

ORIGINAL ARTICLE

Assessment of Prognosis of Dental Implants in Diabetic Patients: An Observational Study

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ABSTRACT:

Background: Improvements in implant design, surface characteristics, and surgical protocols made implants a secure and highly predictable procedure. Diabetes mellitus has long been considered a relative contraindication to dental implant therapy. Hence; we planned the present study to assess the prognosis of dental implants in diabetic patients. **Materials & methods:** The present study included evaluation of prognosis of dental implants in diabetic patients. A total of 100 patients were included in the present study. Among these 100 patients, 50 patients were diabetic while the remaining 50 patients were non-diabetic. Skilled oral surgeons performed the oral dental implant procedures in all the patients. We obtained complete demographic details of all the patients. Only those patients were included in the present study that underwent prosthetic rehabilitation for missing permanent mandibular molars. Follow-up details and records of all the patients were obtained and recorded on excel sheet. Evaluation of all the results was done by SPSS software. **Results:** Success rate of dental implants among diabetic patients was 86 percent while success rate of dental implants among non-diabetic patients was 90 percent. However; we didn't observe any significant difference while comparing the prognosis of dental implants among diabetic and non-diabetic patients. **Conclusion:** Dental implants can be successfully placed in diabetic patients by taking adequate precautionary measures.

Key words: Dental implants, Diabetes, Prognosis.

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INTRODUCTION

Dental implants in the today's scenario 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.^{1, 2} 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.³⁻⁵

Diabetes mellitus is a chronic metabolic disorder that is reaching epidemic proportions, recently projected as affecting over 350 million individuals worldwide.⁶ The number of affected individuals underlines the urgent need to understand the effects of diabetes and improve the care for patients with diabetes. Diabetes mellitus has long been considered a relative contraindication to dental implant therapy.⁷⁻⁹ Hence; we planned the present study to assess the prognosis of dental implants in diabetic patients.

MATERIALS & METHODS

The present study was planned in the department of oral surgery of the dental institute and included evaluation of prognosis of dental implants in diabetic patients. We obtained ethical approval from institutional ethical committee and written consent was obtained after

explaining in detail the entire research protocol. A total of 100 patients were included in the present study. Among these 100 patients, 50 patients were diabetic while the remaining 50 patients were non-diabetic. Inclusion criteria for the including the patients in the diabetic group included:

- Patients suffering from diabetes for a minimum of 10 years,
- Patients in between the age group of 25 to 55 years,
- Patients with absence of any other systemic illness,
- Patients with absence of any other condition known to affect the healing process,
- Patients with negative history of any known drug allergy

Skilled oral surgeons performed the oral dental implant procedures in all the patients. We obtained complete demographic details of all the patients. Only those patients were included in the present study that underwent prosthetic rehabilitation for missing permanent mandibular molars. Follow-up details and records of all the patients were obtained and recorded on excel sheet. Evaluation of all the results was done by SPSS software. Univariate regression curve was used for assessment of level of significance.

RESULTS

We evaluated a total 50 diabetic patients and 50 non-diabetic patients. Mean age of the diabetic and non-diabetic patients was 41.2 years and 42.5 years respectively. Majority of patients in both diabetic group

and non- diabetic group were females. Success rate of dental implants among diabetic patients was 86 percent while success rate of dental implants among non-diabetic patients was 90 percent. However; we didn't observe any

significant difference while comparing the prognosis of dental implants among diabetic and non-diabetic patients (**P- value > 0.05**).

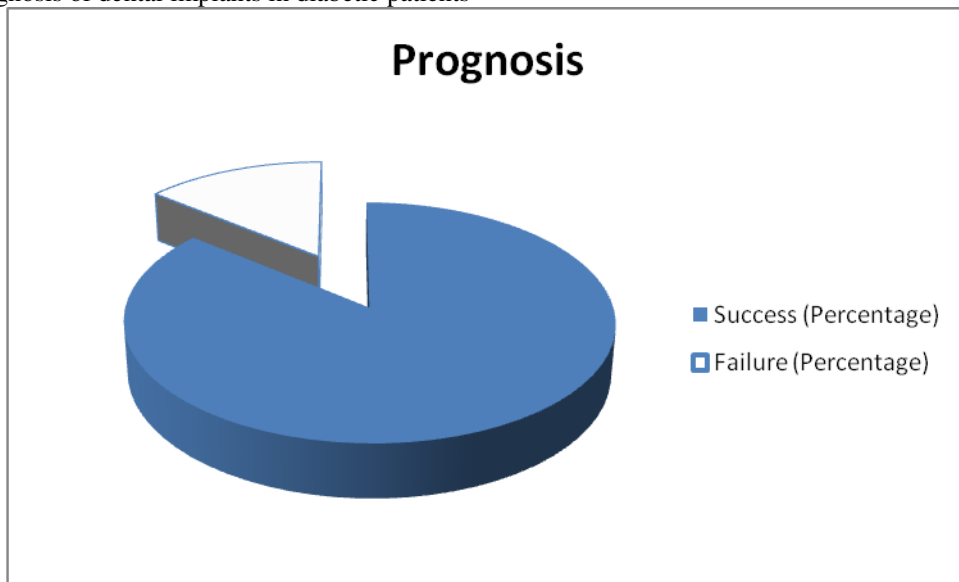
Table 1: Clinical and demographic details of the diabetic and non- diabetic patients

Parameter	Diabetic patients	Non- diabetic patients
Number	50	50
Mean age (years)	41.2	42.5
Males	35	32
Females	15	18

