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Original ARTICLE

Prognosis of dental implants in diabetic and non-diabetic patients: A case-control study

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ABSTRACT
Background: Dentistry has undergone many changes during the past quarter century. Diabetes mellitus is a chronic metabolic disorder that leads to hyperglycemia, which raises multiple complications caused by micro- and macroangiopathy. Hence; the present study was undertaken for assessing the effect of diabetic status on the prognosis of dental implants. **Materials & methods:** A total of 20 diabetic patients and 20 non-diabetic patients were enrolled in the present study. Complete demographic details of all the patients were obtained. Only those patients were included who were scheduled to undergo prosthetic rehabilitation for missing mandibular first molar by dental implant procedures. Blood investigations were analyzed preoperatively and patients with uncontrolled diabetic status were excluded. All the patients were kept on postoperative follow-up for a time period of six months and success rate was assessed. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software. **Results:** Out of 20 patients of the diabetic group, dental implant success occurred in 18 patients while in the non-diabetic group, dental implant success occurred in 19 patients. However; non-significant results were obtained while comparing the prognosis of dental implants in between the diabetic and non-diabetic group. Abutment failure and peri-implantitis were the cause of dental implant failure in the diabetic group while abutment failure was the cause of dental implant failure in the non-diabetic group. **Conclusion:** Under controlled conditions, dental implants procedures had excellent prognosis in diabetic patients.
Key words: Diabetes, Dental Implants

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INTRODUCTION

Dentistry has undergone many changes during the past quarter century; however, no changes have been more profound than those in the field of implant dentistry. Successful endosseous alloplastic implants can be found dating back to AD 600, but the surge in implants for tooth replacement did not flourish until the middle of 1900s.[1- 3] Now that its scientific foundations have been laid, this branch of reconstructive dentistry has passed out of the phase of mere empiricism and sheer wishful thinking. As a result, implant dentistry is now taken much more seriously than was the case, 10 or 20 years ago. Diabetes mellitus is a chronic metabolic disorder that leads to hyperglycemia, which raises multiple complications caused by micro- and macroangiopathy. Diabetic patients have increased frequency of periodontitis and tooth loss, delayed wound healing, and impaired response to infection.[4, 5] Hence; the present study was undertaken for assessing the effect of diabetic status on the prognosis of dental implants.

MATERIALS & METHODS

The present study was conducted with the aim of assessing the effect of diabetic status on prognosis of dental implants. A total of 20 diabetic patients and 20 non-diabetic patients were enrolled in the present study. Complete demographic details of all the patients

were obtained. Written consent was obtained from all the patients after explaining in detail the entire research protocol. All the dental implant procedures were done under the hands of skilled and experienced dental surgeons. Only those patients were included who were scheduled to undergo prosthetic rehabilitation for missing mandibular first molar by dental implant procedures. Blood investigations were analyzed preoperatively and patients with uncontrolled diabetic status were excluded. All the patients were kept on postoperative follow-up for a time period of six months and success rate was assessed. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software. Chi- square test was used for evaluation of level of significance.

RESULTS

In the present study, 12 patients of the diabetic group and 14 patients of the non-diabetic group belonged to the age group of less than 40 years. 15 patients of the diabetic group and 13 patients of the non-diabetic group were males while the remaining were females. Mean BMI of the patients of the diabetic group and non-diabetic group was 24.82 and 23.96 Kg/m^2 respectively. In the present study, out of 20 patients of the diabetic group, dental implant success occurred in 18 patients while in the non-diabetic group, dental implant success occurred in 19 patients. However; non-significant results were obtained while comparing the prognosis of dental implants in between the diabetic and non-diabetic group.

In the present study, abutment failure and peri-implantitis were the cause of dental implant failure in the diabetic group while abutment failure was the cause of dental implant failure in the non-diabetic group.

