Patient Information

The Deal with Vitamin D Deficiency

Vitamin D is often called the "sunshine vitamin," because exposure to the sun's ultraviolet—or UV—rays signals the skin to produce this essential vitamin. Vitamin D is very important to bone health, as it helps the body absorb calcium and keep the right amounts of calcium and phosphate circulating in the blood. It also plays important roles in keeping the immune system, nerves, and muscles healthy.

Vitamin D deficiency occurs when the body does not have access to enough vitamin D. Usually, this happens because the person is not getting enough vitamin D though sun exposure, foods, or supplements. In other cases, there may be a digestive, liver, kidney, or genetic problem that stops the body from absorbing or processing vitamin D properly.

Either way, the consequences of vitamin D deficiency over time can be very serious. In children, insufficient amounts of vitamin D can cause *rickets* (**rik**-ets), a disease in which the bones are softened and weakened, leading to fractures and deformities. In adults, vitamin D deficiency can cause or worsen *osteomalacia* (ahs-tee-oh-ma-**lay**-she-uh), an adult version of rickets, and *osteoporosis* (ahs-tee-oh-puh-**ro**-sis), thinning of the bones. Growing evidence also links vitamin D deficiency with an increased risk of breast, prostate, and colon cancers; multiple sclerosis; heart disease; arthritis; and diabetes—although more research is needed to fully understand the relationships between vitamin D and these conditions. In pregnant women, vitamin D deficiency may increase the chances of a cesarean delivery.

In recent years, vitamin D deficiency has become extremely common among children and adults in the United States. Fortunately, there are steps you can take to make sure you are getting enough vitamin D and to avoid problems.

How do I know if I'm at risk?

As you travel away from the equator (north or south), you are exposed to less sunlight for longer periods of the year. As such, people living in regions far from the equator (such as Alaska) are at higher risk for vitamin D deficiency. The risk is also increased for darker skinned individuals, whose skin contains more melanin, a natural sunblock.

The risk of vitamin D deficiency also increases with age, as the skin becomes less efficient at producing vitamin D from sunlight exposure. Other populations at risk include obese individuals (whose fatty tissue may keep too much vitamin D out of circulation), breastfed infants (since human milk does not provide sufficient amounts of vitamin D), and people with disorders (such as some liver diseases, cystic fibrosis, and Crohn's disease) that reduce the body's ability to absorb dietary fat. Additionally, since vitamin D–fortified milk is an important source of the vitamin for most Americans, people who rarely or never drink milk—such as those who are lactose intolerant or follow a strict vegan diet—are at higher risk.

What are the warning signs?

Some individuals with vitamin D deficiency report bone pain or muscle weakness. But in the majority of cases, the condition produces no early warning signs.

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What tests do I need?

The only way to find out whether you have enough vitamin D in your system is with a blood test. This test measures the amount of 25-*hydroxyvitamin* (hi-**drock**-see-vite-uh-muhn) D, the substance produced when the liver processes vitamin D, in your bloodstream. It reflects the total amount of vitamin D coming from all sources—including diet, supplements, and sun exposure. To get the most accurate measurement, you should be tested during the fall or winter months, when vitamin D blood levels tend to be at their lowest.

How can I avoid the problem?

One of the best ways to prevent vitamin D deficiency is to spend time in the sun. Because most sunscreens block the UV rays that stimulate vitamin D production, however, the skin must be exposed without the protection of sunscreen in order to boost vitamin D levels effectively. Since prolonged exposure to UV rays is known to cause skin damage, including skin cancer, experts are still debating how much sun exposure is safe. Some research suggests that five to 15 minutes of unprotected exposure between the hours of 10:00 AM and 3:00 PM during the spring, summer, and fall may be safe and effective for people with skin that is prone to burning.

You can also increase your vitamin D intake through your diet. Only a few foods—including cod liver oil; oily fish such as salmon, mackerel, tuna, and sardines; egg yolks; beef liver; swiss cheese; and some mushrooms—contain vitamin D naturally. But others, such as milk and certain cereals and juices, have been fortified with vitamin D.

If diet and sun exposure aren't enough, you may want to try vitamin D supplements. It is estimated that at least 1,000 International Units—abbreviated "IU"—of vitamin D are needed to satisfy the body's daily requirement. Too much vitamin D can harm you, though, so before you start taking a vitamin D supplement, talk with your doctor about which supplement is right for you and how much to take.

How is it treated?

Patients diagnosed with vitamin D deficiency usually are prescribed a vitamin D supplement. Typically, a high-dose supplement is taken once a week for eight weeks. If vitamin D levels remain below the target, the supplement may be continued on a weekly or monthly basis. The prescribed dosage can vary depending on the degree of the deficiency and its underlying cause.

If complications of vitamin D deficiency have developed, such as bone or muscle damage, you may require other treatments to address these problems. For instance, people with osteoporosis usually need to take calcium supplements and, in some cases, other medications. Serious bone deformities—as from rickets or osteomalacia—may require surgery.

To learn more, visit the vitamin D page of the National Institutes of Health web site (http://ods.od.nih.gov/factsheets/vitamind.asp).

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