

Degenerative Disc Disease What is it? What causes it?

- I. Introduction
 - A. Degenerative Disc Disease (DDD) has an unfortunate name.
 1. Really is a catchall phrase for a number of structural changes in the spine.
 2. Should be **Idiopathic, Multifactorial Disc Disease (IDD)**.
 - a. Meaning we don't really know what caused this but there are many.
 3. Why did it get that name then and why has it stuck?
 4. **Not a progressive, or Degenerative process, in most people.**
 - a. **Should not be construed as an inevitable part of the normal ageing process.**
 - B. Review the Discogenic Theory of Low Back Pain. What is the natural history of the process?
 1. Comprehensive theory that states the some disease with the disc **may, at some point**, start a cascade of worsening spinal pain, dysfunction, and disability.
 2. Only true in "about a third of patients." A relative small subset of individuals.
 - a. Actually has a good prognosis in most individuals.
 - b. Most of the time, it is an incidental finding during a work-up for a sprain or strain.
 - C. Multifactorial Process
 1. At least 50 "causes."
 2. Focus will be on work causes.
- II. Degenerative Disc Disease is an unfortunate historic name.
 - A. Really is a catchall phrase for a number of structural changes of the spine, such as loss of disc height, disc bulges, and impingement of nerves.
 1. More of a radiologic description.
 2. Should be utilized as clinical diagnosis.
 - a. Meaning the radiologic description and clinical symptoms (and mechanism of injury) should all correlate.
 - B. Should be Idiopathic, Multifactorial Disc Disease.
 1. Meaning we don't really know what caused this, Idiopathic; but there are many, multifactorial.
 - C. Why was the term Degenerative added in the first place?
 3. In medicine, we used the term degenerative to describe a gradual deterioration of function of a body tissue or organ. Not used much anymore.
 4. The term was applied early on to try to describe diseases that seemed to be found predominantly in the elderly age group.
 - b. They were not trying to imply a cause and effect relationship.
 - c. To my knowledge, there was no paper written that said "age" was the cause, just an association.
 5. Before modern imaging, genetic, and epidemiologic techniques were applied.
 6. As physicians and researchers understand diseases better, more appropriate names are usually applied.

- a. Senile dementia is now a list of over 50 different types of dementias (like Parkinson's or Alzheimer's dementia).
 - b. The previous believed single disease is now a better understood larger category of multiple different diseases that act clinically similar.
 - c. This is what has happened with DDD.
- D. **Should not be construed as an inevitable part of the normal ageing process.** This has been a layman's addition (I would also add legal too).
1. It seems when talking with patients (and lawyers) the terms degenerative and aging are used in an equivalent manner.
 - a. Knowledgeable physicians shouldn't do the same. They mean different things.
 - b. I will admit, I will occasional do the same thing. It just seems intuitive that because these diseases are found more frequently in the elderly, that "age" is the cause. Not true.
 - c. It's almost a game in a deposition that if the insurance lawyer gets me to say degenerative; game over, he thinks he wins.
 2. Outward sign of ageing (loss of list): hair, hearing, vision, teeth, memory, concentration, physical stamina, spine posture, et cetera.
 3. With modern medical investigation techniques, we are able to explain these losses in scientific terms.
 - a. We shouldn't just say, "Well, it's because you're getting older."
 4. It's time that same understanding is applied to this disease as well.
- E. I hope I can convince you that the next time you hear the company insurance attorney say that this is just Degenerative Disc Disease and was an inevitable and progressive part of the ageing process; you should not let that statement go without a challenge.
1. What he is saying is old school dogma.
 2. Why; because insurance doesn't pay out for "loss due to the normal aging process." Which, as I've said above, the term DDD implies.
- III. Review the Discogenic Theory of Low Back Pain. What is the natural history of the process?
- A. Comprehensive theory that states the some disease with the disk **may, at some point**, start a cascade of worsening spinal pain, dysfunction, and disability.
 - B. What is the natural history of the process?
 1. The natural history of the disease is what physicians call the likely progression of the disease with time.
 2. Prognosis
 3. "I don't have a crystal ball so I can't tell you for sure, but the likelihood of this getting worse in the future is...."
 4. Answering this question gets to the heart of the matter.
 - a. Is this truly a degenerative process in everybody or is there more to it?
 - C. Basic anatomy of the spinal motion segment and the Discogenic Theory of Low Back Pain.
 1. The disk is the cushion between the vertebral bodies which are the building blocks of the spine. Think of the disk, like a sponge.

