

Bone Health

Low bone density, slow bone healing, stress fractures, osteopenia/osteoporosis, etc. are all linked to diet and lifestyle. Our bones are the greatest storage location for minerals within the body. To balance the level of minerals in the blood, the body will use osteoclasts to break down bone or osteoblasts to build up the bone. This is a constant process called bone turnover. Bone turnover is influenced by hormones.

A body that is inflamed, acidic or low on raw materials is prone to lower bone density and fractures. Chronic inflammation can lead to low bone density and many other illnesses and diseases. In addition, an acidic diet will force the body to pull essential minerals from the bone matrix, reducing the strength and density of bones. Hormone imbalances also affect the nutrient levels, which is why post-menopausal women or those experiencing amenorrhea (lack of menstrual cycle) are more prone to osteoporosis and bone fractures.

The following can lead to chronic inflammation and acidity the body.

- Insulin resistance from fast-burning carbohydrates. All carbohydrates are converted to glucose through the digestive process. Simple sugars, such as breads, refined baked goods, candy and some fruit are converted to glucose very quickly. When levels of blood glucose rise, your insulin level must increase to move glucose from the blood into the cells. High levels of insulin increase secretion of C-reactive protein (CRP) from the liver, which is a marker of systemic inflammation and increased risk of heart disease. Insulin is a fat storage hormone, and the cells in our abdomen have more insulin receptors than other cells. Unfortunately, the type of fat located in the abdomen is active fat and secretes inflammatory chemicals. This creates a vicious cycle, leading to more inflammation and insulin resistance.
- High levels of glucose in the blood also generate AGEs (Advanced Glycation End Products), which damage proteins in the body, such as collagen found in bones, skin and joints. To break up the AGEs, the immune system releases inflammatory cytokines. Depending on the person, AGEs can gather in different places leading to arthritis, cataracts, memory problems ("brain fog"), heart disease, psoriasis or wrinkled skin.
- Food sensitivities can activate the immune system in many different ways, depending on the cause of the sensitivity. Any time the body is reacting to a food, the immune system is involved and inflammatory chemicals are released.
- Chronic stress and lack of sleep leads to cortisol imbalances. Cortisol is released by the adrenal glands in times of stress, be it emotional, mental, or physical stress. Cortisol mobilizes calcium from the bone and increases urinary calcium loss. In addition, when the cells are constantly exposed to cortisol, the cells become resistant to cortisol, making it difficult for the body to regulate the immune system and fight inflammation. Excess cortisol also disrupts our typical sleep patterns, which further increases inflammation.



There are 18 nutrients that are essential for bone health. Include the following in the diet to combat inflammation, reduce acidity and ensure the body has proper levels of nutrients for bone health.

- **Calcium** is the most abundant mineral in bones. **Healthy sources: organic yogurt, steamed leafy greens, sesame seeds, sardines, raw cheese, canned sockeye salmon, blackstrap molasses, broccoli.** Protein helps with calcium absorption. Alcohol and caffeine increases calcium excretion and inhibits absorption.
- **Potassium** is also found in the bone matrix. Potassium neutralizes an acidic state so the body will pull potassium from the bones if the body becomes too acidic. **Healthy sources: sweet potatoes, broccoli, avocados, pumpkin seeds, sunflower seeds, salmon, halibut, Medjool dates.**
- **Magnesium** is used in the bone matrix and helps to absorb calcium. **Healthy sources: broccoli, flaxseeds/oil, pumpkin seeds, Brazil nuts, almonds, blackstrap molasses.**
- **Silicon** is needed for bone and collagen formation. It also helps to attract calcium to bone. **Healthy sources: onions, bell peppers, apples, raw cabbage, pumpkin, cucumber, carrots, sardines.**
- **Vitamin D** improves absorption of calcium and helps bones reform after breakdown. **Healthy sources: crimini/baby bella/Portobello mushrooms, wild fish, pasture eggs.**
- **Vitamin K1 and K2** ensure the calcium and vitamin D move into the cells and does not stay in the blood stream, which increases the risk of cardiovascular disease. **Healthy sources: leafy greens, fish, cod liver oil, fermented foods, grass-fed dairy.**
- **Collagen** is found on the binding sites of bone cells for other materials and helps bones stay flexible. **Healthy sources: sardines, canned salmon, bone broth, bone marrow, Great Lakes Collagen Hydrolysate can be added to foods to improve collagen intake.**
- **Vitamin C** suppresses osteoclasts (cells that breakdown bones), stimulates osteoblasts (cells that build bones) and is needed to form collagen. **Healthy sources: papaya, bell peppers, strawberries, broccoli, kiwi, Brussels sprouts, oranges.**
- **Essential fatty oils, particularly omega-3 fats**, suppress the inflammatory process in the body. It's also important to have the proper ratio of omega 3 to omega 6 fats for healthy cell membranes. **Healthy sources: fish oil, chia, hemp and flax seeds; grass-fed meats, pasture-raised eggs and dairy.**
- **Zinc** is required for calcium absorption, helps to regulate the osteoblasts (build bones) and osteoclasts (breakdown bones). **Healthy sources: oysters, grass-fed meats, sesame and pumpkin seeds, shrimp, cashews.**
- **Boron** helps vitamin D and estrogen improve bone health. **Healthy sources: almonds, walnuts, avocado, broccoli.**
- **Phosphorus** is used to build the bone matrix (do not confuse with phosphoric acid, which draws calcium out of the blood) **Healthy sources: pumpkin and sunflower seeds, Romano cheese, Brazil nuts.** Avoid soda, which has high levels of phosphoric acid.
- **Strontium** – is used to strengthen the bone. **Healthy sources: Brazil nuts, spinach, lettuce, carrots, peas, beans, potatoes, celery, organic dairy.**



