

Periodontal Considerations of Vitamin D in Geriatrics

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Editorial

Vitamin D is commonly designated as the 'sunshine pill' due to the inherent ability of an individual to synthesize it within the body as result of exposure to UV rays. A global prevalence of over one billion, irrespective of race and age groups have been recorded deficient. This could be attributed to lifestyle and environmental factors and also has independent risk factor for total mortality in the general population [1]. To a small extent; it can be absorbed from food. However, these processes become less effective with age. This group of fat soluble entities/secosteroids has been marked responsible for increasing intestinal absorption of calcium, iron, magnesium, phosphate, and zinc. The two distinct categories in this group are vitamin D3 (cholecalciferol) and vitamin D2 (Ergocalciferol). Vitamin D3 is synthesized in mammalian skin under the influence of UVB, wavelength 295-297 nm from sunlight and absorbed into the circulation [2].

Formerly, deficiency of Vitamin D was known to be associated with rickets in children and osteomalacia in adults, however, recent literature has been linked to various diseases like cancer, pneumonia, heart disease, fractures and falls, autoimmune diseases, influenza, type-2 diabetes, depression, osteoporosis and even periodontal disease. To evade such consequences, it is recommended to take vitamin D by both men and women over age 30, at the doses: [3]

31-50 years 200 IU (5 µg)

51-70 years 400 IU (10 µg)

>70 years 600 IU (15 µg)

Normally, Vitamin D level is assessed by measuring plasma 25-hydroxyvitamin D (25-OH D). There are two commonly used terms such as Vitamin D insufficiency and/or deficiency. Vitamin D insufficiency is the lowest threshold value for plasma 25-OH D (around 50 nmol/l). Vitamin D deficiency is defined as values below 25 nmol/l. The availability of these referral values prevents bone mineral loss, secondary hyperparathyroidism, increased bone turnover etc. Today, vitamin D insufficiency has been global problem affecting both the young and old. The reason being to prevent sun-related skin aging, skin cancer and the elderly clinging onto indoor movements, reduction in nutritional food intake and gut absorption of vitamin D which could worsen the problems relating to hypovitaminosis D [4,5].

Two age-related systemic diseases like diabetes and hypertension have also been correlated with insufficiency of Vitamin D. Adequate intake of Vitamin D supplements have improved the conditions [6,7]. Health professionals have also suggested a step up in Vitamin D dose to atleast 800-1000 IU [8], related to their individualist conditions.

Reported evidence have showed that vitamin D supplementation was associated with significantly reduced mortality [9].

Systemic Effects of Vitamin D

Vitamin D is well established as being essential for bone growth and preservation. It exerts its effect on periodontal health through two mechanisms i.e. effect on bone mineral density (BMD) and through immune modulatory effects. Literature review, suggests that Vitamin D receptor (VDR) present in cells of the immune system produce Vitamin D hormone, which could attribute to its immune-regulatory properties [10]. It aids in the absorption of dietary calcium and phosphorus, which if deficient can result in an increase in PTH levels which could contribute to increase in osteoclastic activity creating decrease in BMD, eventually resulting in osteopenia and osteoporosis [11]. In the elderly, nutritional supplementation with Vitamin D and calcium is effective in preventing non-vertebral fractures [12]. Its effects on the cardiovascular system is associated with the regulation of the renin-angiotensin system [13].

Periodontal Disease and Vitamin D

Periodontitis is a complex disease which results in a homeostatic imbalance in bone and connective tissue due to a complex interaction of biofilm and host immune defense system. Microbial pathogens interact to form a biofilm creating periodontal disease. Vitamin D enhances the immune system by stimulation of monocytes [14] and through the regulation of cathelicidin, an antimicrobial peptide produced by within the human body [14]. Literature reported by Garcia et al. [15] states the beneficial role of Vitamin D in the treatment of periodontal disease as a result of its anti-inflammatory effect, through the inhibition of cell cytokine expression and stimulation of immune cells to secrete peptides that have an antibiotic effect.

Scientific search have also proposed links between improvement in periodontal health following dietary intake of Vitamin D and calcium [16] which further had a positive correlation on bone density and reduction of alveolar bone resorption [17].

Data from the national health and nutrition examination survey (NHANES) III survey, investigated the association of serum 25(OH) D concentrations and periodontal attachment loss. The results suggested a strong link of periodontal disease with poor Vitamin D status. Further, poor Vitamin D repletion is associated with increased risk, and severity, of osteoporosis and supplementation (800 IU daily or more in older people) reduces rates of bone loss over time [18].

Hence, it may be noted that replenishment of Vitamin D will reduce the risk of infections that have their etiology related either to

pathogenic content or due to defects in bone. This is of major importance for geriatric patients where aging relates to reduction in immune levels and adequate bone support.

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