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Assessment of implant failure rate in smokers and non-smokers

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***Abstract*---**Background: One of the most imperative developments in modern dentistry is the ability to replace missing teeth using titanium implants placed directly into the jaw. Smoking has been associated with countless diseases, including cancer and neurological, cardiovascular, and respiratory diseases. Hence; the present study was conducted for assessing the implant failure rate in smokers and non-smokers. Materials & methods: A total of 100 subjects were enrolled in the present study. All the 100 subjects were divided into four study groups according to their cigarette smoking habits as follows: Group A: 25 non-smokers, Group B: 25 smokers with habit of smoking less than 5 cigarettes per day from past 5 years, Group C: 25 smokers with habit of smoking 5 to 10 cigarettes per day from past 5 years, and Group D: 25 smokers with habit of smoking more than 10 cigarettes per day from past 5 years. Radiographic and assessment of all the patients was done at six months follow-up. Results: Success rate of dental implant therapy among subjects of group A, group B, group C and group D was 100 percent, 92 percent, 84 percent and 76 percent respectively. Significant results were obtained while comparing the prognosis of dental implants among smoker and non-smokes. Conclusion: Dental implant failure rate was significantly higher among smokers.

***Keywords*---**Smokers, Dental Implant, Failure.

Introduction

One of the most imperative developments in modern dentistry is the ability to replace missing teeth using titanium implants placed directly into the jaw. From one tooth to a whole arch or simply to stabilise a moving denture, implant

dentistry can offer a successful alternative to many restorative problems. The major breakthrough in implant success which ultimately led to the very successful materials and techniques now being used was made in l952 by a Swedish orthopedic surgeon named Per-Ingvar Branemark while investigating microscopic healing of bony defects in rabbit using specially designed microscope heads made up of titanium.[1- 3] Tobacco is today the single most preventable cause of death, killing an estimate of more than 8 million people each year, leading many more to suffer from illnesses. Smoking has been associated with countless diseases, including cancer and neurological, cardiovascular, and respiratory diseases. Therefore, from an economics point of view, the increase in the prevalence of illnesses connected with smoking contributes to an increase in overall medical costs. Smoking is a prevalent behaviour in the population all over the world.[4- 7] Hence; the present study was conducted for assessing the implant failure rate in smokers and non-smokers.

Materials & Methods

The present study was conducted for assessing the implant failure rate in smokers and non-smokers. A total of 100 subjects were enrolled in the present study. Only those were enrolled which had missing molar and were scheduled for prosthetic rehabilitation for the same by dental implant therapy. All the 100 subjects were divided into four study groups according to their cigarette smoking habits as follows:
Group A: 25 non-smokers,
Group B: 25 smokers with habit of smoking less than 5 cigarettes per day from past 5 years,
Group C: 25 smokers with habit of smoking 5 to 10 cigarettes per day from past 5 years, and
Group D: 25 smokers with habit of smoking more than 10 cigarettes per day from past 5 years.
Baseline hemodynamic and biochemical variables were assessed. All the subjects underwent dental implant therapy. All the dental implant procedures were carried out under adequate septic conditions. Radiographic and assessment of all the patients was done at six months follow-up. All the results were recorded and analysed by SPSS Software.

Results

Mean age of the patients of group A, group B, group C and group D was 41.2 years, 43.5 years, 39.4 years and 40.9 years respectively. Majority of the patient population of all the study groups were males. Success rate of dental implant therapy among subjects of group A, group B, group C and group D was 100 percent, 92 percent, 84 percent and 76 percent respectively. Significant results were obtained while comparing the prognosis of dental implants among smoker and non-smokes.

Table 1: Comparison of prognosis of dental implants among smokers and non-smokers

Study group	Success	Failure	p- value
Group A	25	0	0.001 (Significant)

Group B	23	2	
Group C	21	4	
Group D	18	7	

Discussion

In regard to dental implants, a significant relationship has been shown between smoking and the risk of failure of osseointegrated implants, more particularly in the upper jaw. Smoking seems to have an early effect on osseointegration, dependent on the properties of the implant surface and local host genetic responses. It is also suggested that smokers, compared to non-smokers, have an altered bone structure and composition. Using multilevel analysis, including early as well as late implant loss, smoking has been associated with a significantly higher percentage of early lost implants (2.2%) in comparison to non-smoking (0.9%). Late implant failure seems not to be affected by smoking habits.[8- 10] Hence; the present study was conducted for assessing the implant failure rate in smokers and non-smokers.

Mean age of the patients of group A, group B, group C and group D was 41.2 years, 43.5 years, 39.4 years and 40.9 years respectively. Majority of the patient population of all the study groups were males. Success rate of dental implant therapy among subjects of group A, group B, group C and group D was 100 percent, 92 percent, 84 percent and 76 percent respectively. Alfadda SA conducted a systematic review aims to answer the following PICO (Participants, Intervention, Comparison, and Outcome) question: "Does smoking increase the rates of implant failure and peri-implant marginal bone loss in patients with dental implants?" An extensive electronic search of the Cochrane Central Register of Controlled Trials, PubMed, Medline, Embase, and Web of Science databases and a subsequent hand search were performed. Only randomized controlled trial, controlled clinical trials, and prospective studies published up to January 2017 were included. For dichotomous outcomes, the effect estimates for smoking are expressed as odds ratios and 95% CIs. For continuous outcomes, weighted mean differences (WMDs) and 95% CIs are presented. Three randomized controlled trials and 7 prospective studies were included. The odds ratio for implant failure among smokers was 2.92. First-year marginal bone loss in smokers ranged from 0.02 to 0.45 mm. In the nonsmokers, bone loss ranged from -0.08 to 0.42 mm. Nonsmokers lost significantly less bone during the first year and subsequent years.[11]

In the present study, significant results were obtained while comparing the prognosis of dental implants among smoker and non-smokes. Naseri R et al investigated if there was a significantly enhanced risk of dental implant failure due to the increased number of cigarettes smoked per day. Four databases, including PubMed, Embase, Web of Science and Scopus, were searched until January, 2019. The search terms "dental implant, oral implant, smoking, smoker, tobacco, nicotine and non-smoker" were used in combination to identify the publications providing data for dental implant failures related to the smoking habit. Having additional information supplied by the authors, 23 articles were selected for final analysis. The meta-analyses based on implant- and patient-related data showed a significant increase in the RR of implant failure in patients

who smoked >20 cigarettes per day compared with non-smokers. The risk of implant failure was elevated with an increase in the number of cigarettes smoked per day.[12]

Conclusion

Dental implant failure rate was significantly higher among smokers.

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