

A Disc vs. Bone Density Conundrum

by Ann Gerhardt, MD www.drsgmedisense.com

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Reader's question: *About 6 - 8 years ago, I had my first DEXA bone density scan. The result was 130% of normal. The bone density was still high two years ago. Recently when I went to ER for a spell of weakness, I was told that the x-ray of my cervical (neck) spine had degenerative disc disease. Why high density in one area of my bone structure & degenerative discs in another? Judy*

The short answer: Vertebral discs are not bone and whether they degenerate or not has nothing to do with bone density.

The long answer: The spine is a column of bones called vertebra. They are separated by discs. **Discs are NOT bone.** They are a type of cartilage. Discs don't even show up on x-ray, because they contain no calcium. They are similar to flat jelly beans that keep vertebrae from slamming into each other.

A DEXA scan measures bone density in the bone of the lumbar spine (the vertebra just above and below the waist). Judy thinks that there is a difference of strength and integrity of her cervical and lumbar spine. We can't conclude that from her tests, though. **A bone density test measures the concentration of calcium in the vertebra, while an x-ray report that mentions discs derives that information from the space between vertebrae.**

The integrity of discs starts to fail as we age (over 35 years). As they weaken, the weight of the spine squashes them flat. Sometimes the disc ruptures as it weakens, and other times it stays intact, but spreads and pushes on the spinal cord.

Just having a squashed disc does not mean that it will cause pain you might have. **At least half of middle age people have degenerate discs. Most of those people have absolutely no symptoms.**

The question she didn't ask is, "Does my high bone density necessarily mean that my bones are strong?" She may indeed have very calcium-dense vertebral bodies. **BUT, the DEXA scan doesn't tell us how the calcium is arranged in and on the bone.** It measures calcium both inside and on the edges of the vertebral body. Healthy, strong vertebrae have a good amount of calcium throughout, not just on the edges.

As we age, micro-trauma (or big-time injuries) irritate the outside edges of vertebra and pull on their ligamentous connections. Scar tissue containing calcium heals the damage. (A very old person's enlarged knuckles are another example.) Over time the edges of damaged vertebra heavily calcify, forming what is called spurs, independent of what is happening to the vertebral body's inside. The DEXA scan gives an average bone density for each vertebra, lumping the middle, spurs and edges together.

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Written by Ann Gerhardt, MD

Possible DEXA results: (inside means within the vertebral body, not including spurs and arthritic edges)

Very dense bone inside, with or without spurs:	High
Normal bone inside, calcified spurs and edges:	High
Normal bone inside, no spur calcium:	Normal
Low inside calcium, calcified spurs and edges:	Normal
Low inside calcium, no spur calcium:	Low

Further gradations of calcification inside and on the edges/spurs modify the DEXA result along the above continuum.

Disc degeneration and bone calcification are unrelated processes. So the answer to the question is that her **bone** is dense, but her **discs** are thin. It is perfectly reasonable for one person to have both.