

Assessment of the Correlation of Dental Implants and Diabetes

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Abstract **Background:** Diabetes mellitus is a chronic disorder of carbohydrate metabolism. The persistent hyperglycemia in diabetic individuals, inhibit osteoblastic activity and alters the response of parathyroid hormone that regulates metabolism of Ca and P, decreases collagen formation during callus formation, induces apoptosis in lining cells of bone and increases osteoclastic activity due to persistent inflammatory response. Hence; the present study was conducted for assessing the correlation of dental implants and diabetes.

Materials & Methods: A total of 50 diabetic subjects and 50 healthy controls were enrolled. Complete demographic and clinical details of all the subjects were obtained. Clinical examination was carried out. Radiographic examination of all the subjects was done. Dental implant procedures were carried out in all the patients. Follow-up was done and radiographic examination was carried out in all the patients. Prognosis of dental implants in diabetic and non-diabetic patients was evaluated and compared.

Results: Success rate of dental implants among diabetic and non-diabetic subjects was 80 percent and 90 percent respectively. Non-significant results were obtained while comparing the prognosis of dental implants among diabetic and non-diabetic subjects.

Conclusion: Prognosis of dental implants in patients with controlled diabetes is excellent.

Keywords: Dental, Implants

INTRODUCTION

Diabetes mellitus is a chronic disorder of carbohydrate metabolism characterized by hyperglycemia, reflecting distortion in physiological equilibrium in utilization of glucose by tissue, liberation of glucose by liver and

production-liberation of pancreatic anterior pituitary and adrenocortical hormone. Today, dental implants are one of the restorative methods to replace missing teeth. Improvements in implant design, surface characteristics, and surgical protocols made implants a secure and highly

predictable procedure with a mean survival rate of 94.6 % and a mean success rate of 89.7 % after more than 10 years. Implant survival is initially dependent on successful osseointegration following placement. Any alteration of this biological process may adversely affect treatment outcome. Subsequently, as an implant is restored and placed into function, bone remodeling becomes a critical aspect of implant survival in responding to the functional demands placed on the implant restoration and supporting bone.^{1- 3}The persistent hyperglycemia in diabetic individuals, inhibit osteoblastic activity and alters the response of parathyroid hormone that regulates metabolism of Ca and P, decreases collagen formation during callus formation, induces apoptosis in lining cells of bone and increases osteoclastic activity due to persistent inflammatory response. It also induces deleterious effect on bone matrix and diminishes growth and accumulation of extracellular matrix. The consequent result is diminished bone formation during healing, which is observed in number of experimental animal studies.^{4- 7}Hence; the present study was conducted for assessing the correlation of dental implants and diabetes.

MATERIALS & METHODS

The present study was conducted for assessing the correlation of dental implants and diabetes. A total of 50 diabetic subjects and 50 healthy controls were enrolled. Complete demographic and clinical details of all the subjects were obtained. Clinical examination was carried out. Radiographic examination of all the subjects was done. Dental implant procedures were carried out in all the patients. Follow-up was done and radiographic examination was carried out in all the patients. Prognosis of dental implants in diabetic and non-diabetic patients was evaluated and compared. All the results were recorded and analyzed by SPSS software.

RESULTS

In the present study, a total of 50 diabetic and 50 non-diabetic subjects were enrolled. Mean age of the diabetic and non-diabetic subjects was 45.8 years and 42.3 years. Majority of the subjects of both the study groups were males. Overall, success rate of dental implants among diabetic and non-diabetic subjects was 80 percent and 90 percent respectively. Non-significant results were obtained while comparing the prognosis of dental implants among diabetic and non-diabetic subjects.

Table 1: Prognosis of Dental Implants

Prognosis	Diabetic group		Non- Diabetic group	
	n	%	n	%
Success	40	80	45	90
Failure	10	20	5	10
p- value	0.45			

DISCUSSION

In the past two decades, dental implants have become increasingly popular as a procedure to restore missing teeth. A number of patient and procedure related parameters determine the success of the implant treatment. Diabetes Mellitus (DM) is the most common systemic disease which is generally considered as a relative and not an absolute contraindication for implant therapy. Among men and women over 55 years of age, where the rates of edentulism are higher, about 18.4 percent of individuals have some form of diabetes

affecting the whole body.^{7- 10}Hence; the present study was conducted for assessing the correlation of dental implants and diabetes.

In the present study, a total of 50 diabetic and 50 non-diabetic subjects were enrolled. Mean age of the diabetic and non-diabetic subjects was 45.8 years and 42.3 years. Majority of the subjects of both the study groups were males. Inbarajan A et al evaluated the efficacy of implant supported tooth replacement in diabetic patients. The study involved placement of implants (UNITI implants, Equinox Medical Technologies, Zeist, Holland,

diameter of 3.7 mm and length 13 mm) in five diabetic patients (three females and two males) of age ranging from 35-65 years with acceptable metabolic control of plasma glucose. All patients included in the study were indicated for single tooth maxillary central incisor replacement, with the adjacent teeth intact. The survival of the restored implants was assessed for a period of three months by measurement of crestal bone heights, bleeding on probing and micro flora predominance. Paired t-test was done to find out the difference in the microbial colonization, bleeding on probing and crestal bone loss. P values of less than 0.05 were taken to indicate statistical significance. Results indicated that there was a significant reduction in bleeding on probing and colonization at the end of three months and the bone loss was not statistically significant. The study explored the hypothesis that patients with diabetes are appropriate candidates for implants and justifies the continued evaluation of the impact of diabetes on implant success and complications.¹⁰

In the present study, overall, success rate of dental implants among diabetic and non-diabetic subjects was 80 percent and 90 percent respectively. Non-significant results were obtained while comparing the prognosis of dental implants among diabetic and non-diabetic subjects. Sghaireen MG et al compared the failure rate of dental implants between well-controlled diabetic and healthy patients. A retrospective study of case-control design was conceptualized with 121 well-controlled

diabetic and 136 healthy individuals. Records of subjects who had undergone oral rehabilitation with dental implants between the periods of January 2013 to January 2016 were retrieved. Post-operative evaluation was carried out for all patients for about three years to assess the immediate and long-term success of the procedure. From a total of 742 dental implants, 377 were placed in well-controlled diabetic patients (case group) and 365 in healthy subjects (control group). A comparable (9.81%), but non-significant ($p = 0.422$) failure rate was found in the case group in comparison to the control group (9.04%). A non-significant ($p = 0.392$) raised number (4.98%) of failure cases were reported among females in comparison to males (4.44%). In respect to arch, the mandibular posterior region was reported as the highest failure cases (3.09%; $p = 0.411$), with 2.29% of cases reported in the mandibular anterior ($p = 0.430$) and maxillary posterior ($p = 0.983$) each. The maxillary anterior region was found to have the least number (1.75%; $p = 0.999$) of failure cases. More (4.98%; $p = 0.361$) cases were reported to fail during the functional loading stage in contrast to osseointegration (4.44%; $p = 0.365$). A well-controlled diabetic status does not impose any additional risk for individuals undergoing dental implant therapy.¹¹

CONCLUSION

Prognosis of dental implants in patients with controlled diabetes is excellent.

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