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Prognosis of dental implants in smokers and diabetics

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Abstract

Background: Dental implant replacement therapy render fabrication of implant supported or retained prosthesis with excellent prognosis even in the compromised bony conditions where typical removable or fixed prosthesis fails. Hence; the present study was undertaken for assessing the prognosis of dental implants in smokers and diabetics.

Materials & methods: A total of 200 subjects were enrolled in the present study and were divided into four study groups with 50 patients in each group as follows: Group 1: Smokers and non-diabetic Group 2: Diabetic and non-smoker, Group 3: Smokers and diabetic, and Group 4: Controls. Only those patients were enrolled who had missing mandibular first permanent molar and were scheduled to undergo prosthetic rehabilitation by dental implants. All the dental implant procedures were commenced under the hand of skilled and experienced surgeons. Follow-up was done upto a time period of 2 years and prognosis of dental implants was recorded.

Results: Success rate of dental implants among patients of group 1, group 2, group 3 and group 4 was found to be 82%, 94%, 80% and 96% respectively. Significant results were obtained while comparing the prognosis of dental implants among group 1 and group 2, group 1 and group 4, group 2 and group 4, and group 3 and group 4 respectively.

Conclusion: Smoking and presence of diabetes as a co-morbid condition are significant risk factors of dental implant failure.

Keywords: Diabetes, Implants, Smoking

Introduction

In this modern era, artificial replacement of missing teeth with dental implants has been increasingly common and widely accepted option. Undoubtedly, dental implant replacement therapy render fabrication of implant supported or retained prosthesis with excellent prognosis even in the compromised bony conditions where typical removable or fixed prosthesis fails. It is generally accepted that dental implant treatment is done for restorative purposes. The importance of presurgical communication and cooperation between the restorative dentist, periodontist, dental technician, and the implant surgeon is well recognized in modern implantology [1-3].

Diabetes is a risk factor for periodontitis, which appears to develop at least twice as often in diabetics as in populations without diabetes. In addition, periodontal infection can affect glycaemic control in diabetic patients. These coexisting conditions can lead to the gradual loss of tooth attachment to alveolar bone, resulting in tooth loss. Since life expectancy is expected to increase with the advent of better therapies and targeted medicine, an increasing number of patients who smoke or previously smoked, who received radiotherapy for head and neck cancer treatment, or who present with diabetes or osteoporosis may require dental implant treatment [4-6]. Hence; the present study was undertaken for assessing the prognosis of dental implants in smokers and diabetics.

Materials and Methodology

The present study was conducted with the aim of assessing and comparing the prognosis of dental implants in smokers and diabetics. A total of 200 subjects were enrolled in the present study and were divided into four study groups with 50 patients in each group as follows:

Group 1: Smokers and non-diabetic

Group 2: Diabetic and non-smoker

Group 3: Smokers and diabetic

Group 4: Controls

Only those patients were enrolled who had missing mandibular first permanent molar and were scheduled to undergo prosthetic rehabilitation by dental implants. Complete demographic details and clinical data of all the patients were obtained. Radiographic examination of all the patients was carried out and treatment planning was done. Criteria described in the previous literature were used for defining diabetics and smokers. All the dental implant procedures were commenced under the hand of skilled and experienced surgeons. Follow-up was done upto a time period of 2 years and prognosis of dental implants was recorded. All the results were analyzed by SPSS software. Chi-square test was used for evaluation of level of significance.

Results

In the present study, a total of 200 patients were enrolled and broadly divided into 4 study groups; smokers group, diabetic group, smokers plus diabetic and control group. Mean age of the patients of group 1, group 2, group 3 and group 4 was found to be 43.8 years, 44.7 years, 45.8 years and 43.8 years respectively. There were 34 males and 16 females in group 1, 31 males and 19 females in group 2, 30 males and 20 females in group 3 and, 29 males and 21 females in group 4. In the present study, success rate of dental implants among patients of group 1, group 2, group 3 and group 4 was found to be 82%, 94%, 80% and 96% respectively. Significant results were obtained while comparing the prognosis of dental implants among group 1 and group 2, group 1 and group 4, group 2 and group 4, and group 3 and group 4 respectively.