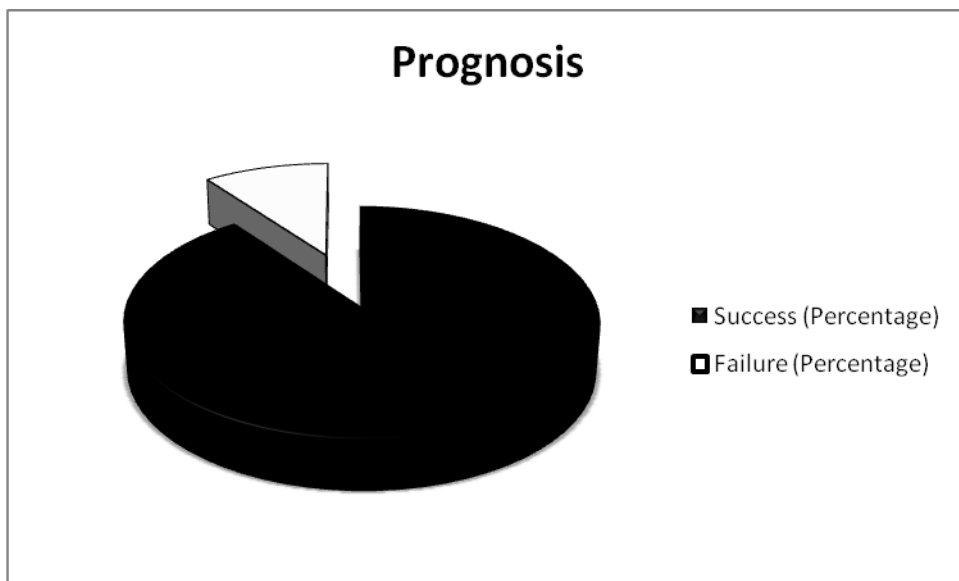
Table 2: Prognosis of dental implants

Parameter	Diabetic patients	Non- diabetic patients	P- value
Success (No. of patients)	43	45	0.71
Failure (No. of patients)	7	5	

Graph 1: Prognosis of dental implants in diabetic patients



Graph 2: Prognosis of dental implants in non- diabetic patients



DISCUSSION

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.^{7,8}

Type -1 diabetes causes decreased bone mineral density, as well as reduced bone formation and higher bone resorption whereas Type -2 diabetes produces normal or greater bone mineral density in some patients. It has been observed that insulin not only reduces the deleterious effect of hyperglycemia by controlling it but also stimulates osteoblastic activity. Hence, bone matrix formation in insulin treated experimental models is similar to control ones.⁹

In the present study, we observed that success rate of dental implants among diabetic patients and non-diabetic patients were 86 percent and 90 percent respectively. However; no significant difference was obtained while comparing the prognosis of dental implants among diabetic and non-diabetic patients (**P- value > 0.05**). Naujokat H et al aimed to answer the PICO question "Do diabetic patients with dental implants have a higher complication rate in comparison to healthy controls?" by a systematic literature search based on the PRISMA statement. They identified 22 clinical studies and 20 publications of aggregated literature, which were quite heterogeneous concerning methods and results. They conclude that patients with poorly controlled diabetes suffer from impaired osseointegration, elevated risk of peri-implantitis, and higher level of implant failure. The influence of duration of the disease is not fully clear. The supportive administration of antibiotics and chlorhexidine seems to improve implant success. When diabetes is under well control, implant procedures are safe and predictable with a complication rate similar to that of healthy patients.¹⁰ Oates TW et al critically appraised the clinical evidence guiding our application of dental implant therapy relative to glycemic control for patients with diabetes. Their initial searches of the literature identified 129 publications relevant to both dental implants and diabetes. These were reduced to 17 clinical studies for inclusion. Reported implant failure rates in these 17 reports ranged from 0 to 14.3% for patients with diabetes. Unfortunately, the majority of these reports lacked sufficient information relative to glycemic control to allow the application of the findings toward clinical care. However, clinical evidence is emerging from several investigations that diabetes and glycemic control are important considerations that may require modifications to therapeutic protocols, but may not be contraindications to implant therapy in diabetes patients. Also, a potentially important role for implant

therapy to support oral function in diabetes dietary management remains to be determined.¹¹

Javed F et al performed a systematic literature search of MEDLINE/PubMed articles published from 1982 up to and including July 2009. In addition, reference lists of original and review articles were searched. The search strategy was to use the following terms in different combinations: dental implants, immediate implants, osseointegration, periodontal disease, diabetes, hyperglycemia, metabolic control, and glycemic control. The search included studies on humans and diabetes-induced animal models. The selection criteria included all levels of available evidence. Suitable variables included the implant survival rate among individuals with diabetes, effects of hyperglycemia and glycemic control on bone, and maintenance of dental implants in subjects with diabetes. Articles published only in the English language were considered, and unpublished data were not sought. They initially identified 33 studies. Fifteen studies, which did not fulfill the selection criteria, were excluded. The included studies reported that poorly controlled diabetes negatively affects implant osseointegration; however, under optimal serum glycemic control, osseointegration can successfully occur in patients with diabetes. Animal studies have confirmed that osseointegration can be successfully achieved in insulin-controlled rats with diabetes, whereas in uncontrolled rats with diabetes, the bone-to-implant contact appears to decrease with time. The use of antiseptic mouthrinses and oral-hygiene maintenance helps in achieving a successful dental implant osseointegration in subjects with diabetes. A successful dental implant osseointegration can be accomplished in subjects with diabetes with good metabolic control (serum glycemic level and hemoglobinA1c in normal range) in a similar manner as in subjects without diabetes.¹²

CONCLUSION

Dental implants can be successfully placed in diabetic patients by taking adequate precautionary measures. However; futures studies are recommended.

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