

Vitamin D & Dentistry: For Stronger Teeth Be D-lightful

Abstract

Being busy doesn't make you special, everyday God gave us the Sun and the ability to change everything that makes us unhappy. Vitamin D deficiency is now recognized as a pandemic. The major cause of vitamin d deficiency is the lack of sun exposure because in busy life no one has enough time to be in sunlight. Sun tan is also a major reason behind that because looks has become an inseparable part of people's life. Because the body makes vitamin D when your skin is exposed to sunlight, you may be at risk of deficiency if you are homebound. Vitamin D deficiency not only causes medical problems but also contributes in dental disease also.

Introduction

Among the entire vitamins which are necessary for body, vitamin D plays an important role including the development and calcification of the bones.

Vitamin D is incredibly important yet almost completely overlooked in dentistry. I don't think any Dentist would ever suggest you to check your vitamin D level for the prevention of periodontal disease or cavities.

Vitamin D is the collective name given to anticrachitic substance synthesized in the body and found in activated by UV radiation. Vitamin D is a fat-soluble vitamin that helps maintain the levels of calcium and phosphorus in your blood. There are two kinds of vitamin D that are beneficial to humans: vitamin D2 and vitamin D3. You can get vitamin D2 can be extracted from plant sources, while vitamin D3 is produced by your skin after exposure to sunlight.

The maxillofacial skeleton shows several unique features when compared to the axial and appendicular bone. Thus, vitamin d related physiopathology follows general but additional site specific pathway in the oral region.

Vitamin D deficiency plays a role in dental include altered formation and oral bone pathologies including jaw osteonecrosis and periodontal disease, the mechanism of which

rely on the specific behavior of oral cells. The oral region is composed of a variety of skeletal tissues. These include the hypermineralized enamel layer which covers the dental crown. Dental enamel is an exclusive example of epithelial derived mineralized tissue in the body. Mesenchymal derived tissues include dentin which constitutes the bulk of crown and dental root. Cementum attaches the teeth inside their bone socket via a connective tissue and periodontal ligament. Two anatomical compartments form the maxillary bones: alveolar bone is intimately associated with teeth during its formation, homeostasis the structural basis of maxilla and mandible which anchors dental arches and their associated alveolar bone.

The first original property of the oral skeleton is the presence of teeth. They are composed of unique epithelial (ameloblasts) and mesenchymal (odontoblasts and cementoblasts) cells which are more or less similar to osteoblasts. Consistently, dental cells are responsive to 1,25-dihydroxyvitamin D3 (1,25(OH)2D3).

Vitamin D metabolites impact dental cells via genomic and nongenomic pathways. Additionally, vitamin D monitors calcium, phosphate, and PTH serum level which secondarily influence dental cells and mineralization.

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Effects of Vitamin D Deficiency on Teeth

We all know the importance of calcium for healthy bones and teeth, but the importance of vitamin D is always overlooked.

Delayed Formation

Dental hypoplasia is a condition characterized by having white spots, small fissures or deep grooves in the enamel of teeth. According to the National Institute of Health, this condition is prevalent in children born to mothers who suffer from vitamin D deficiency. Women who do not receive the right amounts of vitamin D during pregnancy put their developing babies at risk of vitamin D deficiency. Insufficient levels of vitamin D can delay the formation of teeth when babies are born. Newborns may require vitamin D supplements to ensure their teeth develop at normal rates. Interglobular dentin is especially noticeable with vitamin D deficiency, which affects the mineralization of teeth and bones. Hypoplasia of the enamel also may be evident in case of vitamin D deficiency.

Weak Teeth

Insufficient amount of vitamin D level can weaken and soften the structural integrity of bones and teeth in children. This is the reason why developing teeth require the right amounts of calcium to strengthen and harden them. Due to insufficient amounts of vitamin D, our body is unable to get the calcium it needs to make



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teeth strong.

Presence of Malformed Teeth

Our body requires vitamin D to properly form our teeth, decrease level of vitamin D can cause our teeth to become malformed or have flaws in its structure. In fact we may also have holes in our enamel because of low vitamin D levels. Vitamin D deficiency can increase chances of developing cavities in our teeth.

Structural Integrity

Vitamin D and calcium are integral partners in providing strong teeth and bones. When you are deficient in either, your body must maintain its blood supply of those vitamins by leeching them from your bones. In addition to weak and porous bones, loss of bone in your jaw can lead to loss of teeth in the long term. Having teeth that are soft or misshapen is typically a hereditary trait that might be linked to vitamin D deficiency.

