



The Health Nugget

Meant to Last, Part 2

The Sumerian king Aannipadda of Ur had a small square temple built around 4,500 BC. It is reported to be the oldest building in the world still standing. The architecture, materials used, as well as the arid climate of Iraq, contributed to the longevity of this building that has lasted through millennia. When it comes to bone health, the materials used to rebuild bone, and the climate in which preservation best occurs, is also important in ensuring that bones will last.

Since bone is being continually rebuilt, it stands to reason that we daily need building materials to ensure production. Calcium is the main mineral in bone. Calcium's contribution to bone strength is seen when bones are soaked in vinegar. Calcium is leached resulting in soft, pliable bones. While it is important to ingest enough calcium, making sure it is absorbed is just as important.

I remember watching a woman downing TUMS like they were candy. She reasoned that they were a good source of calcium and thus would strengthen bone. TUMS is an antacid containing calcium carbonate. It alkalizes the stomach to reduce heartburn. However, acidic juices facilitate good digestion. When they are neutralized calcium absorption is dramatically reduced. Acid blockers have the same effect. Though perhaps not as quickly swallowed, kale, broccoli, and bok choy offer a tremendous calcium boost with positive side effects. They are also excellent sources of vitamin K, another important bone builder.

Vitamin D also enhances calcium absorption. In one study, two groups of patients were compared and calcium absorption was increased

300 percent with vitamin D treatment.

Vitamin C has a very important role in maintaining bone mass. Studies with mice have shown that vitamin C suppresses clast formation (which would result in decreased bone resorption). Medicinal treatments for osteoporosis such as Fosamax work in the same way. But good ol' vitamin C does more. Not only does it suppress bone resorption but it also stimulates blast production to repair and build new bone. It creates a bone-healthy balance between demolition and construction (catabolism and anabolism).

Surprisingly, the kinds of fat we eat also play a big role in the catabolism–anabolism tango. Researchers have found that when diets were supplemented with walnuts and flaxseeds, raising blood levels of omega-3 fatty acids, the destructive forces of clasts was reduced while simultaneously boosting bone building blasts.

Another important bone-building ingredient is magnesium. Fifty percent of the body's magnesium resides in our bones. Low levels have been linked to fragile bones and calcium loss. Seeds are good sources of magnesium, but pumpkin seeds have the highest levels. Beans are another good source of magnesium, as well as Brazil nuts.

While nutritional provision is important, bone does not automatically strengthen when given its building materials. It must be given the message that it needs to become stronger. No signal is more important than the one given by muscle. Unfortunately, muscle wasting often occurs in the aged and is associated with bone loss. At a certain point the doctor might use the term sarcopenia, used to indicate a progressive reduction in muscle mass and strength.

Sarcopenia is like osteoporosis of muscles.

In a land that weighs the most per capita, being thin is automatically looked upon as healthy. But thin does not always equal strong. Naturally thin women can have low bone and muscle mass. There simply may not be enough weight or torque on the bones for them to respond. Men can experience this as well. Norwegian research revealed that, “Low weight among middle aged men was related to the risk of osteoporosis three decades later, and this risk was significantly affected by weight changes. Weight increase reduced the risk, where as weight loss increased the risk,” says Professor Haakon E Meyer at the Norwegian Institute of Public.¹

Nothing informs wasting muscle and bone that they are still needed quite as loudly as weight-bearing exercise. This includes resistance training, such as lifting or pushing weight. Ideally, your workout should include movements that load the bone along its length. That means a squat is better than lying down and doing a leg extension, for example. The weight in a squat is transmitted down along the spine, through the hip, and down along the bones of the leg. Exercises such as push-ups, bench presses, and overhead presses are bone loading as well.

Impact exercises are also weight bearing. These include walking, running, jumping, skipping rope, or hitting a heavy bag. One study found that even a single bout of high-impact exercise had measurable bone building effects. Study participants jumped up and down until they were exhausted. Measured biomarkers signified that the body was busily fixing the damage and rebuilding the bones to be stronger. Skeletal bone responded that quickly to exercise, resulting in increased bone turnover.²

Other forms of exercise have their beneficial aspects as well, but they may not provide the same kind of loading that weight training and impact activities do. It has been observed, in some cases, that long distance cyclists have surprisingly reduced bone density despite plenty of exercise. Cycling alone will not load the bones along their length. In one study, low bone mineral density was observed in both male and female long distance runners. Perhaps the bones are not as stimulated and get bored with the more repetitive, lighter weight regime. I don't know. These forms of exercise combined with weight training will do more to prevent low bone density. Also, for future discussion, is the impact of hormonal triggers on bone density, which is of equal importance.

It takes a lot of work and right conditions to build a structure what will stand the test of time. It takes even more work when the structure is continually being rebuilt and remodeled. Just because the bones respond to a single bout of exercise does not mean it will do the trick. Consistency of life will make or break your bones, literally.

You may find yourself at a place in life where you have given up and your bones and muscles have responded. Don't give up. Take back the important work of restoring and rebuilding. Find a health care provider, nutritionist, physical therapist, or knowledgeable trainer to help you get started in a safe and effective way. I believe that at any age the body will respond. The promise of God's word to us is: “And the Lord will guide you continually and satisfy your desire in scorched places and make your bones strong . . . and your ancient ruins shall be rebuilt” (Isaiah 58:11-12).

¹ “Thin Men More Vulnerable to Osteoporosis and Bone Fractures than Other Older Men,” 9/20/2008, <http://www.sciencedaily.com/releases/2008/09/080918101526.htm>.

² Rantalainen, et al., “Short-term bone biochemical response to a single bout of high-impact exercise,” *Journal of Sports Science and Medicine* (2009) 8, 553–559, www.jssm.org/vol8/n4/10/v8n4-10pdf.pdf.



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