2. Like a sponge, it has to have fluid to work.
 3. If it dries out, it will collapse and possibly crack like an old dried out sponge.
 - a. It's more complicated than just drying out of the disc, the cartilage cells within the center of the disc, the nucleus pulposus, have died and therefore can no longer reproduce the materials needed for the cartilage to stay healthy. A secondary result is the loss of water that can be seen on the MRI scan.
 - b. Cells just don't just die out, there has to be a cause (see below).
 4. If it cracks, a piece may get pushed out the back, and if big enough, can press on the nerves causing a pinched nerve or sciatica. This is more commonly understood because we can see the piece that has been pushed out in the improper position with an MRI scan.
 5. What cannot be seen with MRI however, is the crack of the disc itself (you can see it with a discogram). Because the cartilage cells are dead within the nucleus, it cannot repair itself. The inflammatory process becomes chronic and in some individuals, painful enough to limit function.
 - a. This is the younger work compensation patient population we deal with low back pain only and DDD on the MRI.
 6. As the disc collapses, weight bearing stress is being transferred to the facet joints in the back of the motion segment which are not able to withstand these new forces. Over time these fail as well and arthritis sets in. As we know, arthritis itself is a painful condition.
 - a. This is the older work compensation patient population we deal with low back pain and some lesser amount of leg(s) symptoms and DDD, arthritis, plus stenosis on the MRI.
 7. It is the secondary results of the arthritis that cause the neurologic systems (leg symptoms) as we age – spinal stenosis.
- D. Here is the good news for patients!!! From what I have read and what I see in my practice (over 25 years) is that in only "about a third of patients," this process becomes a significant problem; a relatively small subset of individuals given the amount of bad discs out there.
1. Actually has a good prognosis in most individuals.
 2. Most of the time, it is an incidental finding during a work-up for a sprain or strain.
 - a. Thus the multiple studies showing the tremendously high number of asymptomatic "bad" discs.
 - b. Boden, et al., Journal of Bone and Joint Surgery, 1990.
 - i) Classic paper.
 - ii) Looked at 67 asymptomatic individuals, about one-third of the subjects were found to have a substantial abnormality; more changes were noted with age.
 - c. Powell, et al., had 302 women with no history of back pain undergo MRI scans of the lumbar spine. More than a third of women aged 18 to 40 had at least one

degenerative disc. The percentage was higher for those older than 40 years of age.

d. Jensen, et al., essentially repeated this study with 98 men and women who had no history of back pain. 64% of the sample had degenerative changes at one disc and 38% of the sample had degenerative changes at more than one disc.

e. Takatalo, et al., performed essentially the same study on a much larger sample of 558 young men and women ages 20-22. They found that almost half of the young men and women had at least one degenerative disc.

f. In summary, I'm not sure why insurance lawyers bring this one up; it just helps prove my point because I'm dealing with a symptomatic patient (not an asymptomatic patient as were studied here). I think they are trying to say that it's just a coincidence that their claimant's back hurts and there is a DDD that I'm trying to say is the cause of their symptoms.

- E. Moreover, degenerative changes of the spine do not inevitably get worse. Numerous studies over the years have shown that, while degenerative changes of the spine can get worse, most of the time they remain the same or get better.
1. Symmons, et al., reviewed X-rays of 742 women aged 45 or older and then repeated the X-rays 8 to 11 years later. They divided the women into two groups, those with back pain and those without back pain. They found that 40% of those with back pain had degenerative disc disease, which did not get worse. They also found that 70% of the women without back pain had degenerative disc disease, which did not get worse.
 2. Using MRI scans on a repeated basis, Matsubara, et al., followed 32 patients with herniated discs in their lumbar spine. They found that, over the course of a year, 62% of disc herniations spontaneously reduced in size. The remaining 38% herniations did not progressively worsen.
 3. Using repeated MRI scans over time, Hutton, et al., reviewed two groups of patients with lumbar-related endplate changes. Endplate changes are another type of degenerative change in the spine. The first group was 36 patients with a low level of endplate changes and the second group was 22 patients with a more advanced stage of such changes. In the first group, half remained the same; a little less than half got worse; and two patients reversed back to normal. In the second group with the more advanced changes, most remained the same; some got better and none got worse.
 4. Humphreys, et al., looked at still other degenerative changes of the spine. They found that foraminal stenosis did narrow with age but found no progression of disc height, lordosis, or reduced width of the central canal.
- F. How do I use this information and **determine causation**:
1. Unless obvious, an injury to a disc is a diagnosis of exclusion; meaning all other reasonable causes of the problem have had time to heal (sprains and strains).

