

ORIGINAL RESEARCH

Assessment of effect of smoking on prognosis of dental implants

Ankush Jamwal¹, Sandeep Kaur Bali², Shazia Mir³

¹Post-Graduate Scholar, ²Professor and Head, ³Associate Professor, Department of Prosthodontics Govt. Dental College, Srinagar

ABSTRACT:

Backgrounds: The success and predictability of implants are well established. Cigarette smoking is still considered a common habit. Hence; the present study was undertaken for assessing the correlation between smoking and dental implant prognosis. **Materials & methods:** A total of 50 smokers and 50 non-smokers were enrolled in the present study. Only those patients were included in the smoker group and non-smoker group who underwent dental implant therapy for missing maxillary first molar. Only those patients were included under the smoker group who had positive smoking history of more than 10 cigarettes per day for a minimum of 5 years. Complete demographic details of all the patients were obtained. All the dental implant procedure was carried out under the hands of skilled and experienced Prosthodontist. Follow-up was done and clinical and radiographic evaluation of all the patients was done at follow-up. **Results:** Among the smokers group, dental implants were successful in 76 percent of the patients while in the remaining 24 percent of the patients, failure of dental implants occurred. In the non-smoker group, dental implants were successful in 96 percent of the patients while in the remaining 4 percent of the patients, failure of dental implants occurred. While comparing the success of dental implants in between smokers and non-smokers, non-significant results were obtained. **Conclusion:** In smokers, dental implants do not have good prognosis in comparison to non-smokers.

Key words: Dental implants, Smoking

Received: 15 Jan, 2020

Revised: 19 Jan, 2020

Accepted: 28 Jan, 2020

Corresponding author: Dr. Sandeep Kaur Bali. Professor and Head, Department of Prosthodontics Govt. Dental College, Srinagar

This article may be cited as: Jamwal A, Bali SK, Mir S. Assessment of effect of smoking on prognosis of dental implants. *Int J Res Health Allied Sci* 2020; 6(1):35-37.

INTRODUCTION

The success and predictability of implants are well established. For a great number of dental implant systems survival rates are within the 90 percentile. The success rates of implants tend to be lower than implant survival rates and change in relation to the measured criteria (implant mobility, bone loss, the presence of signs and symptoms, the resulting level of aesthetics, etc.). Despite the fact that implant survival and success rates are high, there is a growing impression that there are risk factors exposing patients to complications and ultimately to failure of implants. Among the perceived risks are occlusal overload, lower bone quality, and systemic diseases.¹⁻³

Cigarette smoking is still considered a common habit. Of smokers, increased plaque accumulation, higher incidence of gingivitis and periodontitis, higher rate of tooth loss, and increased resorption of the alveolar ridge have been found in the oral cavity. Cigarette smoking may adversely affect wound healing, and, thus, jeopardize the success of bone grafting and dental implantation. Bone grafts and sinus lift operations are both common and well-

documented procedures before dental implant placement. Heat as well as toxic by-products of cigarette smoking, such as nicotine, carbon monoxide, and hydrogen cyanide, have been implicated as risk factors for impaired healing, and, thus, may affect the success and complications of those surgical procedures. An association among dental implants, grafting procedures (i.e., bone grafts, maxillary sinuses augmentation), and history of smoking has been reported. A higher degree of complication, or implant failure rates, were found in smokers with and without bone grafts.⁴⁻⁶ Hence; the present study was undertaken for assessing the correlation between smoking and dental implant prognosis.

MATERIALS & METHODS

The present study was conducted with the aim of assessing the prognosis of dental implants among smokers. Ethical approval was obtained from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol. A total of 50 smokers and 50 non-smokers were enrolled in the present study. Only those

patients were included in the smoker group and non-smoker group who underwent dental implant therapy for missing maxillary first molar. Only those patients were included under the smoker group who had positive smoking history of more than 10 cigarettes per day for a minimum of 5 years. Complete demographic details of all the patients were obtained. All the dental implant procedure was carried out under the hands of skilled and experienced Prosthodontist. Follow-up was done and clinical and radiographic evaluation of all the patients was done at follow-up. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. Chi- square test was used for assessment of level of significance.

RESULTS

In the present study, a total of 50 smokers and 50 non-smokers were enrolled. Mean age of the smokers and the non-smokers was 41.3 years and 44.8 years respectively. 58 percent of the patients of the smokers and 62 percent of the non-smokers were males while the remaining were females.

In the present study, among the smokers group, dental implants were successful in 76 percent of the patients while in the remaining 24 percent of the patients, failure of dental implants occurred. In the non-smoker group, dental implants were successful in 96 percent of the patients while in the remaining 4 percent of the patients, failure of dental implants occurred. While comparing the success of dental implants in between smokers and non-smokers, non-significant results were obtained.

