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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: A total of 30 subjects with controlled diabetes and 30 healthy controls were enrolled. A Performa was made and detailed clinical profile of all the subjects was enrolled. Thorough oral examination of all the subjects was carried out. Baseline hemodynamic profile and biochemical profile of all the subjects was assessed. Only those subjects were enrolled which required prosthetic rehabilitation for missing mandibular first molar. Dental implant therapy was carried out in all the subjects. After 6 months follow-up radiographic and clinical evaluation of all the subjects was done for assessing the prognosis. Results: Among the controlled diabetic group, success of dental implant therapy was seen in 93.33 percent of the patients while among the control group, success of dental implant therapy was seen in 96.67 percent of the patients. Non-significant results were obtained while comparing the prognosis of dental implant therapy among the two study groups. Conclusion: Under controlled glycaemic conditions, dental implant therapy among diabetic patients had excellent prognosis.

Keywords---diabetes, dental, implants.

Introduction

In order to ensure implant success, it is essential to select patients who do not possess local or systemic contraindications to therapy. Absolute contraindications to implant rehabilitation include recent myocardial infarction and cerebrovascular accident, valvular prosthesis surgery, immunosuppression, bleeding issues, active treatment of malignancy, drug abuse, psychiatric illness, as well as intravenous bisphosphonate use. Any of these conditions bar elective oral surgery, and require judicious monitoring by the physician as well as the dental provider. One of such topic of current research is prognosis of dental implants in diabetic patients.^{1- 3}

Diabetes mellitus (DM) is a chronic metabolic disorder characterized by persistent hyperglycemia. It may be due to impaired insulin secretion, resistance to peripheral actions of insulin, or both. According to the International Diabetes Federation (IDF), approximately 415 million adults between the ages of 20 to 79 years had diabetes mellitus in 2015. DM is proving to be a global public health burden as this number is expected to rise to another 200 million by 2040. Chronic hyperglycemia in synergy with the other metabolic aberrations in patients with diabetes mellitus can cause damage to various organ systems, leading to the development of disabling and life-threatening health complications, most prominent of which are microvascular (retinopathy, nephropathy, and neuropathy) and macrovascular complications leading to a 2-fold to 4-fold increased risk of cardiovascular diseases.^{4- 6} Hence; the present study was conducted for assessing prognosis of dental implants in diabetic patients.

Materials & Methods

The present study was conducted for assessing prognosis of dental implants in diabetic patients. A total of 30 subjects with controlled diabetes and 30 healthy controls were enrolled. A Performa was made and detailed clinical profile of all the subjects was enrolled. Thorough oral examination of all the subjects was carried out. Baseline hemodynamic profile and biochemical profile of all the subjects was assessed. Only those subjects were enrolled which required prosthetic rehabilitation for missing mandibular first molar. Dental implant therapy was carried out in all the subjects. After 6 months follow-up radiographic and clinical evaluation of all the subjects was done for assessing the prognosis. All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software.

Results

Mean age of the patients of the controlled diabetic group and non-diabetic group was 45.8 years and 48.3 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 93.33 percent of the patients while among the control group, success of dental implant therapy was seen in 96.67 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		p- value
	Number	Percentage	Number	Percentage	
Controlled diabetic group	28	93.33	2	6.67	0.226
Control group	29	96.67	1	3.33	
Total	30	100	30	100	

Discussion

The replacement of missing teeth by titanium dental implants is currently the gold standard in dental rehabilitation. Different statistically analyzed factors

associated with implant failure are age and sex, smoking, systemic diseases, maxillary implant location, quantity and quality of bone, and implant surface treatments and characteristics. Immunological and genetic factors have also been reported to be associated with early implant failure. Periodontitis and cigarette smoking are associated with an increased rate of implant failure. It decreases the vascularity of local tissues and interrupts in healing, chemotaxis, and systemic immunity.⁷⁻⁹ 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 45.8 years and 48.3 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 93.33 percent of the patients while among the control group, success of dental implant therapy was seen in 96.67 percent of the patients. Reviewing the literature published in the last 10 years, the survival rate for implants in diabetic patients ranges between 88.8% and 97.3% one year after placement, and 85.6% to 94.6% in functional terms one year after the prosthesis was inserted. In a retrospective study with 215 implants placed in 40 diabetic patients, 31 failed implants were recorded, 24 of which (11.2%) occurred in the first year of functional loading. This analysis shows a survival rate of 85.6% after 6.5 years of functional use. The results obtained show a higher index of failures during the first year after placement of the prosthesis. Another study carried out with 227 implants placed in 34 patients shows a success rate of 94.3% at the time of the second surgery, prior to the insertion of the prosthesis. In a meta-analysis with two implant systems placed in edentulous jaws, failure rates of 3.2% were obtained in the initial stages, whereas in the later stages (from 45 months to 9 years), this figure increases to 5.4%.¹⁰⁻¹⁴

Non-significant results were obtained while comparing the prognosis of dental implant therapy among the two study groups. A prospective study with 89 well-controlled type 2 diabetics in whose jaws a total of 178 implants had been placed reveals early failure rates of 2.2% (4 failures), increasing to 7.3% (9 further failures) one year after placement, indicating a survival rate of 92.7% within the first year of functional loading. The 5-year survival rate was 90%.¹²⁻¹⁵ The fact that most failures occur after the second-phase surgery and during the first year of functional loading might indicate microvascular involvement is one of the factors implicated in implant failures in diabetic patients.^{10, 12, 15} Osseointegration is the process of osseous healing and bone remodeling building an actual interface between the living bone tissue and the implant surface, after implant insertion. This process is crucial for implant stability as well as inflammation-free survival.¹⁶

In a prospective clinical study, 22 implants were placed in diabetics and 21 implants in a healthy control group (12 patients each). The stability values were comparable both at the time of implant insertion and when the implant was exposed after 4 months.¹⁷ In another retrospective case-control study, 257 subjects were included, 121 with and 136 without diabetes; diabetes was defined as well controlled with an HbA1c below 8%. Implant failure in the osseointegration phase was observed in 17 cases in the diabetes group (4.5%) and 16 cases in the control group (4.4%), so that a non-significant difference has been concluded.¹⁸

Conclusion

Under controlled glycaemic conditions, dental implant therapy among diabetic patients had excellent prognosis.

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