

In The Realm of The Bone Matrix

Bone is tough stuff. Bones from both man and beast have been used by primitive cultures for thousands of years for tools because of the density and high-impact tolerance of bone. Martial artists, using their bare hands, can break through slabs of wood and concrete with the proper use of their bones. In fact, many people forget that while we may be able to theoretically live without them, perhaps as some blobby, vegetative mass, it is solely because of our bone structure that we are able to move, run, play and build. At times we take these bones for granted.

There are some people who learn the hard way not to take their bones for granted: those who have suffered a fracture due to age-related bone loss and osteoporosis. Few things in life can debilitate someone the way discovering your bones are no stronger than a pane of glass can. One wrong step and a broken hipbone could be the result. Days in the hospital and weeks in physical therapy is not the way most of us imagine spending our golden years. Therefore, it is vitally important that we take the time to understand what our bones need from us so that they can continue to support us and keep us able, especially in the later years of life.

The importance of calcium is well understood in western culture. Anyone who has ever seen a milk commercial has thoroughly understood that bones need calcium. While the nutritional value of milk has been grossly overstated, it is true that supplementation of proper forms of calcium up to 1,500mg per day has been conclusively proven to help young people achieve greater peak bone density at around age 35, as well as slow the depletion of bone mass during the adult and late stages of life. Of course the effectiveness of calcium supplementation is dependent upon proper intake of essential trace minerals, namely magnesium, so that the calcium can be properly utilized by the body to construct new bone tissue.

It is important to clarify that not all forms of calcium can be absorbed and used for bone tissue formation. Among the most efficiently absorbed calcium forms is calcium hydroxyapatite. This is calcium and phosphorus combined together in the exact ratio that is naturally produced in the body. This makes it extremely absorbable, highly efficient and non-toxic. Other forms of calcium are either difficult, if

not impossible, for the body to absorb and can even be toxic.

Though the importance of proper calcium intake cannot be understated, there is more to bone health than just packing your body full of calcium. Your bones need more than calcium to maintain their strength. While calcium is the primary mineral, bone is actually held together with other materials, mostly collagen so that the bone tissue remains strong, yet mildly pliable.

When people go camping in the woods, they often make their own fire by gathering wood from the forest. Some wood is better than others for making a fire. The test is simple; attempt to break the twig with your arms or under your knee. If the wood breaks with a clean snap, its firewood. This is usually old wood that has dried out and died. If you've ever tried to break a branch off a tree, even a thin one, with just your hands, you know that all the wet fibrous material on the inside won't snap, but bend. It will keep on bending and maybe, after a lot of hard work you might get it to rip apart.

Older fragile bones are similar to the dead and dry wood in the forest, they may be hard, but one smart strike and they break. Most parents have noticed that young children can take an impact to their bones that would obliterate an elderly person. My son, when he was about twelve or thirteen, had a dirt bike land on his foot and he suffered only a slight crack. Not splinters, no break, just a crack. What might have left me with a mangled foot left my son with a cast for three weeks and an excuse from school for a couple days.

The reason why younger people have more resilient bones has not a whole lot to do with the amount of calcium, but more importantly, the overall composition of their bone matter, more commonly known as the bone *matrix*. While many people commonly assume that their skeleton is a jumble of limestone, this is far from the truth. Your bones are more like hollow tubes with a tough outer shell protecting a crisscross of blood vessels that wind their way through meshy inner fibers of bone matter.

It actually makes more sense to think of your skeleton as an organ. Your bones are made up of a lot of living organic material that performs a number of vital roles in the body that actually

have nothing to do with physical support or dexterity. Bone marrow, for example, produces all of the blood cells in the circulatory system. This includes, red blood cells, white blood cells, and platelets. This makes bone marrow almost entirely responsible for many of the immune system functions in the body as well.

In order to protect this precious marrow, the bones need to be strong and resilient. We would prefer that the bones be dense, yet mildly pliable so that they do not break easily, but absorb impacts without great distress. This does not mean that your bones should wobble like a rubber pencil, but it should have some give, more like a rubber brick. Imagine someone trying to karate chop a rubber brick, they'd have to call in Chuck Norris. Exactly. Only Chuck Norris should be able to break your bones.

But seriously, the body's natural inclination is to construct strong bones in this fashion through a sophisticated network of signals that alert the body to where the bones need to be reinforced and which bones are not utilized and require less maintenance.

Just like skin, bones are constantly being remanufactured as the old and used up portions get worn out or damaged. Two different enzymes are responsible for this process. Osteoclasts remove old, worn, or damaged bone tissue and osteoblasts form new tissue in its place. This cycle is called bone remodeling. The rate at which new bone formation occurs typically reduces with age. In the first year, after a baby is born, its entire skeleton has been reconstructed naturally at least once. In adulthood, this is typically reduced to about 10% of all bone tissue per year. This means that unless measures are taken, your bones have to last ten times as long before they will get a chance to be naturally repaired.

