

Assessment of Correlation of Prognosis of Dental Implant Therapy with Serum Vitamin D Levels

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ABSTRACT

Background: Dental implant therapy is a routinely employed dental procedure for prosthetic rehabilitation of missing teeth. A relationship between bone metabolism, vitamin D, and early implant failure in human has not been proven to date. Hence; the present study was undertaken for assessing correlation of prognosis of dental implant therapy with serum vitamin D levels.

Materials & methods: A total of 100 patients who were scheduled to undergo dental implant therapy for missing mandibular first molar were included in the present study. All the patients were recalled in the morning, one week before the dental implant therapy. Blood samples were taken and were sent to laboratory where auto-analyser was used for assessment of serum vitamin D levels. All the dental implant procedures were carried out under the hands of skilled and experienced implantologists. Follow-up records were maintained and prognosis of dental implant therapy was assessed by radiographic and clinical examination.

Results: Out of 41 patients with serum vitamin D levels of less than 10 ng/dL, dental implant failure occurred in 12.2 percent of the patients. Out of 37 patients with serum vitamin D levels between 10 to 30 ng/dL, dental implant failure occurred in 13.5 percent of the patients. While analysing the correlation of prognosis of dental implant therapy and serum vitamin D levels, non-significant results were obtained.

Conclusion: Prognosis of dental implants is unaffected in patients with low vitamin D levels.

Keywords: Dental implant, Vitamin D.

INTRODUCTION

Dental implant therapy is a routinely employed dental procedure for prosthetic rehabilitation of missing teeth. Immediate loading procedures for edentulous jaws have become widely popular among clinicians as well as among patients. High survival rates and a low incidence of complications demonstrate the predictability of implant treatment, regardless of the loading regimen involved. The challenge today is not to prove

functionality but rather to develop simple and cost-effective protocols. A healthy compromised patient can benefit from oral implant rehabilitation, which will significantly increase the patient quality of life and sometimes will even improve its medical condition.¹⁻³

A dental implant is a surgical component that interfaces with the bone of the jaw or skull to

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support a dental prosthesis such as a crown, bridge, denture, facial prosthesis or to act as an orthodontic anchor. A relationship between bone metabolism, vitamin D, and early implant failure in human has not been proven to date. Vitamin D induces bone formation around implants in rodents. Besides the classical function, findings of the last decades indicate vitamin D as an important immune regulator targeting both, the innate and adaptive immune response, since all cells of the immune system express vitamin D receptor (VDR).⁴⁻⁷ Hence; the present study was undertaken for assessing correlation of prognosis of dental implant therapy with serum vitamin D levels.

MATERIALS & METHODS

The present study was undertaken for assessing correlation of prognosis of dental implant therapy in with serum vitamin D levels. A total of 100 patients who were scheduled to undergo dental implant therapy for missing mandibular first molar were included in the present study. Patients with history of any other systemic illness were excluded. Among these 100 patients, serum vitamin D levels were less than 10 ng/dL in 41 percent of the patients while it was between 10 to 30 ng/dL in 37 percent of the patients. All the patients were recalled in the morning, one week before the dental implant therapy. Blood samples were taken and were sent to laboratory where auto-analyser was used for assessment of serum vitamin D levels. All the dental implant procedures were carried out under the hands of skilled and experienced implantologists. Follow-up records were maintained and prognosis of dental implant therapy was assessed by radiographic and clinical examination. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software.

RESULTS

In the present study, a total of 100 patients were included. Mean age of the patients was found to be 46.2 years. 59 percent of the patients belonged to the age range of more than 40 years. Majority of the patients were males in the present study. Serum vitamin D levels were less than 10 ng/dL in 41 percent of the patients while it was between 10 to 30 ng/dL in 37 percent of the patients. Smoking habit was present in only 12 percent of the patients.

In the present study, out of 41 patients with serum vitamin D levels of less than 10 ng/dL, dental implant failure occurred in 12.2 percent of the patients. Out of 37 patients with serum vitamin D levels between 10 to 30 ng/dL, dental implant failure occurred in 13.5 percent of the patients. While analysing the correlation of prognosis of dental implant therapy and serum vitamin D levels, non-significant results were obtained.

