



Sunshine, Vitamin D, and Bone Health

Vitamin D is unique among vitamins in that our body can make all it needs with help from the sun. When the ultraviolet rays hit our skin, our bodies can make vitamin D. We can produce more vitamin D during the summer months due to more sunlight. When we do not get enough sun, we need to get vitamin D from the food we eat. Because it is a fat-soluble vitamin, vitamin D is stored in the liver and adipose (fat) tissue and can become toxic. Recently, vitamin D has received a decent amount of press because many Americans do not get enough; by one estimate, more than a third of young adults may take in too little. Why is this vitamin so important to our bone health and how can we be sure we are getting enough of this vital nutrient?

One of the major roles of vitamin D, which is also a hormone, is to regulate our blood calcium levels. Calcium is indispensable to the proper functioning of all our body tissues – including muscles, nerves, and glands. These tissues draw calcium from the blood as needed. Hence, there must be a constant supply of calcium. Our skeleton acts as a calcium reserve. When calcium intake is low, our blood calcium level is maintained at the expense of our bones. Inadequate vitamin D sets the stage for loss of calcium from the bones which can result in fractures from osteoporosis.

To replenish blood calcium, vitamin D acts at three body locations to raise blood calcium levels:

- 1) skeleton,
- 2) digestive tract - where food brings in calcium, and
- 3) kidneys – which can recycle calcium that would otherwise be lost in urine.

Calcium is the most abundant mineral in the body and is a major component of our bones – 99% of our calcium stores are in the bones and teeth. Therefore, without enough Vitamin D, our bone health is compromised. Rickets, a vitamin D deficiency disease, is characterized by abnormal bone growth in children. Deficiency for adults results in a painful bone disease known as osteomalacia; the bones become increasingly soft, brittle, and deformed.

Once vitamin D is produced in skin or consumed in our

food, it requires chemical conversion in the liver and kidney. Calcitriol is the primary form of vitamin D in the body; it is converted from calcidiol in the kidneys. Calcitriol then travels to various parts of the body to do its work.

Vitamin D stimulates maturation of cells, including immune cells that defend against disease. Vitamin D also acts on genes, affecting how cells grow, multiply, and specialize. Because this vitamin is stored in the body, it is possible to have too much. Vitamin D is the most potentially toxic of all vitamins – generally due to taking supplements. Intakes of 5x recommendations have been associated with signs of vitamin D toxicity.

The DRI (Dietary Reference Intakes) for vitamin D are:
 5 micrograms (µg)/day = ages 19-50
 10 micrograms = ages 51-70
 15 micrograms = 71+

The UL (upper intake level) is 50 micrograms per day (2,000 IU on supplement labels). Toxicity from too much vitamin D includes calcification of blood vessels, kidneys, heart, lungs, and tissues of joints. Please beware of supplementation!!

To receive vitamin D from the sun, the pigment of your skin is a factor. The darker the skin, the longer exposure to direct sunlight is needed – even as much as three hours – depending on the climate. Light-skinned people need much less – 10 to 15 minutes. Sunscreen inhibits vitamin D absorption, but you cannot get too much vitamin D from the sun; the sun itself begins to break down excess vitamin D in the skin. Besides the sun, rich sources for vitamin D include fortified milk, salmon (3 oz. = 4.3 µg) shrimp (3 oz. = 3.0 µg), liver, and sardines.

Remember to get a little sun, and/or eat foods rich in vitamin D so your bones and tissues will stay healthy and function properly!!

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