Analysis of the effects of vitamin D insufficiency on osseointegration of dental implants

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Abstract

Vitamin D is a key factor in the union of innate and adaptive immunity, and its deficiency may influence on osseointegration process. Therefore, the objective of this research was to investigate the effects of serum levels of vitamin D on osseointegration of dental implants. Ten participants underwent 25-hydroxy-vitamin D (25-(OH)D) serum levels and were classified according to the Endocrine Society's Clinical Practice Guidelines: 5 participants with Vitamin D Insufficiency = 25-(OH)D21-29ng/ml (Group D-Insufficient) and 5 participants Sufficient in vitamin D = 25-(OH)D30-100ng/ml (Control Group). Osseointegration was assessed through clinical, digital imaging radiographic and Osstell ISQ in the act and 3rd month after implant placement. Laboratory analyzes included the evaluation of the gene expression of OPG / RANKL in the two groups, at the time of implant implantation (Time 1) and at the time of reopening of the implant and clinical evaluation (Time 2). The clinical-radiographic results evidenced adequate clinical osseointegration in all participants of the research. The OPG/RANKL levels did not present a statistically significant difference between the groups and/or between the intervals of analysis. This study concluded that despite altered serum levels of vitamin D, there is no clinical correlation with vitamin D insufficiency, osseointegration and bone remodeling system.

Key words: osseointegration, dental implant, vitamin D

Results

Table 1. Clinical aspects of the research participants

Parameters	Control (N=4)	Vitamin D Insufficiency (N=6)	p-value
Gender			
Male	2 (50.0%)	3 (50.0%)	1.0 (OR:1.0CI 0.77- 12.05)
Female	2(50.0%)	3 (50.0%)	
Age			
Mean	48.4±9.08	47.9±8.2	0.54
Sun Exposure			
1 x week	0 (00.0%)	0 (00.0%)	0.33
2 x week	0 (00.0%)	1 (16.7%)	
3 x week	1 (25.0%)	0 (00.0%)	
No Exposure	3 (75.0%)	5 (83.0%)	
Use of sunprotection			
Yes	2 (50.0%)	1 (16.7%)	0.33 (OR:0.2; CI 0.01-3.66)
No	2 (50.0%)	5 (83.0%)	
Dental Implant number	11	6	---
Osstell (ISQ) (time 1)	76.8±5.06	75.6±5.4	0.16
Osstell (ISQ) (time 2)	76±6.34	74.7±5.2	0.14

Figure 1. Radiographs at Interval 01 and Interval 02: INSUFFICIENT VITAMIN D PATIENT)

Figure 2. Radiographs at Interval 01 and Interval 02 : SUFFICIENT PATIENT IN VITAMIN D.

Background and Aim

The objective of this research was to investigate the effects of serum levels of vitamin D on osseointegration of dental implants.

Conclusion

Osseointegration of the implant is not influenced by vitamin D insufficiency and there is no correlation between serum vitamin D levels and OPG/RANKL gene expression.

Methods and Materials

- Ten participants underwent vitamin D(25-(OH)D) serum levels:
- 5 participants with Vitamin D Insufficiency and 5 participants Sufficient in vitamin D (Control Group).
 - Laboratory analyzes: gene expression of OPG / RANKL at the time of implant implantation (Time 1) and at the time of reopening of the implant and clinical evaluation (Time 2).

References

This is a double-blind study that was submitted to the Research Ethics Committee of the Federal Fluminense University and from number 1,786,797 on October 20, 2016.

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