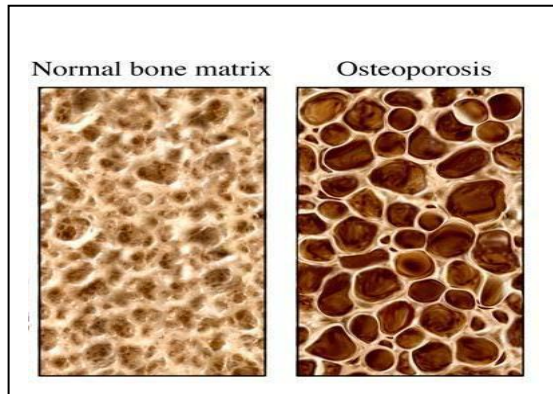


## Bone Health By Dr Andrew Park

Most people and doctors only associate vitamin D, aka cholecalciferol or D3, and the importance of it, with calcium absorption. While this is true, recent research is claiming other benefits of this vitamin. 10 years ago, vitamin D levels were not part of the routine blood test but times have changed. More and more people are deficient in vitamin D than we know.

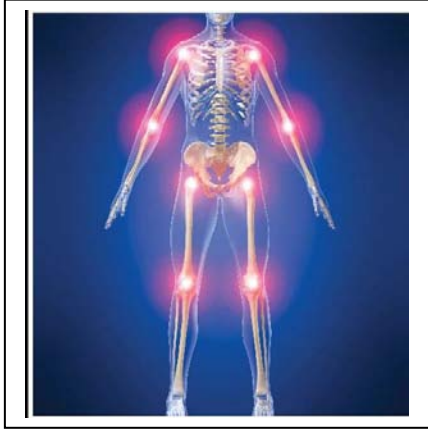
Everyone knows that having low levels of vitamin D is linked with decreased bone mineral density and osteoporosis. Muscle pain and weakness is also associated with vitamin D deficiency. Falls are the major reason for fractures in the elderly. The most common fracture amongst post-menopausal women is spinal compression fracture, followed by the most concerning of all, the hip. According to the Center for Disease Control (CDC), one in every three adults age 65 and older falls. According to a recent UCLA survey, 46% of all women say they know little or nothing at all about osteoporosis. 39% of women over the age of 45 never discuss osteoporosis with their doctor. Again, vitamin D deficiency leads to muscle and bone weakness which increases the risk of falls.



According to Wolff's Law, "bone in a healthy person will adapt to the loads under which it is placed." This means that the more force is applied to bones through exercise, the stronger they will become. This is good news for the female golfer as participating in the sport of golf strengthens muscles and bone. The adult bone does not grow but it constantly remodels itself. Decrease in bone density actually starts for the female, around the age of 30 and worsens with menopause. This is why maintaining bone health through proper nutritional intake and exercise are important.

The most common misunderstanding about maintaining bone health is taking calcium supplements. Your bones are a reservoir of many different types of minerals needed for daily bodily function. The two most notable minerals are calcium and phosphorus. Calcium is very highly regulated by the body through various hormones and organs. Calcium is also found in many different food sources. Your body will mobilize calcium from your bones to ensure calcium is supplied to other parts of your body to maintain function, like muscle contraction. This only occurs when calcium is not being absorbed due to vitamin D deficiency or chronic metabolic acidosis conditions as your body uses calcium to buffer acidic states. The key to maintaining optimal bone health is having adequate vitamin D levels, exercise, and a healthy balanced diet. Since calcium levels are highly regulated, blood tests for calcium levels are not reliable. Instead, a form of X-ray called DEXA scan is used to assess bone density. Again, calcium is highly regulated by the body and deficiencies are noted with decreased levels of vitamin D.

Vitamin K is the other vitamin only understood for blood clotting. This vitamin actually functions to modulate calcium deposition. Simply said, vitamin D is responsible for calcium absorption while vitamin K is responsible for calcium deposition into bone. The other important function of vitamin K is prevention of atherosclerosis as it will prevent tissue calcium deposition. Vitamin K is activated in the presence of vitamin D.



