

ORIGINAL RESEARCH

Effect of Smoking on Success of Dental Implants

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ABSTRACT:

Background: The success of the treatment of missing teeth with dental implants is the complete integration of an implant with the bone and the correct functioning of implant-based prosthetic restoration for many years. The success of implant restorations is adversely affected by smoking. Hence; the present study was conducted for assessing the effect of smoking on success of dental implants. **Materials & methods:** A total of 33 smokers and 33 healthy controls were enrolled in the present study. All the dental implant procedures were carried out under local anesthesia and follow-up details were recorded. Criteria described in the previous literature were used for defining smokers. Probing depth (PD) score was measured (mm) at the above-mentioned 6 sites, and the average of the 6 measured values was recorded as the PD score for that implant. All the clinical data was recorded in Microsoft excel sheet and was recorded by SPSS software. **Results:** While comparing the mean probing depth scores in between smokers and non-smokers, significant results were obtained. Failures occurred in 33.33 percent of the smokers and 6.06 percent of the non-smokers. Significant results were obtained while comparing the prognosis of dental implants in between smokers and non-smokers. **Conclusion:** Smoking is a significant risk factor for failure of dental implant.

Key words: Smoking, Dental Implants, Success

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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.¹⁻

³The success of the treatment of missing teeth with dental implants is the complete integration of an implant with the bone and the correct functioning of implant-based prosthetic restoration for many years. Factors that may affect therapeutic failure are the patient's age, general diseases including osteoporosis, diabetes, and hypertension, as well as dental and medical factors. The simultaneous presence of several factors is also significant. Tobacco smoking is one of

the essential factors that may affect the success of implant treatment of missing teeth.⁴

Studies have shown that smokers have a higher risk of periodontal disease, loss of tooth, and oral cancer. It has been observed that smoking is associated with decreased bone height, bone loss, poor bone quality, and peri-implantitis. Previous authors have concluded that both systemic and local injury to the tissues occurs with smoking and which is a common cause for decrease in tissue oxygenation, which in turn affects wound healing.⁵⁻⁷ In smoking patients, since more than five decades, osseointegrated dental implants are being used to support prosthetic suprastructures associated with removable or fixed prostheses. Although, the success of implant restorations is adversely affected by smoking and the resulting biological complications lead to the loss of

the supporting bone, dental implant-supported fixed or removable prostheses are one of the most widely used treatment options.⁸Hence; the present study was conducted for assessing the effect of smoking on success of dental implants.

MATERIALS & METHODS

The present study was conducted with the aim of assessing the effect of smoking on success of dental implants. A total of 33 smokers and 33 healthy controls were enrolled in the present study. Written consent was obtained from the patients after explaining in detail the entire research protocol. Complete demographic and clinical details of all the patients were obtained. All the dental implant procedures were carried out under local anesthesia and follow-up details were recorded. Criteria described in the previous literature were used for defining smokers. Probing depth (PD) score was measured (mm) at the above-mentioned 6 sites, and the average of the 6 measured values was recorded as the PD score for that implant. All the clinical data was recorded in Microsoft excel sheet and was recorded by SPSS software. Chi-square test and student test was used for evaluation of level of significance.

In the present study, a total of 33 smokers and 33 non-smokers were included. Only those patients were included which underwent dental implant procedures for prosthetic rehabilitation of missing mandibular first molar. Mean age of the patients of smokers group and non-smokers group was 31.5 years and 32.9 years respectively. There were 23 males and 10 females in the smokers group and 25 males and 8 females in the non-smokers group. Mean probing depth score in the maxillary anterior zone of the smokers and non-smokers was found to be 4.79 and 3.36 respectively. Mean probing depth score in the maxillary posterior zone of the smokers and non-smokers was found to be 4.83 and 3.43 respectively. Mean probing depth score in the mandibular anterior zone of the smokers and non-smokers was found to be 4.46 and 3.19 respectively. Mean probing depth score in the mandibular posterior zone of the smokers and non-smokers was found to be 4.89 and 3.53 respectively. While comparing the mean probing depth scores in between smokers and non-smokers, significant results were obtained. Failures occurred in 33.33 percent of the smokers and 6.06 percent of the non-smokers. Significant results were obtained while comparing the prognosis of dental implants in between smokers and non-smokers.

