

Got D?

By Ann Carey Tobin, M.D., FAAFP

In the past Vitamin D was given little consideration by most of us. Common knowledge holds that bone health is assisted when factors in our skin utilize the sun to manufacture our body's vitamin D requirements. Add some vitamin D-fortified food, calcium and exercise to the formula, and most people once felt that they have this vital area of wellness covered. Surprisingly, while it is true that eating well for optimal health should be easily accomplished by most, research is demonstrating that many Americans are vitamin D deficient. Exciting research is also indicating that vitamin D is not just for bone health.

Vitamin D Facts

Vitamin D is absorbed from the diet or manufactured in the skin, transported to the liver for conversion into the pre-hormone calcidiol, stored in the fat and muscle, and then converted via the kidneys and other tissues to its active steroid hormone form, calcitriol. Exposure to the sun is the most efficient way to synthesis vitamin D, providing 10,000-20,000 IU per day, often within 15-20 minutes of midday sun. However, many factors interfere with this process. Sunscreen, clothing and glass will block the UV-B rays responsible for vitamin D production, and many people, such as office workers, nightshift workers, and the housebound, do not expose themselves to sufficient sunlight. Even supposedly adequate exposure to sunlight might not always be enough. Sunlight intensity is dependent on latitude, altitude, season, cloud cover, ozone levels and other factors. Vitamin D deficiency is common in the northern latitudes (e.g. northern USA and Canada) in the winter, when the skin will manufacture little or no vitamin D for four to five months of the year. In addition, production in the skin and absorption from the diet both decline with age. Other confounding variables include obesity (vitamin D is sequestered in the fat and is less available to circulate in the body), skin pigment (more skin pigment requires longer exposure to the sun), chronic kidney failure, and malabsorption diseases. Finally, food sources are often not adequate to meet vitamin D requirements. There are few natural sources of vitamin D— oily fish, such as salmon, mackerel, tuna, herrings, sardines, and mushrooms, eggs from hens fed a vitamin D-fortified diet, and minor sources found in fortified foods, such as dairy, soy milk, orange juice and cereals.

Disease Prevention & Treatment

Evidence suggests that vitamin D deficiency is common, and that it does represent a significant public health issue. Vitamin D's metabolite, calcitriol, is critical for regulation of calcium and phosphorous, and therefore, for maintaining strong bones. In fact, studies seem to indicate that the amount of vitamin D available is more vital to this process than the amount of calcium consumed. Researchers in this area speculate that the recommendation for daily calcium intake will decrease as the recommendation for daily vitamin D increases. Increased vitamin D intake and blood levels appear to have positive ramifications in the treatment of many disease processes. Vitamin D seems to increase muscle protein synthesis, and may prevent falls by increasing muscle strength and neuromuscular function in addition to strengthening bone. Vitamin D appears to have immunologic activity. For example, population research suggests that long-term vitamin D supplementation decreases the risk of MS in women by up to 40%. Population studies have also shown lower rates of rheumatoid arthritis in older women. In one study, higher levels of vitamin D were correlated with better lung function, a response speculated to be secondary to an immune-regulated decrease in inflammation. Increasing levels of vitamin D are correlated with a decreased risk of developing premenstrual syndrome (PMS). Evidence is also mounting that vitamin D has an anticancer role. According to The Vitamin D Council, "Current research has implicated vitamin D deficiency as a major factor in the

pathology of at least 17 varieties of cancer as well as heart disease, stroke, hypertension, autoimmune diseases, diabetes, depression, chronic pain, osteoarthritis, osteoporosis, muscle weakness, muscle wasting, birth defects, periodontal disease, and more.” More recently autism has been added to that list. With receptors for vitamin D’s metabolites found through out the body, it appears likely that vitamin D is not only critical for bone health, but it is involved in healthy immune function, as well as manifesting anti-inflammatory and anticancer benefits.

Recommendations

Overt signs of vitamin D deficiency include muscle pain, and proximal muscle weakness, often associated with heaviness in the legs, rapid fatigue, and problems climbing stairs and getting out of chairs. It may also affect psychomotor function and balance. However, many people do not manifest or recognize signs of deficiency, and experts are now recommending that most people supplement with 800 to 1000 IU of vitamin D3 (cholecalciferol) per day, perhaps more, depending on the amount of sun exposure, time of year, and health issues. At this time conventional medicine recommends that the upper limit of unsupervised supplementation should not exceed 2000 IU per day, but higher levels can be safely tolerated when therapeutic intervention is required and monitored. Some researchers feel that amounts closer to 5000 IU per day are necessary to maintain adequate storage levels. They argue that fat storage levels must be ample to allow the hormone to be split between its first critical pathway, one that maintains calcium balance, with pathways that lead to realization of the other health benefits mentioned. In addition, the body does require adequate levels of certain cofactors to insure this process is supported. The list is topped by magnesium and vitamin K, but also includes zinc, boron and vitamin A. Vitamin D hypersensitivity, manifested as elevated blood calcium levels, is possible in a small group of individuals with certain health conditions. Treatment plans should be discussed with your health care provider.

Vitamin D2, or Ergocalciferol, is a manufactured version of vitamin D3 often prescribed by physicians. It is not the human analogue, but it is considered vegetarian. At the high weekly doses prescribed it can increase your blood level quickly, but it will dissipate quickly as well. Low oral dosing is usually not therapeutic. With appropriate doses and monitoring low vitamin D levels can be safely reversed using the natural form of vitamin D--cholecalciferol, or D3.

Blood levels of vitamin D can be evaluated with a 25-OH vitamin D level, and vitamin D therapy is monitored with this test and blood calcium levels. Current research supports an optimal 25-OH vitamin D level of 50-80 ng/ml, but not all conventional testing laboratories have converted to these revised reference ranges. I suggest a baseline vitamin D level for all individuals living in our region, but it is particularly useful information for anyone with symptoms of deficiency, with risk factors or illnesses mentioned in this article, those over age 50, especially the elderly, and individuals with limited exposure to sunscreen-free sun time, including some children. Populations at particular risk are the institutionalized, nursing home residents, and the severely ill hospitalized patient.

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