Vitamin D is imperative in the regulation of calcium; no amount of calcium will enter into bones and teeth if the vitamin D levels are low. The result can be Osteoporosis, Periodontal Disease and Weak Teeth.

Vitamin D is really very important in the process of keeping the teeth anchored into their socket.

Vitamin D reduces the gingivitis because of the anti-inflammatory effect of vitamin.

Gum disease causes an escalation in the production of cytokines, which are biological bodies that increase inflammation in your body. Vitamin D is able to suppress the production of cytokines, and therefore reduce the risk of periodontal disease.

Vitamin D During Pregnancy

Getting enough vitamin D is an important part of pregnancy. Vitamin D absorbs calcium, a mineral used to strengthen bones and teeth. Due to low level of calcium, you're more susceptible to osteoporosis, cavities and periodontal disease, among other medical and dental problems.

When you don't get the proper amount of calcium during pregnancy, your baby will start taking it from your bones. Expectant mothers need vitamin D to help absorb enough calcium for themselves as well as their unborn babies.

In utero, an infant is completely dependent upon the calcium, vitamin D and phosphorus its mother takes in to form healthy bones and teeth. If maternal intake is low, formation of those structures and the child's own vitamin D levels will be impaired. This can translate to teeth that are weak and malformed in adulthood.

Just as calcium and vitamin D are needed for healthy bones, they are also necessary for baby's oral health. Teeth start to form in utero, so dental problems can start before they even erupt. It's long been known that calcium helps strengthen a fetus' teeth during the development process but now scientists have discovered a link between prenatal vitamin D and tooth decay.

"A recent study indicates that children born to mothers with inadequate vitamin D levels had a greater chance of developing early

childhood dental caries. During the study, the vitamin D levels of 206 pregnant women were analyzed during their second trimester. Only 10.5 percent of the women had adequate levels of vitamin D. Researchers then followed up on 135 of these infants at 16 months of age. Of the children born to women with lower levels of vitamin D, 21.6 percent of them had enamel defects, which leave teeth more susceptible to dental cavities. Tooth decay was found in 33.6 percent of the children born to women with the lowest levels of vitamin D.

The results of this study raise concerns in the dental health community, and although further research is needed, it may mean expectant mothers need to increase their vitamin D intake to help prevent childhood dental problems".

What are the Symptoms of Vitamin D Deficiency?

There is no clear pattern of symptoms. In fact many people remain asymptomatic despite low levels. But here are the more common symptoms

- §Fatigue
- §General muscle pain and weakness
- §Muscle cramps
- §Joint pain
- §Chronic pain
- §Weight gain
- §High blood pressure
- §Restless sleep
- §Poor concentration
- §Headaches
- §Bladder problems
- §Constipation or diarrhea

What Diseases are Associated with Vitamin D Deficiency?

Vitamin D deficiency has been shown to play a role in almost every major disease. This includes:

- §Osteoporosis and Osteopenia
- §17 varieties of Cancer (including breast, prostate and colon)
- §Heart disease
- §High blood pressure
- §Obesity
- §Metabolic Syndrome and Diabetes
- §Autoimmune diseases
- §Multiple sclerosis
- §Rheumatoid arthritis
- §Osteoarthritis
- §Bursitis
- §Gout
- §Infertility and PMS
- §Parkinson's Disease
- §Depression and Seasonal Affective Disorder
- §Alzheimer's Disease
- §Chronic fatigue syndrome
- §Fibromyalgia
- §Chronic Pain
- §Periodontal disease
- §Psoriasis

Normal Level of Vitamin D

How much vitamin D we need varies with age, body weight, latitude, percent of body fat, skin coloration, use of sun block, season of the year, individual variation in sun exposure, and

probably how ill you are.

As a general rule, old people require more than young people, big people require more than little people, fat people require more than skinny people, northern people require more than southern people, dark-skinned people require more than fair skinned people, winter people require more than summer people and ill people may need more than well people.

Daily Requirement -400 IU (10 mg)

Pharmacokinetics

Given orally, vitamin D is well absorbed from the small intestines in the presence of bile salts. It is converted to 25- OHD3 in the liver and circulates in the plasma, bound to a protein and is stored in the adipose tissue. Vitamin D is also degraded in the liver and the metabolites are extracted in the bile.

Sources of Vitamin D



25-Hydroxy Vitamin D Test

The 25-hydroxy vitamin D test is the most accurate way to measure how much vitamin D is in your body.

In the kidney, 25-hydroxy vitamin D changes into an active form of the vitamin. The active form of vitamin D helps control calcium and phosphate levels in the body.

