



Miserable Marriage between Periodontitis and Vitamin D Deficiency

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Abstract

Who said that even the most dangerous diseases cannot be prevented or treated by simple, axiomatic and natural modalities? To catch this opportunity we should know our disease very well, and from this concept the subject of our mini review was born. Recently, there was a relation between periodontal diseases and vitamin D being built and strengthened by the results of researches. In other words we will target one of the most important causative factors of periodontitis, we will review the relation between periodontitis and vitamin D deficiency.

Keywords: Periodontitis; Periodontal Diseases; Vitamin D; Vitamin D Deficiency

Introduction

Periodontitis could be defining as an infectious - inflammatory disease that resulted from the effect of different microorganisms. In this disease, the target is the supporting tissues of the teeth, which consequently lead to the damage of the alveolar bone and the other supporting structures and ultimately lead to several clinical features like for example: bleeding on probing, pocket formation, mobility, tooth migration and finally with miserable end of the tooth that cannot be avoided [1,2].

Causes of Periodontitis

A complicated interplay between specific microorganisms and a manipulated response of immune system being the most valuable causative factor of periodontitis [3,4]. The load of bacteria broadcasts, when the community of oral biofilm is disorganized. These results in a condition called as a microbial dysbiosis, with a consequent increase in the inflammatory condition that associated with increase in the inflammatory mediators and cytokines. This irritated situation eventually leads to periodontal disease developments [5,6].

Socransky SS, et al. pioneered the identification of a specific periodontal microorganism, they called them red complex. Red complex including, Porphyromonas gingivalis, Treponema denticola and Tannerella forsythia accused as the main causative factor of sever periodontal destruction [5-8]. However this accusation expanded to include other species and other causative factors that showed to be responsible for the disease development. Diabetes, smoking, hormonal changes, obesity, vitamin C deficiency and other conditions, being in the circle of this accusation [9,10].

When the Sun is Rise, Vitamin D is also Arise

One of the fat-soluble vitamins is vitamin D, this vitamin not only available broadly in diet but it also can be activated and gained from sunlight [11]. Vitamin D₂ which is also called ergocalciferol, can be gained from plants sterol. While Vitamin D₃ which is also called cholecalciferol primarily gained from dietary sources of animal origin. About 80% of vitamin D formed in skin endogenously by the effect of ultra violet wave of the sun light on 7-dehydrocholesterol [12]. Vitamin D deficiency had been associated with periodontal

diseases specifically periodontitis, several previous studies had concluded this fact [12-16].

In addition, it had been shown that supplementation of vitamin D not only associated with decrease the resorption of the bone but also is responsible for increase bone gain [15-18]. The production of TNF- α , IL-6 and IL-1 β depressed by vitamin D, in other words vitamin D has double effects on periodontium. From one side it has a modifiable effect on bone density and on the other side it has an immune regulatory consequences [19,20].

The effects of Vitamin D on periodontitis and periodontal disease had been studied by several researches and they were summarized by: Vitamin D effect on innate immune response of gingival epithelial cells and its effect that involves the up regulation of antimicrobial peptides [21].

Another studies had shown that there is some type of relationship between periodontal disease and the polymorphisms of vitamin D receptor gene [22,23]. By affecting the immunological function from one side and bone metabolism from the other, vitamin D receptor consequently has a strong effect on periodontal diseases pathogenesis [24,25].

On the other hand other study found a relationship between vitamin D receptor polymorphism and periodontal pathogen including (*Tannerella forsythensis*, *Porphyromonas gingivalis* and *Aggregatibacter actinomycetemcomitans*), this type of relationship proved in both culturing and genetic techniques [26]. An explanation of this relationship is that vitamin D may affect the bone density and consequently lead to changes in the trabecular outline of the bone which make bone resorption not a difficult sequel after periodontal pathogen invasion [27,28].

One of the effects of dropping of vitamin D levels in serum is that its effect on parathyroid hormone (PTH). Consequently PTH has its effect on osteoclast and lead to raise its activity in the bone. The normal daily dose of vitamin D for oral and periodontal health is still under controversy. However it had been shown that for getting a bone gain, clinical attachment gain and improvement in both probing depth and bleeding on probing, the recommended dose is more than 20 ng ml [29].

As well as it had been shown that getting improvement in gingival condition can be reached by the dose of 500 μ g [30]. One of the limitations of almost all studies of vitamin D and periodontitis is that these studies targeted specific population and did not take individual, racial and behaviour varieties in to consideration. Therefore their results cannot be generalized. Another limitation is the assessment of

bone level after intervention with vitamin D supplement; as most study depend on panoramic radiograph with its usual problems of magnification and distortion. However computed tomography technology still presents as a solution of that problem in spite of its technical and economical demands.

Conclusion

The relation between periodontitis and vitamin D deficiency is strong enough to be described as a 'miserable marriage' but fortunately we can reverse the effect and we can gain another kind of marriage between vitamin D supplementation and periodontal health.

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