This process is impeded by poor lifestyle choices as well. Alcohol, caffeine, soft drinks, and cigarettes all divert minerals away from your bones and place the demand in the liver and other areas of your body to deal with the toxic burden created by the consumption of these substances. This is why children and young adults should avoid these substances for the sake of their health, as well as their bones. It gives me great concern to see the popularity of caffeinated beverages in teenagers and young

adults. The health problems they can expect to face if they continue will not be pleasant.

Maintaining a healthy bone matrix requires two components: proper nutrient consumption and weight bearing exercise. The first component is relatively straightforward, your bones require calcium, magnesium, zinc, copper, manganese, and other trace minerals and vitamins in order to assist the proper absorption of the calcium and supply the osteoclasts and osteoblasts with the necessary nutrients they need to function optimally. There are two vitamins that fill this role well: vitamins K2 and D3. K2 is naturally produced by good bacteria in the large intestine and D3 is the type of vitamin D produced in the skin by ultraviolet b rays from the sun. These two vitamins work in tandem to assist the function of osteoblasts and osteoclasts so that they can function more harmoniously.

Even though these vitamins are produced naturally in the body, many individuals, particularly elderly people and those with poor diets and sedentary lifestyles, typically have less than is needed of these nutrients in order to maintain adequate bone health to prevent osteoporosis and a compromised bone matrix.

Besides, K2 and D3, another beneficial nutrient that helps improve flexibility in the bone matrix is a nutrient derived from hops called Rho Iso Alpha Acid (RIAA) that has been shown in numerous studies to reduce inflammation in bone and joint tissues. While improving bone matrix, it can also help relieve symptoms of arthritis.

A healthy supply of essential minerals and vitamins K2 and D3 are necessary for proper bone matrix, but there is another vitally important element required. Back in the 1970s, it was observed by member in the space program that astronauts who returned from extended periods in zero gravity (approximately 18 days) experienced massive reductions in bone density, in some cases up to 70%! The solution was to develop weight-bearing exercises that could be done in a zero gravity environment. This means that your bone tissues need to be repaired just from the damage created by the stress from the earth's gravitational pull. This also means that minor controlled stresses on your bones send indicators to the body that the bones need to be repaired and reinforced in that location.

This means that weight-bearing exercise is critical for bone health. Quite literally you have to use, or lose it. You don't need to be an Olympic weight lifter to get the right level of force on your bones to be healthy. Force is required, however, in order to activate your body's natural bone renewing processes to their fullest.

One of the ways that I maintain my fitness and get great exercise is with Pilates. Pilates is about developing core strength, as well as creating long and lean muscles with greater flexibility. It doesn't require weights, but uses resistance to increase strength, which is great for bone strength and is also more comfortable.

Obviously, when it comes to osteoporosis and deteriorating bone matrix integrity, the keys to success are prevention and early detection. The major problem with bone deterioration is that most people don't know it's happening until they break a bone. Usually by that time, depending on the level of deterioration, it may be too late to entirely reverse the condition. This is why it is also important to get tested for bone density to find out in what condition your bones are in and what steps you have to take in order to return your bones to proper strength or maintain them in healthy condition.

Since every individual is unique, it is also true that some people have different risk factors and nutrient requirements in order to keep their bodies in optimal health. While a bone density analysis can tell you in what condition your bones are in, it cannot necessarily tell you what is affecting their condition and what specific steps you should take to prevent it from deteriorating.

There is a test called an OsteoGenomic® profile that assesses your DNA through a blood test for various genes, specifically those known to affect your risk of rapid bone loss, chronic inflammation, arthritis, age-related bone fractures, early menopause and hormone dysfunction. It is a one-time test that will allow you to make dietary and lifestyle changes that take these risks/strengths into consideration in order to give you the best results.

Because it is a blood test, it is important that you consult with a qualified medical professional to determine if the test is right for you, and to discuss the results with you as well as construct

a detailed and tailor made program that properly reflects your unique needs and lifestyle.

Another effective analysis, besides a bone density test, is a bone resorption assessment test. This is a urinalysis that tests for traces of calcium and other bone mineral that have not been reclaimed by the body and excreted. This will help determine the rate at which your body may be losing bone density and may give insight as to what areas to target to prevent further loss.

Once again, the core of optimal health, not just for your bones, but for your overall condition, comes down to the specific choices you make regarding your dietary habits, your exercise routine, and your overall lifestyle. There is no substitute for eating a healthy balanced diet, properly supplementing those nutrients that compliment your diet, and engaging in regular aerobic exercise.

You bones give you all the support you need, isn't it time that you gave a little back?



**4789 Vineland Ave.
Toluca Lake, CA 91602
(818) 761-1661
www.nutrikon.com**