2. I assume that the “degenerative disc” (desiccated disc) preexisted the alleged injury. Good assumption because we believe it takes years for a disc to desiccate and the MRI is usually obtained shortly after an injury.
 - a. They are asymptomatic up to this point (remember all the asymptomatic people with these discs).
 - b. I believe these discs are more susceptible to injury than their normal counter parts. They are in a weakened state and cannot adequately repair themselves if they become injured.
3. I determine if there was a work **injury** significant enough to have caused an injury to this susceptible and asymptomatic disc. They just don’t spontaneously become symptomatic in my opinion.
4. Is there an **imaging study (objective study) that confirms the clinical picture?**
 - a. Unfortunately, these “crack” are too small to be imaged with our current scanners; might see an annular tear or bulging.
 - b. A “bad” lumbar disc should cause back and possibly hip and posterior thigh pain. Not pain “shooting” up the back, down the arms, front of thighs, groin, abdomen, etc.
 - c. I assume the “crack” is there if the MRI shows significant desiccation. If there is a question, then a discogram is ordered.
5. Most importantly, what is the **recent history?**
 - a. Ask the patient?
 - i) I’m an optimist and I believe my patients.
 - ii) If an insurance carrier can provide past history that disputes the patients, then I consider it and might alter my opinion.
 - b. As stated above, these discs are **almost always asymptomatic prior the injury.**
 - c. If there is a past history what do I think is significant? Cannot give a definitive answer but I usually follow these patterns:
 - i) Chiropractor maintenance adjustments every few months don’t count as significant.
 - ii) Chiropractor visits (or primary care physicians) within a few months prior to injury for similar symptoms count.
 - iii) Chiropractor visits (or primary care physicians) repeated bouts that required weeks of treatment over years for similar symptoms count.
 - iv) If there has been a change such as new onset on leg symptoms and the MRI shows a significant HNP, I might say the leg radiculopathy warrants a significant injury but for the leg pain only; not back pain.
 - v) Surgery on that disc level with the past two years, even with a “good result” is significant; surgery 5 years ago with no visits or symptoms after recovery is not.
 - vi) Previous awards for “sprains and strains” are not significant if the claimant returned to full duty and had no problems for several years.

vii) If there was previous MRI taken “years ago” that showed DDD, the patient went years with little and no symptoms and now has problems but the new MRI shows no new changes, I usually find for the patient because they went along time without symptoms.

viii) For the gray areas, I make my best guess and leave it to the judge.

G. How do I work with this information and treat the patient:

1. I avoid the whole issue by not getting the MRI until most minor things should have healed (6 to 12 weeks; sprains, strains, aggravation of arthritis).
2. If the MRI is normal (meaning no disc desiccation), and I’m sure there has been enough time (and proper treatment) for things in #1 to have passed, and then I respectfully say, “I’m sorry but I can’t find what is causing your continued pain and symptoms with our current technology. That’s to say I believe you still hurt but I can’t find a correctable cause to your problem, therefore you’ll have to live with it.” Remember all the horrible things said to, and about, LBP patients prior to the MRI scan.
3. If the MRI shows desiccation, then I assume that the desiccated disc has been injured, chronically inflamed, and cannot repair itself. If I cannot get the chronic inflammation better with medicines and advanced pain management techniques, then I consider surgery. An independently provided provocative, blinded, and controlled discogram might be requested if more than one level is involved or there are other confounding factors involved in the case. I remove the entire disc and fuse. Disc replacement technology is unproven in my opinion.

H. In short, I believe that less than 10 % of my private, 20 % of personal injury and 30 % of workers compensation patient ultimately end treatment with a fusion.

1. Why the higher numbers in the later categories? “I just want it fixed.”
2. In well over two thirds of patients, a dried out disc is not a progressive (degenerative), inevitability debilitating disease that will require a surgery with somewhat mixed results.

IV. What causes this problem?

A. Shift gears.

B. Show the ugly slide.

C. Multifactorial Process – many causes.

1. At least 50 “causes.”
2. Work factors, what are they?
 - a. By definition, work factors cause disease by cumulative trauma.
 - b. Things which workers are required to do, or are routinely exposed to, in their jobs.

D. For spinal conditions, they are:

1. Heavy work
2. Lifting and forceful movements
3. Awkward postures – bending and twisting
4. Whole-Body Vibration exposure

5. Static positions

E. How were they established?

1. The National Institute Occupational Health and Safety and the Center for Disease Control have compiled guidelines to determine which work factors are applicable for an injury claim.
2. These guidelines were established in 1997 by subjecting all the available medical literature at the time to meta-analysis.
3. Over 40 articles were reviewed for each work factor.
4. Determined if there is evidence to support or refute a particular work factor's association with an injury type.
5. Have been up-dated continuously since 1997 and supported with recommendations to improve safety to workers and to minimize the effects of the work exposure.
6. Studies since 1997 have continued to support their conclusions.

F. Conclusion:

Heavy work	Evidence
Lifting and forceful movements	Strong evidence
Awkward postures – bending and twisting	Evidence
Whole-Body Vibration exposure	Strong evidence
Static positions	Insufficient evidence