Vitamin D Supplements May Reduce Risk for Dental Caries
Laird Harrison  |  Dec 04, 2012

Dental professionals may want to consider whether their patients have adequate vitamin D levels when assessing them for caries, a new study suggests.

Vitamin D supplements were associated with a 47% reduction in risk for caries, according to a systematic review and meta-analysis published online November 9 in *Nutrition Reviews*.

However, the quality of the evidence amounted to "low certainty" by the standards of the US Preventive Services Task Force, according to the study's author, Philippe P. Hujoel, DDS, PhD, professor of oral health sciences, University of Washington, Seattle.

"There have been 3 studies conducted recently," Dr. Hujoel told *Medscape Medical News*. "They were very favorable, but they increased vitamin D levels by low amounts through full-spectrum lighting, making it unclear if the caries reduction was due to vitamin D or due to the pineal gland activation. Dentistry has emphasized fluoride and sealants, and vitamin D has fallen by the wayside."

Vitamin D has long been known to play a role in tooth formation, but some researchers have theorized that it might have additional benefits in reducing caries through either antimicrobial or immunological effects.

The decline in interest in the effects of vitamin D on caries is puzzling because even those studies done between World War I and World War II suggest that supplements and ultraviolet light treatments could reduce caries rates, Dr. Hujoel said.

The American Dental Association (ADA) initially endorsed that finding, and the American Medical Association (AMA) followed suit, but then the ADA reversed its position for reasons that are no longer clear, Dr. Hujoel said. He is exploring that history for a future article.

Dr. Hujoel did not find a big difference between the effects of ultraviolet therapy and nutritional supplementation with either vitamin D2 or vitamin D3.

Ineffective After Age 13 Years

According to his analysis, vitamin D supplementation was ineffective after the age of 13 years, particularly for girls, and he theorized that changes in body fat could influence the way vitamin D is stored and metabolized.

He notes that the better trials he found were more likely to show evidence for the success of the treatment. "Regardless of whether trial quality was defined by an overall quality score, by individual study design characteristics, by the pivotal nature of a study, or by the time era in which the studies were conducted, higher study quality translated into higher vitamin D effectiveness," he writes.

For example, the studies in which the treatment groups were more similar showed a significantly larger vitamin D benefit than those studies in which investigators assigned vitamin D on the basis of health awareness or caries experience.

In addition, the trials with the biggest funding, scope, and sample sizes reported more pronounced beneficial effects. Finally, 2 studies published in 1975 and 1989 with more contemporary design, caries scoring methods, and settings showed more effectiveness than...
the 22 controlled clinical trials conducted between World War I and World War II.

Dr. Hujoel also researched whether the caries reduction associated with vitamin D was a result of "vehicle effects" (the benefits of whatever was administered along with the vitamin D). For example, some trials used cod liver oil, which also included vitamin A, iodine, and marine fats.

Other trials used ultraviolet light therapy, which could have activated the participants' pineal glands, increasing salivation. That effect might have been more important than stimulating their skin to produce vitamin D precursors.

However, these alternative explanations cannot easily account for the consistent benefit across trials that used a variety of vitamin D therapies.

**Falls Short of Proof**

The meta-analysis falls short of proving that vitamin D protects against caries, Dr. Hujoel acknowledged. Although some of the studies done decades ago were sophisticated for their time, with control groups, randomization, and statistical analysis, they did not entirely meet contemporary standards of study design.

In a few, investigators also appeared to have conflicts of interest. For example, he writes, "[a] pathologist involved with patenting vitamin D3 extraction was described as cooperating 'heartily' with caries trials and coauthored a report suggesting that vitamin D3 was superior to vitamin D2."

In addition, Dr. Hujoel pointed out, populations have changed since the early 20th century, when the bulk of the research was done. Diets were lower in carbohydrates and phosphate, rickets was common, fluoride was less widely used, and sun exposure was considered essential to health.

Finally, Dr. Hujoel notes that he did not find evidence of a dose response. For this reason, he does not think that patients who have adequate serum vitamin D levels are likely to get any benefit from supplements.

"I'm not at all in favor of supplementing," he said. "Children should play in the sun or get vitamin D through their diet."

Still, it would not hurt to recommend that patients with caries make sure they are getting adequate vitamin D, as they will likely benefit in more ways that just the narrow issue of caries prevention, he said.

That recommendation might particularly pertain to patients found to be at high risk for recurring caries, according to Michael Rethman, DDS, an associate clinical professor at the University of Maryland in Baltimore and former chair of the ADA's Council on Scientific Affairs. Dr. Rethman was not involved in the study.

"I agree with [Dr. Hujoel's] analysis that this is a topic that ought to be looked at with well-designed prospective clinical trials," Dr. Rethman told Medscape Medical News.

*Dr. Rethman and Dr. Hujoel have disclosed no relevant financial relationships.*

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