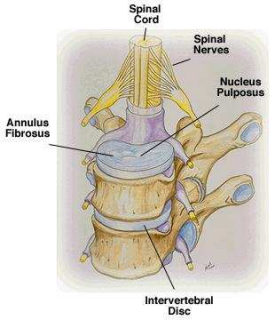
Degenerative Disc Disease

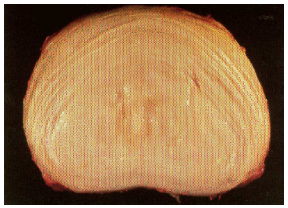
By Alan Colledge, MD and Chad Allred, PT,

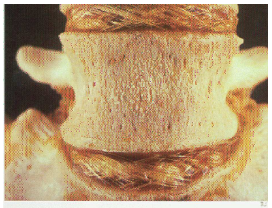
The term degenerative disc disease (DDD) refers to a condition affecting the discs and the facet joints of the spine that can be painful. Some confusion comes from the term degenerative, which implies that the spine is deteriorating or disintegrating. Degenerative disc disease is neither. It is analogous to gray hair and wrinkled skin of the spine. It is a natural process and is not necessarily related to chronic worsening back pain. Just as nobody awakes all of a sudden grey and wrinkled, the same with DDD, it is slow progressive condition. MRI scans have documented that approximately 30% of all 30 year olds have signs of DDD even thought they have no symptoms. By the age of 60, almost all have it. As with any chronic condition, proper education and understanding of the condition is imperative in that mostly what can be done, only patients can do.

The Source of Pain



The lumbar disc is comprised of three major components: the nucleus pulposus, annulus fibrosus and the vertebral end plate. The **nucleus** has a jelly like character. With degeneration, this material can be extruded and irritate the nerves mechanically with pressure and/or chemically with inflammation.

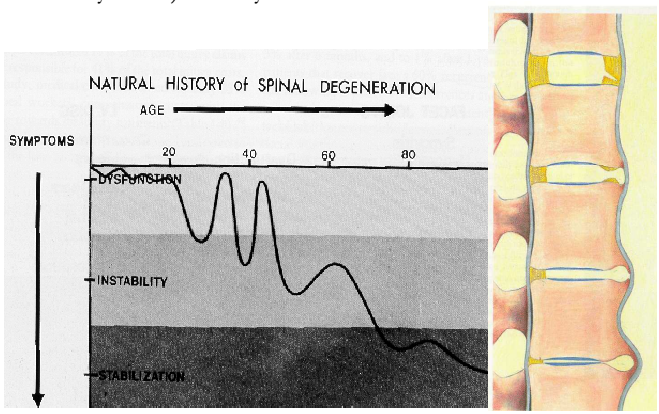




The **Annulus** forms a very tough fibrotic outer shell layer, much like a radial tire which encapsulates the nuclear jelly. The outer layers of the annulus has nerves and if damage occurs to the annulus, pain results.

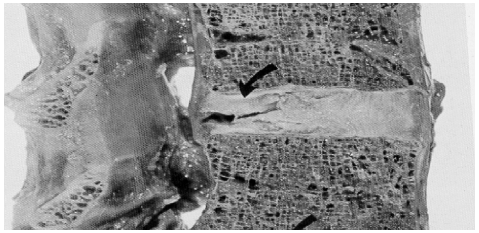
The Degenerative Cascade

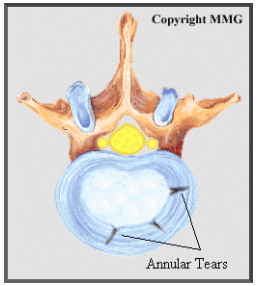
With time DDD follows a well known natural process of aging, referred to as the degenerative cascade as described by Kirkaldy-Willis. These phases include 1) dysfunction, 2) instability and 3) stability.



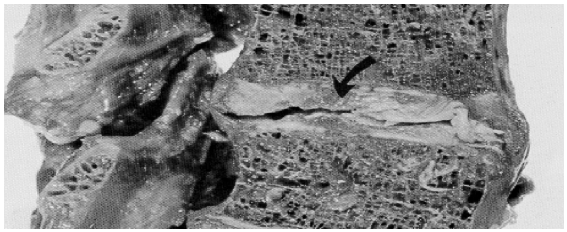
Natural History of Spinal Degeneration

1) Dysfunction: This typically occurs with cumulative trauma, where the forces exceed the tissue strength of the outer annulus, resulting in small painful tears. In response to these tears the muscles around the painful segment contract involuntary, called muscle spasm) to prevent the painful joint from moving. Gradually these muscles build up irritating lactic acid, causing further pain and more spasm.