Table 1: Demographic data

Demographic data	Smoker group	Non-smoker group
n	50	50
Mean age (years)	41.3	44.8
Males	29	31
Females	21	19
Mean BMI (Kg/m²)	24.8	23.1

Table 2: Prognosis

Prognosis	Smoker group		Non-smoker group	
Success	38	76	48	96
Failure	12	24	2	4
Chi- square value	299.3			
p- value	0.000 (Significant)			

DISCUSSION

Dental implants lack the periodontal ligament compared to natural teeth. The stability of these surrounding tissues is influenced by dynamic processes involving cellular and molecular events. The most predictive health indicators related to these cellular and molecular events are the evaluation of the clinical parameters associated with the soft tissue and the bone level measurements on the radiographs. As it is a dynamic organ, the stability of the surrounding bone is considered an important criterion to predict the prognosis of implant survival in the long-term. In contrast, nicotine, which is the active ingredient

involved in smoking, suppresses blood circulation in the bones and inhibits the normal functions of the bone forming cells.⁷

Even 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.⁸ Hence; the present study was undertaken for assessing the correlation between smoking and dental implant prognosis.

In the present study, a total of 50 smokers and 50 non-smokers were enrolled. Mean age of the smokers and the non-smokers was 41.3 years and 44.8 years respectively. 58 percent of the patients of the smokers and 62 percent of the non-smokers were males while the remaining were females. Chrcanovic BR et al tested the null hypothesis of no difference in the implant failure rates, risk of postoperative infection, and marginal bone loss for smokers versus non-smokers, against the alternative hypothesis of a difference. Main search terms used in combination: dental implant, oral implant, smoking, tobacco, nicotine, smoker, and non-smoker. An electronic search was undertaken in September/2014 in PubMed/Medline, Web of Science, Cochrane Oral Health Group Trials Register plus hand-searching. Eligibility criteria included clinical human studies, either randomized or not. The search strategy resulted in 1432 publications, of which 107 were eligible, with 19,836 implants placed in smokers, with 1259 failures (6.35%), and 60,464 implants placed in non-smokers, with 1923 failures (3.18%). The insertion of implants in smokers significantly affected the failure rates, the risk of postoperative infections as well as the marginal bone loss. The results should be interpreted with caution due to the presence of uncontrolled confounding factors in the included studies. Smoking is a factor that has the potential to negatively affect healing and the outcome of implant treatment.⁸

In the present study, among the smokers group, dental implants were successful in 76 percent of the patients while in the remaining 24 percent of the patients, failure of dental implants occurred. In the non-smoker group, dental implants were successful in 96 percent of the patients while in the remaining 4 percent of the patients, failure of dental implants occurred. While comparing the success of dental implants in between smokers and non-smokers, non-significant results were obtained. Twito D et al analyzed the influence of smoking habits and other possibly relevant factors on dental implant survival. The study population included all patients who underwent dental implants between the years 1999 and 2008 at a large military dental clinic and were examined in the periodic medical examination center. Correlation between implant characteristics and patients' smoking habits, as mentioned in the questionnaire answered by patients in the periodic examination, was performed. Besides

standard statistical methods, multiple linear regression models were constructed for estimation of the relative influence of some factors on implant survival rate. The long-term results of the implant treatment were good. 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.⁹ 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. Publications were excluded if the quantity of cigarettes consumed per day was not reported. Fixed- or random-effects meta-analyses were used to pool the estimates of relative risk (RR) with 95% confidence intervals (CI). 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.¹⁰

CONCLUSION

From the above results, the authors concluded that in smokers, dental implants do not have good prognosis in comparison to non-smokers.

REFERENCES

1. Brånemark PI, Adell R, Albrektsson T, Lekholm U, Lundkvist S, Rockler B. Osseointegrated titanium fixtures in the treatment of edentulousness. *Biomaterials*. 1983;4:25–28.
2. Pomerleau CS, Pomerleau OF, Snedecor SM, Mehringer AM. Defining a never-smoker: results from the nonsmokers survey. *Addictive Behaviors*. 2004;29:1149–1154.
3. Silness J, Loe H. Periodontal Disease in Pregnancy II. Correlation Between Oral Hygiene and Periodontal Condition. *Acta Odontol Scand*. 1964;22:121–135.
4. Ma L, Zwahlen RA, Zheng LW, Sham MH. Influence of nicotine on the biological activity of rabbit osteoblasts. *Clinical Oral Implants Research*. 2011;22:338–242.
5. Haas R, Haimböck W, Mailath G, Watzek G. The relationship of smoking on peri-implant tissue: A retrospective study. *The Journal of Prosthetic Dentistry*. 1996;76:592–596.
6. Bagambisa FB, Kappert HF, Schilli W. Cellular and molecular biological events at the implant interface. *Journal of Craniomaxillofacial Surgery*. 1994;22:12–17.
7. Lago L, Da Silva L, Gude F, Rilo B. Bone and Soft Tissue Response in Bone-Level Implants Restored With Platform Switching: A 5-Year Clinical Prospective Study. *International Journal of Oral Maxillofacial Implants*. 2017;32:919–926.
8. Chrcanovic BR1, Albrektsson T2, Wennerberg A3. Smoking and dental implants: A systematic review and meta-analysis. *J Dent*. 2015 May;43(5):487-98.
9. Twito D, Sade P. The effect of cigarette smoking habits on the outcome of dental implant treatment. *PeerJ*. 2014;2:e546.
10. Naseri R1, Yaghini J2, Feizi A3. Levels of smoking and dental implants failure: A systematic review and meta-analysis. *J Clin Periodontol*. 2020 Jan 19. doi: 10.1111/jcpe.13257. [Epub ahead of print]