ORIGINAL RESEARCH

Diabetes and dental implant prognosis

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ABSTRACT
Background: The present study was conducted for assessing prognosis of dental implants in diabetic patients.
Materials & methods: 50 patients with well-controlled diabetes and 50 healthy controls made up the entire sample. A Performa was created, and every patient was given a thorough clinical profile. All of the subjects underwent extensive oral examination. All subjects' baseline hemodynamic and biochemical profiles were evaluated. Only those patients who needed prosthetic rehabilitation due to a missing mandibular first molar were included. All of the subjects had dental implant therapy. All of the individuals underwent a radiological and clinical evaluation at the 6-month mark to determine their prognosis.
Results: Mean age of the patients of the controlled diabetic group and non-diabetic group was 46.3 years and 50.4 years respectively. Majority of the subjects of both the study groups was males. Among the controlled diabetic group, success of dental implant therapy was seen in 94 percent of the patients while among the control group, success of dental implant therapy was seen in 96 percent of the patients. Non-significant results were obtained while comparing the prognosis of dental implant therapy among the two study groups.
Conclusion: Dental implant therapy for diabetic patients showed a great prognosis under managed glycemic circumstances.
Key words: Diabetes, Dental, Implants

INTRODUCTION
Dental implantation is a surgical process of the jaw bone to support a crown, bridge, denture, and facial prosthesis. The basis of modern dental implantations is called osseointegration, it is the direct structural and functional connection between living bone and the surface of a load-bearing implant. Osteointegrated implants have been used to treat various condition ranging from edentulism to head and neck reconstruction. Dental implants are used to facilitate retention of auricular mandibular, maxillary, nasal, and orbital implants, and for bone-anchored hearing aids. The implant fixture is first placed so as to osseointegrate, and then a dental prosthesis is added. A variable amount of healing time is required for osseointegration before a crown, denture, or abutment is placed which will hold a dental prosthesis.[1]

Dental implants became a scientific cornerstone after the serendipitous invention of Dr. Branemark who helped in the evolution of the concept of osseointegration (direct, rigid attachment of the implant to the bone without any intervening tissue in between two implants).[2]

Diabetes is the 7th leading cause of death in the world and in combination with obesity and hypertension (HTN), leads to cardiovascular diseases (CVDs) which are the first leading cause of death globally.[1] The prevalence of diabetes mellitus (DM) and obesity are worldwide increasing in parallel.[2] A recent study reported that with population growth, aging, and the rise in overweight and obesity, the number of adults with diabetes in the world increased from 108 million in 1980 to 422 million in 2014. Globally, the prevalence of diabetes has increased in both gender equally, in men from 43% in 1980 to 90% in 2014 and in women from 50% to 79%[3]

With one million deaths attributable to diabetes India is the second largest contributor to regional mortality. In 2015, India had 69.2 million people with diabetes and 36.5 million impaired glucose tolerance (IGT) people (20–79 years) which are expected to rise to 123.5 million and 63.6 million by 2040, respectively. The prevalence of diabetes is high in urban than in rural India (14.2% vs. 8.3%) while prediabetes prevalence was found to be nearly same (urban 14.5%; rural 14.7%)[4].

Hence; the present study was conducted for assessing prognosis of dental implants in diabetic patients.

MATERIALS & METHODS

50 patients with well-controlled diabetes and 50 healthy controls made up the entire sample. A Performa was created, and every patient was given a thorough clinical profile. All of the subjects underwent extensive oral examination. All subjects' baseline hemodynamic and biochemical profiles were evaluated. Only those patients who needed prosthetic rehabilitation due to a missing mandibular first molar were included. All of the subjects had dental implant therapy. All of the individuals underwent a radiological and clinical evaluation at the 6-month mark to determine their prognosis.

RESULTS

Mean age of the patients of the controlled diabetic group and non-diabetic group was 46.3 years and 50.4 years respectively. Majority of the subjects of both the study groups was males. Among the controlled diabetic group, success of dental implant therapy was seen in 94 percent of the patients while among the control group, success of dental implant therapy was seen in 96 percent of the patients. Non-significant results were obtained while comparing the prognosis of dental implant therapy among the two study groups.