Table 1: Demographic data

Parameter		Group 1	Group 2	Group 3	Group 4
Age group (years)	Less than 25	9	10	6	12
	25 to 40	13	12	15	12
	More than 40	28	28	29	26
Gender	Males	34	31	30	29
	Females	16	19	20	21

Table 2: Prognosis of dental implants on 2 year follow-up

Prognosis	Group 1	Group 2	Group 3	Group 4
Success	41 (82%)	47 (94%)	40 (80%)	48 (96%)
Failure	9 (18%)	3 (6%)	10 (20%)	2 (96%)

Table 3: Inter-group comparison

Groups	p- value
Group 1 versus Group 2	0.000*
Group 1 versus Group 3	0.452
Group 1 versus Group 4	0.001*
Group 2 versus Group 3	0.012*
Group 2 versus Group 4	0.117
Group 3 versus Group 4	0.027*

*: Significant

Discussion

A dental implant is one of the treatments to replace missing teeth. Their use in the treatment of complete and partial edentulism has become an integral treatment modality in dentistry. Dental implants have a number of advantages over conventional fixed partial denture. A variety of conditions, including implant design (length, shape or surface texture), patient-related medical risk factors (systemic diseases or habits, such as smoking), and surgery-related factors (surgeon's experience or surgical design) have been considered to influence the outcome for implant restoration. With the dramatic advancements in materials science and

surgical techniques, increasing attention is focused on patient-related conditions as risk factors for dental implant failure [7-9]. Hence; the present study was undertaken for assessing the prognosis of dental implants in smokers and diabetics.

In the present study, a total of 200 patients were enrolled and broadly divided into 4 study groups; smokers group, diabetic group, smokers plus diabetic and control group. Mean age of the patients of group 1, group 2, group 3 and group 4 was found to be 43.8 years, 44.7 years, 45.8 years and 43.8 years respectively. There were 34 males and 16 females in group 1, 31 males and 19 females in group 2, 30 males and 20 females in group 3 and, 29 males and 21 females in group 4. F Marchand *et al.*, assessed the success of dental-implant treatment in patients with 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].

Clinical trials of endosseous implants consistently rate smoking as a primary patient-centered risk factor for implant loss. Various studies report a failure rate of implants in smokers compared to nonsmokers, ranging from 6.5% to 20%. The negative impact of tobacco smoking in implant outcome may be related to multiple factors and their mechanism may be mediated through both local and systemic biologic routes. Effects of smoking on implant survival and success are more pronounced in areas of poor quality trabecular bone. In smokers, maxillary implants have more failure rate as compared to mandibular implants. Probably, maxillary bone is of lower quality and consequently more susceptible to the damaging effects of smoking. Vasoconstriction caused by the local absorption of nicotine into the bloodstream is shown to be a significant factor for implant failure by some studies. This can explain lower failure rates in the posterior mandible among smokers, since this area is covered by the tongue and hence protected against local influence of tobacco smoke [10-14].

In the present study, success rate of dental implants among patients of group 1, group 2, group 3 and group 4 was found to be 82%, 94%, 80% and 96% respectively. Significant results were obtained while comparing the prognosis of dental implants among group 1 and group 2, group 1 and group 4, group 2 and group 4, and group 3 and group 4 respectively. Rachel Anner *et al* evaluated the factors associated with long-term implant survival in a large cohort of patients in regular follow-up until data collection. The study population consisted of 475 patients who were referred to a private clinic. Data were collected from patient files with regards to smoking habits, periodontal condition, diabetes mellitus, implant survival, and time when implant failure occurred. Patients were divided into those who participated in a supportive periodontal program in the clinic and those who only attended the annual free-of-charge implant examination. A total of 1626 implants were placed with a follow-up ranging from 1 to 114 months (average 30.82 +/- 28.26 months). Overall, 77 (4.7%) implants were lost in 58 (12.2%) patients after a mean period of 24.71 +/- 25.84 months. More than one-half of the patients (246; 51.7%) participated in a structured supportive periodontal program in the clinic, and 229 (48.3%) only attended to the annual free-of-charge

implant examination. Smoking and attendance in a regular supportive periodontal program were statistically associated with implant survival. Patients with (treated) moderate-to-advanced chronic periodontal disease demonstrated higher implant failure rates but, this difference did not reach statistical significance. Diabetes mellitus was not related to implant survival in this patient cohort. Smoking and attendance in a regular supportive periodontal program were found to be strongly related to implant survival ^[15].

Conclusion

From the above results, the authors concluded that smoking and presence of diabetes as a co-morbid condition are significant risk factors of dental implant failure. However; further studies are recommended.

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