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Is Lack of Vitamin D Aggravating Your Patients' Musculoskeletal Conditions and Increasing their Risk of Cancer and Multiple Sclerosis?

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In the July 2002 edition of the *American Journal of Clinical Nutrition*, Dr. Michael Holick, from the Boston University Medical Center, provides an important editorial reviewing the evidence on vitamin D and its influence on bone health, immune function and risk of colon, breast, ovarian and prostate cancer. He cites a recent report by Shannon Nesby-O'Dell,DVM, which provides irrefutable evidence that vitamin D deficiency is a major unrecognized epidemic in adult women of childbearing age (15-49) in the U.S., and suggests it is likely is equally prevalent among males of the same age.

Vitamin D deficiency is considered to correlate with a blood level of 25-hydroxyvitamin D below 20 ng/mL. Vitamin D receptors exist in the intestine and bone, for regulating calcium and bone metabolism, and are also present in a wide variety of other tissues and organs, including the brain; pancreas; skin; gonads; stomach; colon; breast; mononuclear cells; and activated T and B lymphocytes. Recent studies indicate that tissues expressing vitamin D receptors are able to convert 25-hydroxyvitamin D into 1,25 dihydroxy-vitamin D for their own internal use.

The 1,25 dihydroxyvitamin D form of vitamin D is the most potent form of this vitamin. Studies illustrate that it exerts a number of anti-tumor effects on local tissues, as well as immune modulating influences, which may be important in the prevention of multiple sclerosis. As such, circulating levels of 25-hydroxyvitamin D serve as the raw material from which local tissues synthesize 1,25 dihydroxyvitamin D for their own internal use. Epidemiological studies suggest that lower vitamin-D status is associated with a higher risk of breast, colon, ovarian and prostate cancer.

Garland, et al., reported that when 25-hydroxyvitamin D blood levels were above 20 ng/mL, adults had a 50 percent decreased risk of developing colon cancer later in life. Other studies indicate that blood levels of 85-120 ng/mL may be highly protective with respect to cancer risk, and may significantly reduce the risk of developing multiple sclerosis via immune-modifying influences. Experimental studies reveal that 1,25 dihy-droxyvitamin D exhibits a number of anti-cancer effects, including inhibition of cellular proliferation (including an anti-proliferative effect on human prostate, breast and colon cancer cell lines), the induction of cellular maturation, and immunomodulatory influences. Holick states that the local cellular production of 1,25 dihydroxyvitamin may be essential for the regulation of cellular health, thereby decreasing the risk of developing some cancers.

Further evidence for this contention stems from the observation that African- Americans, who are chronically vitamin-D deficient (largely due to melanin concentrations blocking ultraviolet light penetration of the skin, significantly reducing the synthesis of vitamin D), have a higher incidence and more aggressive forms of many cancers, including those of the breast and prostate. One study has shown that men who are exposed to more sunlight can delay the onset of prostate cancer by more than five years.

From an evolutionary standpoint, exposure to direct sunlight is the principal way in which we derive our vitamin D stores. Very few foods, in their natural forms, contain vitamin D. Unfortunately, a great number of Americans live above 42-degree latitude, where there is too little year-round sunlight intensity to maintain optimal blood levels of 25-hydroxyvitamin D. For these individuals, it is necessary to eat fatty fish, such as salmon and mackerel, three to four times per week to satisfy the body’s vitamin D requirement. Of course, there are 100 IU of vitamin D in every eight ounces of fortified milk, as well.

Although the 1997 recommendations by the Institute of Medicine suggest that middle-aged adults (50-70 yrs) should consume 400 IU of vitamin D per day, and older subjects should consume 600 IU of vitamin D per day, evidence is strong to indicate that in the absence of exposure to sunlight, the adequate intake for vitamin D should be at least 800-1,000 IU per day. Holick points out that vitamin D intake is completely safe up to 2,000 IU per day for those aged one year and older, and that the risk of vitamin D toxicity is greatly exaggerated by many health policy makers.

The only way to know a patient’s vitamin D status is via a blood test to measure circulating levels of 25-hydroxyvitamin D, which should be performed annually. A good target to shoot for is 85-120 ng/mL. Vitamin D toxicity has never occurred with blood levels of 25-hydroxyvitamin D below 250 ng/mL. Thus, a

wide margin of safety is in place to guard against risk of toxicity, in the event that vitamin D supplementation is implemented.

Finally, it should be noted that vitamin D is not only important in the prevention of childhood rickets, but that vitamin D is essential to maximize skeletal health from birth until death. The conversion of 25-hydroxyvitamin D to 1,25 dihydroxyvitamin D in the kidneys gives rise to blood levels of 1,25 dihydroxyvitamin D, which increases the efficiency of intestinal calcium and phosphorus transport. Vitamin D deficiency causes a mineralization defect that results in subtle growth retardation in adults, known as *osteomalacia*.

Osteomalacia is characterized by nonspecific or generalized bone pain, muscle aches, and weakness, i.e., symptoms similar to those of fibromyalgia. In fact, it was shown that a majority of Danish women with symptoms of fibromyalgia had severe vitamin D deficiency and osteomalacia, and that these factors were responsible for many of the reported musculoskeletal symptoms. As such, it is important to screen these patients for potential vitamin D deficiency and to correct it if discovered. As well, it should be noted that the conversion of 25 - hydroxyvitamin D to dihydroxyvitamin D in the kidneys declines with age, due to reduced synthesis of the hydroxylase enzyme that catalyzes this metabolic step. Therefore, it becomes necessary to provide higher doses of vitamin D to older subjects to compensate for the reduced synthesis of the more potent form of vitamin D (dihydroxyvitamin D). The study by Chapuay demonstrated that providing 800 IU of vitamin D per day to institutionalized elderly women (over 80 years old), as a sole intervention, was able to reduce the incidence of hip fractures by approximately 50 percent over a three-year period.

Evidence suggests that many North Americans are vitamin-D deficient, and would benefit from additional vitamin D supplementation. Most multiple vitamins contain 400 IU of vitamin D, an amount that is reported to raise vitamin D blood levels (25-hydroxyvitamin D) by approximately 45 ng/mL. However, even higher amounts of total supplemental vitamin D (800 - 1,000 IU per day) may considered in regards to optimizing bone health and reducing risk of certain cancers and multiple sclerosis, in the management of some cases of fibromyalgia; and prevention in patients with a previous history of colorectal, prostate, ovarian or breast cancer.

Reference

Holick M. Too little vitamin D in premenopausal women: why should we care? *Am J Clin Nutr*. 2002;76:3-4.

Please take time to listen to Dr. Meschino's interviews on **Chiro Web.com**. The subjects of the first three are: *Combining Traditional, Complementary and Natural Interventions, The Benefits of Melatonin, and Using Natural Remedies to Manage Women's Health Issues*. Each interview is packed with important information available to you and your patients. You can listen to the interviews at http://www.chiroweb.com/audio/meschino. There is a link on the directory page for your feedback.

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