Table 1: Demographic data.

Parameter		Number of patients	Percentage of patients
Age group (years)	Less than 40	41	41
	More than 40	59	59
Gender	Males	53	53
	Females	47	47
Serum Vitamin D levels	Less than 10 ng/mL	41	41
	10 to 30 ng/mL	37	37
	More than 30 ng/mL	22	22
Smoking habit	Present	12	12
	Absent	88	88

Table 2: Correlation of prognosis of dental implant therapy and serum vitamin D levels

Serum Vitamin D levels	Dental implant- Success		Dental implant- failure		p-value
	Number of patients	Percentage	Number of patients	Percentage	
Less than 10 ng/mL	36	87.8	5	12.2	0.88
10 to 30 ng/mL	32	86.5	5	13.5	
More than 30 ng/mL	19	86.4	3	13.6	

DISCUSSION

Osseointegration of dental implants depends on several different factors: surgical and prosthetic factors (surgical technique and operator experience, timing and type of prosthetic loading, and quality of prosthetic rehabilitation), implant-related factors (material, design, and surface), and patient-related factors (bone volume/quality at the recipient site and host response). This is now a well-known fact that the psychosomatic reactions of patients to loss of their teeth generated only little concern in the past. Though, in this modern era, artificial replacement of missing teeth with dental implants

have been increasingly common and widely accepted option which often been referred as an affirmative experience by patients with regards to function, cosmetic and psychological aspects. Undoubtedly, dental implant replacement therapy render fabrication of implant supported or retained prosthesis with excellent prognosis even in the compromised bony conditions where typical removable or fixed prosthesis fails.⁷⁻⁹ Low serum 1,25-dihydroxyvitamin D triggers higher levels of serum PTH, which in turn promotes high bone turnover, exacerbates osteopenia and finally results in cortical bone loss and pathogenesis of osteoporosis.⁸ Hence; the present study was undertaken for assessing correlation of prognosis of dental implant therapy with serum vitamin D levels.

In the present study, a total of 100 patients were included. Mean age of the patients was found to be 46.2 years. 59 percent of the patients belonged to the age range of more than 40 years. Majority of the patients were males in the present study. Serum vitamin D levels were less than 10 ng/dL in 41 percent of the patients while it was between 10 to 30 ng/dL in 37 percent of the patients. Smoking habit was present in only 12 percent of the patients. Mangano F et al investigated whether there is a correlation between early dental implant failure and low serum levels of vitamin D. 822 patients treated with 1625 implants were selected for this study; 27 early failures (3.2%) were recorded. Their study failed in proving an effective link between low serum levels of vitamin D and an increased risk of early implant failure.

In the present study, out of 41 patients with serum vitamin D levels of less than 10 ng/dL, dental implant failure occurred in 12.2 percent of the patients. Out of 37 patients with serum vitamin D levels between 10 to 30 ng/dL, dental implant failure occurred in 13.5 percent of the patients. While analysing the correlation of prognosis of dental implant therapy and serum vitamin D levels, non-significant results were obtained. Gianserra R et al evaluated the outcome of dental implants placed in patients with a history of periodontitis. A total of 1727 patients were consecutively treated in four private practices. Fitting a logistic regression for early implant failures and total implant failures, taking into account the clustering of implants in patients, there were no statistically significant differences between the three periodontal

screening and recording groups.¹⁰ Guido Mangano F et al investigated whether there is a relationship between low serum levels of vitamin D and EDIF. 885 patients treated with 1,740 fixtures were enrolled in this study. Overall, 35 EDIFs (3.9%) were reported. No correlation was found between EDIF and the patients' gender ($P=0.998$), age ($P=0.832$), smoking habit ($P=0.473$) or history of periodontal disease ($P=0.386$). Their study failed to demonstrate a significant relationship between low serum levels of vitamin D and increased risk of EDIF.¹¹

CONCLUSION

From the above results, the authors concluded that prognosis of dental implants is unaffected in patients with low vitamin D levels.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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