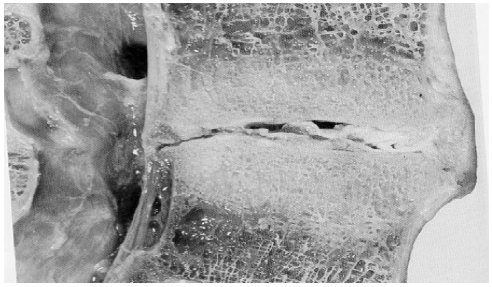




2) Instability: Just as a when a knee looses it's cartilage instability of joint occurs causing painful osteoarthritis. Because the outer annular fibers do not have ability to heal itself, with repeated use, the cascade progresses over time, just like the knee, from dysfunction into the unstable phase, creating mechanical or arthritic pain. This unstable phase can go on for several years.



3)Stability: As the arthritis advances, bone spurs form in the front of the vertebra and the vertebral space narrows. These



eventually bridge and fuse causing the spine to becomes stable.

Common Symptoms

The primary symptoms of DDD is central low back pain, which can be referred into the hip and posterior thigh. Prolonged activities such as sitting and standing can aggravate the symptoms requiring a frequent change positions and morning stiffness, which decreases with light activity. In severe cases of DDD pressure may be exerted on the nerve roots, which may cause radiating leg pain.

Imaging Studies

X-rays show **n**arrowing of the disc spaces that has occurred over time with eventual bone spurring.

MRIs show narrowing and darkening (desiccation) of the disc spaces, along with irregularities of the disc and the status of the nervous tissue.

Treatment

There are two types of treatment for DDD, conservative and surgery.

Conservative treatment includes the following:

Education: "The demons you know are easier to manage than those you don't." The term DDD can be very frightening and intimidating. Education helps to alleviate fears with the realization that DDD is a natural condition that all humans experience over time. It is expected that just as your ancestors accomplished all that they did with this condition, so should you. It is not going to be crippling or disabling. Individuals with DDD can carry on with a normal life albeit with some modifications.

Medication: Anti-inflammatory medications help to relieve pain and soft tissue swelling in and around the joints. Muscle relaxants and pain medication can be helpful in alleviating acute symptoms.

Activity modification: Certain activities can put too much strain on the joints and aggravate symptoms. Signs of overload following a certain activity include: pain that lasts for longer than 1-2 hours or significant worsening leg pain.

Weight reduction: Any increased weight will be loaded through the discs, which will aggravate symptoms and cause further problems. Weight management is critical for improved health.

Exercise: as with all of our musculoskeletal system, regular physical conditioning is critical to compensate for joint instability. This includes isometric, aerobic and dynamic strengthening. A physical therapist can help facilitate a your regular strengthening and endurance program for the supporting musculature.

Bracing and ergonomic supports can also be helpful in supporting the low back and taking strain off of the joints.

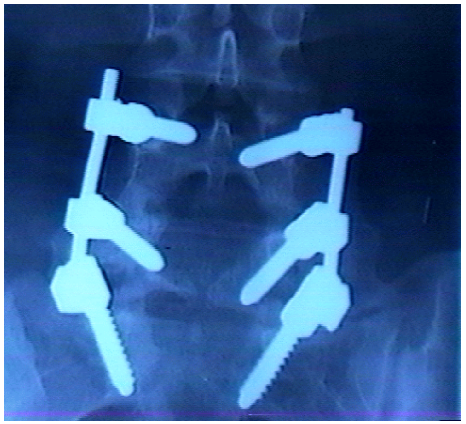
Chiropractic manipulation, joint mobilization, hot packs, electrical stimulation, ultrasound, and massage may provide short-term relief by helping the muscle spasms, similar to a hot shower, but unfortunately they have never been shown to reverse the degenerative changes in the joints themselves. The degenerative changes will still be present after the above treatment has been given.

Rest for 1-2 days can be helpful in alleviating pain from a severe acute episode of back pain. Prolonged bed rest has not been shown to be effective and can have negative consequences for your physical and emotional well-being.

Surgical Treatment

If conservative treatments fail for intractable back and leg pain, surgery may be an option. Spinal fusion is the most common surgery performed for DDD. The surgery may include removal of the intervertebral disc with the insertion of bone screws and/or metal cages to facilitate fusing the joint and hopefully reduce pain.

In one study reviewing 185 Utah patients who had fusions (70% for DDD) 5 years before, 56% of patients with DDD were satisfied with their results. 25% were totally and permanently disabled. 41% percent reported that their overall quality of life had not improved or had worsened as a result of lumbar fusion. Spine 2000 pp. 1259-65.



Conclusion

With proper education, understanding, the majority of the cases of DDD can be properly managed without disability as your ancestors have done. It is like any other chronic condition, with the future mostly determined by the patient, rather than someone else.