

Vitamin A and Bone Health



Question:

Does Vitamin A intake affect a person's bone health and increase their risk for fractures?

Answer:

Studies on the association between vitamin A and osteoporosis and hip fracture risk have yielded conflicting results.

What is Vitamin A?

Vitamin A is necessary for good health; it plays a vital role in our vision, bone health, reproduction and cellular function. There are several forms of vitamin A, including retinol. Beta-carotene isn't vitamin A, but the body can use beta-carotene to make vitamin A.

Retinol is sometimes called the "true" or preformed vitamin A, because it is already in a form the body can use. Retinol is found in animal foods such as liver, eggs, and fatty fish. Some fortified foods and products, such as cereals, and in dietary supplements, also contain retinol. Cod liver oil contains an exceptional amount of vitamin A.

Beta-Carotene is a precursor for vitamin A. The body needs to convert it to retinol (vitamin A) for use. Beta-carotene is found naturally in orange and dark green plant foods, such as carrots, sweet potatoes, mangos, and kale.

How Much Vitamin A do I need?

The Institute of Medicine (IOM) developed the Recommended Dietary Allowances (RDA) for vitamin A (retinol). The recommended intake is 2,310 IU for women and 3,000 IU for men. The percent of Daily Value (DV) of vitamin A listed on food and dietary supplement labels are based on the higher, 1968 RDA value of 5,000 IU per day. This 1968 RDA is

approximately twice as high as what is recommended by the IOM. The safe Upper Limit (UL) for the Vitamin A (retinol) is 10,000 IU. There is no safe upper limit for beta-carotene. If the body already has enough of this nutrient, it will not convert beta-carotene into vitamin A.

The Research

Unfortunately, the studies on vitamin A and osteoporosis don't give consistent results. Another issue is that these studies are observational, so they cannot prove cause and effect. To prove cause and effect, we would need a controlled clinical trial, in which women were randomly selected to take different amounts of vitamin A, and then followed for many years to note who developed osteoporosis and bone fractures.

We don't have this type of study, but the observational research does give us some indication that vitamin A plays an important role in bone health. It seems that both too little vitamin A in the diet or from supplements, and too much, may contribute to osteoporosis.

One large study of 72,000 postmenopausal women found that women who consumed too much vitamin A—more than 10,000 IU per day— had double the risk of hip fracture compared with women taking in less than 4,125 IU per day (1). This result was strongest for women not taking hormone replacement (HRT), which make sense, because we know HRT itself will protect women from bone loss.

Two other large studies—one that followed nearly 35,000 women, and another that included more than 75,000 women—failed to show a strong relationship between intake of vitamin A and retinol and hip fracture risk (2,3). One of these studies did suggest that taking vitamin A supplements may increase hip fracture risk a small amount.

Why are the research results conflicting?

One reason why the research hasn't given us a clear picture is that other nutrients may play an important role in how vitamin A affects bone health. For example, researchers who studied bone health in 232 women found that getting too much vitamin A in combination with getting too little vitamin D was particularly bad for bones. Women who fit this profile had significantly higher risk of osteoporosis (4).

And a comprehensive review of nutrition and bone health underscores the importance of overall nutrition to bone health. The authors of this paper noted that when it comes to bone health, vitamin D and calcium get all the press. However, they pointed out that both excessive and insufficient consumption of vitamin A may harm bones, and that deficiencies in B vitamins and vitamins C, E, and K can compromise bone health.

The following tips and ideas will help you minimize your risk of hip fractures and insure adequate intake of vitamin A:

- Aim to eat more than two cups of fruits and two and one half cups of vegetables per day, especially deeply colored fruits and vegetables. Plants are the healthiest way to obtain beta-carotene and other carotenoids, several of which our bodies can convert to vitamin A as needed.
- Since liver and cod liver oil have very concentrated amounts of vitamin A, they should not be used on a regular basis.
- If you take a multivitamin and mineral supplement, stick with a brand that contains no more than 100% of the Daily Value (5000 IU) of vitamin A. Vitamins that provide at least 20% of vitamin A in the form of beta-carotene or mixed carotenes are the best option. Be sure to read labels, to avoid taking in more than 100% of the vitamin A daily value from all your dietary supplements together. Consult with a registered dietitian or your physician.
- If you smoke, do not consume a vitamin supplement that uses beta-carotene as its main source of vitamin A. Studies show that the combination of supplemental beta-carotene and smoking may increase risk of some cancers and heart disease. Ask your health care provider for help with quitting smoking.
- Read labels on frequently eaten foods that may be vitamin A fortified, to determine how much pre-formed vitamin A (retinol) you are getting. Limit foods that contain 50% or more of the retinol form of Vitamin A per serving to 1-2 per week. If you also take a multi-vitamin with 100% of the DV for Vitamin A, you may want to switch to a brand that gives you a little less, so you don't overdo it with vitamin A from these different sources.
- Ask your doctor to check your vitamin D level. If it is low, your doctor or dietitian can help you develop a plan to safely bring vitamin D levels into the normal range.

The original question and answer were generously donated by Diana Dyer, MS, RD a cancer survivor, registered dietitian, organic garlic farmer, and the author of "A Dietitian's Cancer Story: Information & Inspiration for Recovery & Healing from a 3-time Cancer Survivor."

Question and Answer updated by Heidi Scarsella, RD, CSO, LDN, on behalf of the ON-DPG.

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