- **Copper** – aids in the formation of collagen. **Healthy sources: sesame and sunflower seeds, cashews, shiitake mushrooms, garbanzo beans, walnuts.**
- **Turmeric, garlic and ginger** are anti-inflammatory. Use to flavor meals whenever possible.
- **Bone broth** is essential as it has bone minerals and collagen from the healthy bones. Ideally, make your own from organic, grass fed/free range bones. If you cannot make, you can purchase organic bone broth from Pacific Foods but it will not be as effective. Eat daily.
- **Fermented foods** help to feed the beneficial gut bacteria (probiotics) and balance the immune system.

Avoid the following foods:

- Refined sugars and carbohydrate meals without fat and protein.
- Fruit on its own, as it will spike blood sugar. Always combine with a fat or a protein.
- Conventional dairy. If you can digest dairy well, choose fermented, organic, grass-fed (yogurt, kefir) or raw dairy products.
- Excess sodium from processed foods as it causes the body to excrete calcium in the urine. Unrefined sea salt SHOULD be consumed as it contains many of the essential nutrients for bone health.
- Alcohol, which increases the acidity of the blood. It also inhibits absorption and increases excretion of calcium, magnesium, vitamin C, zinc and copper.
- Excessive caffeine, which also causes the body to excrete calcium and magnesium in the urine.
- Gluten and other grains are inflammatory and contribute to leaky gut.
- Conventional red meats and unhealthy vegetable oils, such as canola, sunflower, corn, soybean, peanut, safflower and cottonseed, which contain arachidonic acid and omega-6 fats, leading to inflammation.
- Excessive animal protein intake as it increases acidity in the body.

It can be difficult to obtain high levels of some of the above nutrients so supplements may be needed, particularly in times of healing. The following supplements may be beneficial.

- Fish oil with high levels of EPA/DHA
- Vitamin D
- Calcium and magnesium
- Vitamin K2 (MK-7)
- Digestive enzymes and/or hydrochloric acid to help increase absorption of minerals in the diet
- Probiotics to help build up the good bacteria in the GI tract
- Daily multivitamin or greens with antioxidants

After the initial phase of healing has past and some impact exercise is resumed, the following can help to reduce overall inflammation.

- Curcumin/Turmeric to reduce systemic inflammation
- Proteolytic enzymes to breakdown inflammation
- Traumeel to reduce pain and inflammation in the injured area



Lifestyle Recommendations:

It's also beneficial to include resistance training, as well as body-weight cardio. The body looks at bones, muscles, ligaments, joints, etc. on a use it or lose it basis. If you are not stressing your bones, the body will assume you don't need them and will not send materials to maintain and rebuild.

Exposure to sunlight is also needed for the body to make its own vitamin D, but depending on your location, it may be difficult for the body to get enough sunlight in the winter to make vitamin D.

Testing:

The following lab tests are recommended if you are prone to stress fractures, have hormonal imbalances or are concerned about the health of your bones.

- Vitamin D test
- Bone density test