should also be used to rule out serious disorders. Red flags include weight loss, night pains, fever, tenderness with percussion over the lower ribs (renal stones), palpable masses



in the abdomen (tumors or abdominal aortic aneurysm), and any progressive neurological symptoms. Also, psychological evaluation is important to discover the history of mental illness or narcotic abuse.

Diagnostic imaging is another vital portion of the diagnosis. Plain radiographs should be the initial study including AP, flexion, and extension views. Loss of disc height and degeneration of adjacent bony segments can be discovered with this method. Next, MRI can be used to clearly investigate the disc including height, integrity, and inflammatory changes. Finally, discography is an invasive, investigative technique that can be used in preparation for surgery or to more clearly study the intervertebral discs. Discograms can be used to determine whether or not a disc is generating the patient's pain.

What are the treatment options for degenerative disc disease?

Conservative treatment is generally initiated for a period of time because the majority of patients recover without the need for surgery. Physical therapy is an excellent form of treatment to strengthen the abdominal and lumbar musculature and create a more stable core. Bracing is typically not used in treating discogenic pain although special orthoses to

reduce the weight on the lumbar spine have been shown to be of therapeutic use. Chiropractic manipulation is indicated for treatment of acute low back pain, but has limited to no value with chronic back pain that lasts longer than twelve weeks. The use of traction has been beneficial in cervical disc degeneration, but is not supported with the lumbar spine. Lastly, anti-inflammatory medications and injections have been shown to be beneficial because of the inflammatory response of the nucleus pulposus.

If patients do not achieve the desired pain relief with conservative treatment, the appropriate option is surgery. The surgical approach centers on removal of the pain source. Therefore, the most common procedures for degenerative disc disease include discectomy with or without fusion. Microdiscectomy is often performed either with magnifying glasses or a microscope and is performed through a posterior approach. In fusion surgery, both anterior and posterior approaches are possible, but anterior interbody fusions have been found superior. The fusion rates have recently been increased with the addition of recombinant human bone morphogenetic protein (rh-BMP) to rates as high as 90% to 100%. Finally, artificial disc replacement surgery is now available to replace the disc and preserve motion. The initial results for this new surgical approach are positive, but long-term results are not available at this time.

What are the important points?

- The risk factors for degenerative disc disease are:
 - Genetics
 - Smoking
 - Obesity
- Patients with degenerative disc disease have daily back pain that is exacerbated by long periods of sitting or standing and relieved with bed rest
- Plain film radiography, MRI, and discograms are all beneficial in the diagnosis
- Conservative treatments include physical therapy, chiropractic manipulation (if acute),

and anti-inflammatory medications

- Surgical treatments include microdiscectomy, discectomy with fusion, and disc arthroplasty

References:

1. Spivak JM, Connolly PJ. Orthopaedic Knowledge Update: Spine 3. American Academy of Orthopedic Surgeons. Rosemont, IL 2006.
2. Devlin VJ. Spine Secrets: Questions and Answers Reveal the Secrets to Successful Diagnosis and Treatment of Spinal Disorders. Hanley and Belfus. Philadelphia, PA 2003.

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PHYSICIAN SPOTLIGHT

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Dr. McKenzie practices general orthopedics. He specializes in spine surgery, arthroscopic surgery, shoulder surgery, total joint replacement of the hips and knees, with a special interest in joint revision surgery. Dr. McKenzie graduated from the University of South Dakota School of Medicine and went on to complete his residency at Mayo Graduate School of Medicine. Dr. McKenzie joined Orthopedic Institute in 1996.

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