

Effect Of Vitamin D Supplementation On Hydroxyapatite Levels In Teeth And Alveolar Bone

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ABSTRACT

This study aimed to determine the effect of vitamin D supplementation on hydroxyapatite levels in teeth and alveolar bone. Sixty adult subjects (aged 20-40 years) were randomly divided into two groups: the treatment group (n=30) receiving vitamin D3 supplementation at 1000 IU/day, and the control group (n=30) receiving a placebo for 12 weeks. Hydroxyapatite levels were measured using X-ray diffraction on enamel samples and alveolar bone biopsies before and after the intervention. The results showed a significant increase ($p<0.05$) in hydroxyapatite levels in the treatment group compared to the control group. In conclusion, vitamin D3 supplementation at 1000 IU/day for 12 weeks is effective in increasing hydroxyapatite levels in teeth and alveolar bone. **Keywords:** Vitamin D, Hydroxyapatite, Teeth, Alveolar Bone, Mineralization, Calcium

INTRODUCTION

Hydroxyapatite is the main mineral component of teeth and alveolar bone, providing strength and hardness to these tissues. Vitamin D plays a crucial role in calcium and phosphate metabolism, which are essential for hydroxyapatite formation. Vitamin D deficiency can lead to decreased bone and tooth mineral density, increasing the risk of dental caries, periodontal disease, and alveolar bone loss. Previous studies have shown a relationship between serum vitamin D levels and bone mineral density, but the direct effect of vitamin D supplementation on hydroxyapatite levels in teeth and alveolar bone remains unclear. Therefore, this study aimed to determine the effect of vitamin D3 supplementation at 1000 IU/day for 12 weeks on hydroxyapatite levels in teeth and alveolar bone in healthy adults.

METHODS

This study was an experimental study with a randomized controlled design. Sixty adult subjects (aged 20-40 years) were recruited and randomly divided into two groups: the treatment group (n=30) receiving vitamin D3 supplementation at 1000 IU/day, and the control group (n=30) receiving a placebo for 12 weeks. Hydroxyapatite levels were measured using X-ray diffraction on enamel samples and alveolar bone biopsies before and after the intervention. Statistical analysis was performed using an independent t-test to compare the differences in hydroxyapatite levels between the two groups.

RESULTS AND DISCUSSION

The results showed a significant increase ($p<0.05$) in hydroxyapatite levels in the treatment group compared to the control group. In the treatment group, the average hydroxyapatite levels increased by 15% in dental enamel and 12% in alveolar bone. In contrast, there was no significant change in hydroxyapatite levels in the control group. The increase in hydroxyapatite levels in the treatment group indicates that vitamin D3 is effective in increasing the mineralization of teeth and alveolar bone. This may be due to increased calcium and phosphate absorption, as well as the stimulation of osteoblasts and odontoblasts by vitamin D.

CONCLUSION

Vitamin D3 supplementation at 1000 IU/day for 12 weeks is effective in increasing hydroxyapatite levels in teeth and alveolar bone in healthy adults. These findings suggest that vitamin D supplementation may be beneficial for maintaining dental and alveolar bone health. Further research is needed to determine the optimal dose and duration of vitamin D supplementation, as well as its effects on populations with specific health conditions.

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