Table 1: Demographic data of patients of both the study groups

Parameter		Diabetic group	Non-diabetic group
Age group (years)	Less than 40	12	14
	More than 40	8	6
Gender	Males	15	13
	Females	5	7
Mean BMI (Kg/m^2)		24.82	23.96

Table 2: Prognosis of dental implants

Prognosis	Diabetic group	Non-diabetic group	p- value
Success	18	19	0.86
Failure	2	1	

Table 3: Reasons of failure of dental implants

Reasons of failure	Diabetic group	Non-diabetic group
Abutment failure	1	1
Peri-implantitis	1	0

DISCUSSION

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. The critical dependence on bone metabolism for implant survival leads us to evaluation of certain risk factors. One of the controversial discussed diseases is diabetes mellitus.[5- 9] Hence; the present study was undertaken for assessing the effect of diabetic status on the prognosis of dental implants.

In the present study, 15 patients of the diabetic group and 13 patients of the non-diabetic group were males while the remaining were females. Mean BMI of the patients of the diabetic group and non-diabetic group was 24.82 and 23.96 Kg/m^2 respectively. Marchand F et al assessed the success of dental-implant treatment in patients with diabetes. Dental-implant treatment is an efficient means of replacing lost teeth. However, diabetes can be considered a relative contraindication for this type of treatment because of the slightly higher failure rate compared with populations without diabetes. Prerequisite selection of suitable diabetic patients, eradication of co-morbidities (poor oral hygiene, cigarette-smoking, periodontitis), stabilization of glycaemic control (HbA(1c) at around 7%) and preventative measures against infection can increase the success of dental implantation in diabetic patients to a satisfactory rate of 85-95%. Implant surgery is never a matter of urgency; thus, diabetes patients with the best chances of success should be conjointly selected and prepared by both dental and diabetes clinicians.[10]

In the present study, out of 20 patients of the diabetic group, dental implant success occurred in 18 patients while in the non-diabetic group, dental implant success occurred in 19 patients. However; non-significant results were obtained while comparing the prognosis of dental implants in between the diabetic and non-diabetic group. Fiorellini JP et al assessed the success and survival rates of dental implants in diabetic patients. In this retrospective analysis, 215 implants placed in 40 patients at 2 clinical centers were evaluated. Chart reviews and interviews provided medical and implant data. From the analysis, 31 failures occurred, for an overall success rate of 85.6%. Of these failures, 24 occurred within the first year of functional loading. The mean time of functional load was 4.05 +/- 2.6 years. When the success rate was analyzed by implant location, success rates for the maxilla and mandible were 85.5% and 85.7%, respectively. For the anterior and posterior regions, success rates were 83.5% and 85.6%, respectively. The lifetable analysis revealed a cumulative success rate of 85.7% after 6.5 years of function. Based on the data, the survival rate of dental implants in controlled diabetic patients is lower than that documented for the general population, but there is still a reasonable success rate. The increase in failure rate occurs during the first year following prosthetic loading.[11]

In the present study, Abutment failure and peri-implantitis were the cause of dental implant failure in the diabetic group while abutment failure was the cause of dental implant failure in the non-diabetic group. Farzad P et al assessed the success of dental implants in diabetic patients. Medical records from 782 patients were examined in patients treated by the Brånemark method for partial or total edentulism with implant supported bridges. From these records, 25 patients (3.2%) with diabetes before implant treatment (136 implants) were identified and further studied with respect to age, gender, type of diabetes, treated jaw, degree of edentulism, bone graft, implant survival, periimplant inflammation, bleeding on probing, and radiographic bone loss. Furthermore, the patients' opinion about the outcome of the

treatment was registered. The implant success rate was 96.3% during the healing period and 94.1% 1 year after surgery. Of all 38 bridges, one was lost. Few complications occurred and all patients, except for one, were satisfied with the treatment. Today, diabetic patients are being treated successfully for all types of edentulism, including bone-grafting treatment. Diabetics that undergo dental implant treatment do not encounter a higher failure rate than the normal population, if the diabetics' plasma glucose level is normal or close to normal as assessed by personal interviews.[12]

CONCLUSION

From the above results, the authors concluded that under controlled conditions, dental implants procedures had excellent prognosis in diabetic patients. However; further studies are recommended.

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