RESULTS

GRAPH 1: Demographic data

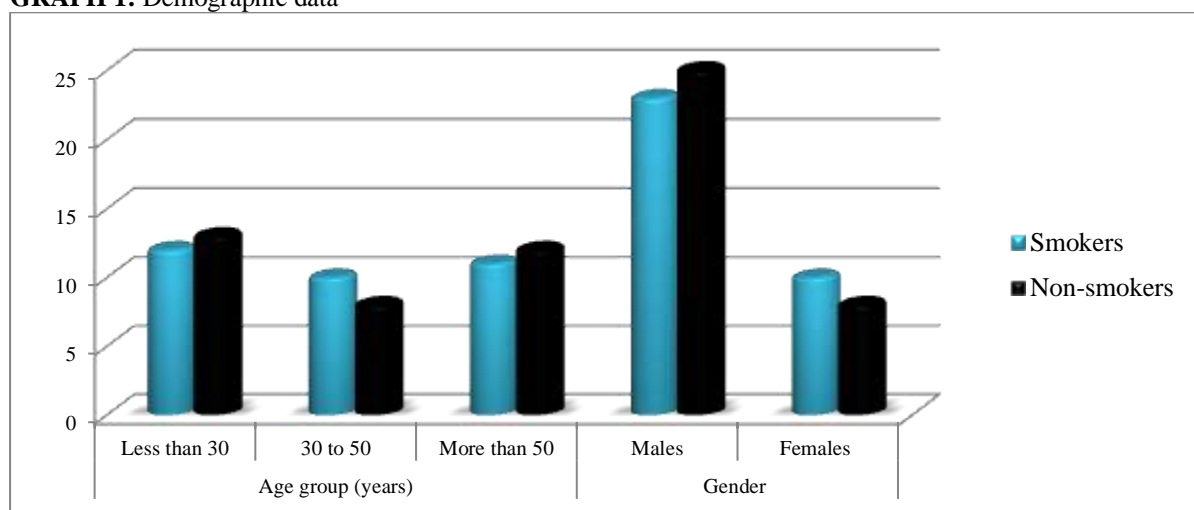


TABLE 1: Comparison of probing depth

Probing depth score		Smokers	Non-smokers	p- value
Maxillary	Anterior zone	4.76	3.36	0.00*
	Posterior zone	4.83	3.43	0.01*
Mandible	Anterior zone	4.46	3.19	0.03*
	Posterior zone	4.89	3.53	0.00*

*: Significant

TABLE 2: Prognosis of dental implants

Prognosis	Smokers		Non-Smokers		p- value
	Number of patients	Percentage	Number of patients	Percentage	
Success	22	66.67	31	93.94	0.00*
Failure	11	33.33	2	6.06	

*: Significant

DISCUSSION

Now in days Dental Implants are the best permanent and secure solution in the replacement of one or more missing teeth giving you a natural appearance. They are made of biocompatible materials, just the same as hip implants or similar orthopedic devices, and function as anchors or support for traditional forms of dentistry, such as crowns, bridges or dentures. Smoking has its influence on general as well as oral health of an individual. A primary relationship between smoking and coronary heart disease, stroke, subclinical atherosclerosis, chronic obstructive pulmonary disease, pneumonia, low birth weight, and various cancers has been established without doubt. Pregnant women who smoke tobacco have increased risk of stillbirth.^{8,9}

There are many studies showing smoking impairs bone wound healing and cause clear detriment to the skeletal tissues. Smoking is also found to be associated with osteoporosis as well as with reduced bone density in femur, vertebra and jaw bone and decreases in the bone mineral content found in the smokers than compared to non-smokers. Smoking effect on bone regeneration is established by studies that found success of bone regeneration in non-smokers may reach 95% where as 65% in smokers.¹⁰ Hence; the present study was conducted for assessing the effect of smoking on success of dental implants.

Smoking is also related to low calcium absorption. Reports in the literature show lower survivability of dental implants in smokers. One possible mechanism by which smoking might affect osseointegration is lowering blood flow rate due to increased peripheral resistance and platelet aggregation. Smoking by-products such as CO and cyanide delay wound healing and together with nicotine inhibit cell proliferation. Tobacco directly affects osteoblast function performed a systematic review and meta-analysis including 35 studies in order to analyse whether smoking affects implant prognosis with/without augmentations.⁷⁻¹⁰

Mumcu E et al analysed 137 implants in the 'implant-supported fixed prostheses' (ISFP) group (31 smokers, 106 non-smokers) and 94 implants (21 smokers, 73 non-smokers) in the 'implant-supported removable prostheses' (ISRP) group. The recorded clinical periodontal parameters were the presence/absence of a plaque index, bleeding index, and the probing depths. The overall clinical parameters were found to be poorer in smokers than in non-smokers ($p < 0.05$). In all the groups, time-dependent bone loss was observed. However, among the patients with ISRPs, smokers were associated with significantly greater marginal bone loss compared to patients with ISFPs ($p < 0.05$). In smokers with dental ISRPs, the marginal bone loss rates are likely to reach critical levels.⁹

Arora A et al assess the effect of smoking on survival of dental implant. The study participants were

selected from all the patients who underwent for dental implant in implant center. For each patient, various information regarding implant characteristics and smoking habits were recorded. The age range of patients was between 30 and 54 years. There were 2142 (57.2%) male and 1579 (42.4%) female participants; in that 72.2% were non-smokers and 27.7% were smokers. Implant placed more in mandible (2312, 62%) than in maxillary region (1409, 37.8%). From 3721 patients, 3600 were successful and 121 failures. Success of implant was considerably more in non-smokers than smokers. Implant failure rate was more in smokers with increased frequency and duration of cigarette smoking habit, but it was statistically not significant. They have observed 0.049% mobility in smokers compared to 0.007% in non-smokers.¹⁰

Twito D et al analysed the influence of smoking habits and other possibly relevant factors on dental implant survival. The study refers to 7,680 implants. 7,359 (95.8%) survived and 321 (4.2%) did not survive. Concerning smoking habits, in a uni-variable analysis, factors found to have an association with implant survival were the smoking status of the patients (smoking/no smoking), the amount of smoking, passive smoking, and the time elapsed in ex-smokers from the time they ceased smoking to the time of implantation. In a multi-variable analysis, factors found to have an association with implant survival were smoking status (smoking/no smoking) and amounts of smoking as expressed in pack years.¹¹

Mumcu E et al evaluated the effects of smoking on dental implants in patients with fixed implant-supported prostheses over a period of 36 months following loading. Smoking was associated with increases in marginal bone loss around implants, independent of their location in the jaws.¹²

CONCLUSION

From the above results, the authors concluded that smoking is a significant risk factor for failure of dental implant.

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