What many don't know is that vitamin D is also low on patients with low immunity and systemic autoimmune disorders like rheumatoid arthritis, psoriasis, type 1 diabetes, and Hashimoto's Thyroiditis or hypothyroidism. Evidence has shown vitamin D to modulate immune and anti-inflammatory responses. Low levels are associated with reoccurrences of the common cold and flu. Vitamin D acts like a hormone on the gene transcription level to regulate growth and differentiation on the cellular level. This is critical as uncontrolled proliferation of cells is the cause of cancer. It also down-regulates production of some inflammatory processes and antigen-presenting capabilities of immune cells. This is critical because it will enhance our innate immunity and inhibit the development of autoimmunity.

The RDA for vitamin D was recently raised for young adults from 200 to 400 IU/day and for older adults from 400 to 600 IU/day. Keep in mind that the RDA represents the bare minimum nutritional intake for the healthy individual only and does not take into consideration those in diseased or deficient states. Many clinical research data has shown positive effects on bone, muscle strength, reduction on cancer incidence, cardiovascular disease, influenza, insulin resistance, and more with 2,000 to 4,000 IU/day dosages.

The best sources of vitamin D in foods per 3 ounce serving are salmon at 530 IU, sardines 231 IU, mackerel 213 IU, and Quaker Nutrition for Women Instant Oatmeal at 154 IU per 1 packet. Perhaps the best natural method of attaining vitamin D is through sun exposure. Physics in regards to sun ray angles in relation to the earth, latitude, and the time of day plays a significant role in sun exposure response to vitamin D production. This often leads to confusion within the public. Safe sun exposure without protection is to the limit of the skin turning slightly pink or blush. If exposure is extended, the skin will burn and vitamin D production will not occur. For simplicity sake, exposure to the sun for 15-20 minutes at 4-5 days per week is recommended to maintain adequate vitamin D levels. However, since vitamin D consumption through foods and sun exposure is not enough, supplementation is also highly recommended.

Holick MF. High prevalence of vitamin D inadequacy and implications for health. *Mayo Clin Proc.* 2006;81(3):353-373.

Gaugris S, Heaney RP, Boonen S, Kurth H, Bentkover JD, Sen SS. Vitamin D inadequacy among post-menopausal women: a systematic review. *QJM.* 2005;98:667-676.

Pietri M, Lucarini S. The orthopaedic treatment of fragility fractures. *Clin Cases Miner Bone Metab.* 2007 May-Aug; 4(2): 108-116.

Fu LW, Vender R. Systemic role for vitamin d in the treatment of psoriasis and metabolic syndrome. *Dermatol Res Pract.* 2011;2011:276079. Epub 2011 Jun 5.

Lagishetty V, Liu NQ, Hewison M. Vitamin D metabolism and innate immunity. *Mol Cell Endocrinol.* 2011 Jun 1.

Falcone TD, Kim SS, Cortazzo MH. Vitamin k: fracture prevention and beyond. *PM R.* 2011 Jun;3(6 Suppl):S82-7.

Brown SE. Vitamin K: the overlooked bone builder and heart protector. *Nutrition and bone health.* Jan 2009.

<http://www.betterbones.com/bonenutrition/vitamin-k/benefits.aspx>.

Chatrou ML, Reutelingsperger CP, Schurgers LJ. Role of vitamin K-dependent proteins in the arterial vessel wall. *Hamostaseologie.* 2011 Jun 29;31(4).

\*Dr. Andrew J Park is a Doctor of Chiropractic with a Masters in Nutrition and Masters in Acupuncture. He is a certified Titleist Performance Institute Medical Professional, PSC Certified Chiropractic Provider on the PGA Tour, Active Release Provider for the IRONMAN and Revolution 3 Triathlon. Contact Dr Park at [bleuhealthsports@yahoo.com](mailto:bleuhealthsports@yahoo.com) for questions, comments, future article requests or visit us at [www.bleuhealthsports.com](http://www.bleuhealthsports.com). Copyright Dr. Andrew J Park\*