Table 1: Comparison of prognosis of dental implant therapy

Group	Success		Failure		Total	p- value
	Number	Percentage	Number	Percentage	Number (%)	
Controlled diabetic group	47	94	3	6	50 (100%)	0.237
Control group	48	96	2	4	50 (100%)	

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.[5] 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. 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[6], delayed wound healing[7], and impaired response to infection. In 1980, more than 150 million people worldwide were affected and that number had grown to 350 million by 2008.[8] This trend highlights the need for better understanding of diabetes and its therapy and its

impact on dental implant rehabilitation. In the past, diabetes was long time seen as a relative risk factor to dental implants. In contrast, today, there is a change in paradigm. Recent studies offer indirect evidence for diabetes patients benefiting from oral rehabilitation based on dental implant therapy. After tooth loss, patients avoid food which needs more effort to masticate which can lead to an adverse nutrition with poor metabolic control. A sufficient dental rehabilitation allows the patient to improve nutrition and the metabolic control. On the other hand, it is still unclear how quality of diabetes therapy and duration of disease influence the success of dental implants. The ability to anticipate outcomes is an essential part of risk management in dental implant surgery. Recognizing conditions that place the patient at a higher risk of complications will allow the surgeon to make informed decisions and refine the treatment plan to optimize the outcomes.[9]

Hence; the present study was conducted for assessing prognosis of dental implants in diabetic patients.

In the present study, mean age of the patients of the controlled diabetic group and non-diabetic group was 46.3 years and 50.4 years respectively. Majority of the subjects of both the study groups was males. Among the controlled diabetic group, success of dental implant therapy was seen in 94 percent of the patients while among the control group, success of dental implant therapy was seen in 96 percent of the patients.

Al Ansari et al[10] evaluated the impact of diabetes mellitus on dental implant failure rates and marginal bone loss (MBL). An electronic search was undertaken in three databases, plus a manual search of journals. Meta-analyses were performed as well as meta-regressions in order to verify how the odds ratio (OR) and MBL were associated with follow-up time. The review included 89 publications. Altogether, there were 5510 and 62,780 implants placed in diabetic and non-diabetic patients, respectively. Pairwise meta-analysis showed that implants in diabetic patients had a higher failure risk in comparison to non-diabetic patients (OR 1.777, p < 0.001). Implant failures were more likely to occur in type 1 diabetes patients than in type 2 (OR 4.477, p = 0.032). The difference in implant failure between the groups was statistically significant in the maxilla but not in the mandible. The MBL mean difference (MD) between the groups was 0.776 mm (p = 0.027), with an estimated increase of 0.032 mm in the MBL MD between groups for every additional month of follow-up (p < 0.001). There was an estimated decrease of 0.007 in OR for every additional month of follow-up (p = 0.048). In conclusion, implants in diabetic patients showed a 77.7% higher risk of failure than in non-diabetic patients.

Most of the studies[11-14] observed slightly high percentage of early failure of implants in diabetics compared to late failure. Some reports[13,15,16] indicated increased failure rate within first year of placement of implant. The published retrospective and prospective studies data, retrieved through various sources from 1994 to 2011, indicated that the success rate of dental implants in diabetic patients were in range of 85.5-100% and were comparable to the non-diabetic patients. Most of the studies were of opinion that success rate in well/fairly controlled diabetics was either equal or insignificantly lower than normal individuals.

Two studies[17,18], has taken chance to involve uncontrolled diabetic patients for dental implantation and observed encouraging results as early implant success was similar to non-diabetics. However, it is noteworthy that number of patients and implants placed (4 implants in 3 patients) in uncontrolled diabetics was quite low and all the patients selected were free of micro and macro-vascular complications.

CONCLUSION
Dental implant therapy for diabetic patients showed a great prognosis under managed glycemic circumstances.

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