

Co-relation between Smoking and Bone Healing around Dental Impants: A Clinical Study

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Abstract:

Background: Osseointegrated implants as a foundation for the prosthetic replacement of missing teeth has become widespread in the recent time, but the success of it depends on several parameters.

Materials and Methods: The retrospective study was designed on 3260 implants patients. Various characteristics of implants and smoking habit were recorded of each patient.

Results: Out of it 3128 implants survived and 132 failed. 2610 implants were placed in men and 650 in female patients with an age range between 26 and 58 years.

Conclusion: Even though smoking is not a contraindication to dental implants but it do has a significant effect on survival of implants. Implant patients should be informed about adverse effects of tobacco.

Key Words: Dental implants, implant failure, osseointegrated implants, smoking tobacco

Introduction

One of the most revolutionary developments in dentistry is the ability to replace missing teeth using implants directly into the jaw which is a successful alternative to many restorative problems.¹

In last decade, use of osseointegrated implants as a basis for the prosthetic replacement of missing teeth has become widespread.²

Survival rates of implants are higher in normal healthy individuals with non-pathological bone. Studies have reported that acceptance and success rates around 90-95% for dental

dental implants. Albeit, the occurrence of failure may be confronted.³

There is a growing evidence that there are certain risk factors exposing patients to complications and ultimately to implant failure. Occlusal overload, lower bone quality, implant quality, smoking, and systemic diseases are the recognized risks factors for implant failure.

Implant failure, in general, terms is defined as the mobility of the implant either at the time of Osseo integration (early failure) or in the post loading period (late failure).⁴

Smoking is a prevalent behavior in the population all over the world. A survey of health status in the United States has established a clear link between smoking and low levels of periodontal health and support.⁵

The purpose of this study was to evaluate the influence of smoking on the failure rate of dental implants placed over a period of 6-year.

Materials and Methods

The retrospective study was conducted on patients who were treated by dental implants between the years 2005 and 2014 and were examined regularly. Ethical permission was taken from Institution Ethical Committee before the commencement of the study. Written consent was taken from all the study participants.

Patients having missing teeth in either jaw with sufficient bone to permit replacement of an implant were included in study whereas with subjects with insufficient bone quantity, systemic disorders, drug dependency, psychological problems, a history of irradiation to head and neck are excluded from the study.

Two skilled oral and maxillofacial surgeons placed all dental implants. All patients underwent regular follow-ups in the department of prosthodontics. Implant status was recorded during these checkups as either successful or failure.

Detailed habit history of the study participants was taken including frequency, quantity, duration of smoking cigarette.

Numerous features of the implant were recorded which includes implanted region, implanted jaw, immediate implantation, bone augmentation, membrane use, sinus lift, immediate loading, implant failure.

A correlation between implant characteristics and patients' smoking habits was performed. Results obtained were statistically analyzed using a Chi-square test *t*-test with the application of SPSS software version 16.

Results

The study population consisted of total 3260 implants placed in between 2004 and 2014 year. Only those cases were selected where sufficient information regarding smoking habit is available. Out of it 3128 implants survived and 132 failed. 2610 implants were placed in men and 650 in female patients with age range between 26 and 58 years (Tables 1-4).

Discussion

In this retrospective study, 3260 dental implants with different sizes placed in different sites of the mandible and maxilla (650 women, 2610 men). The present study showed that majority of implants (69.48%) was placed in maxilla than mandible (30.52%).

The present study was conducted to evaluate the influence of smoking and non-smoking on bone healing around dental implants. This study involved 70.43% non-smoker patients, whereas 29.57% were smokers.

Table 1: Demographic characteristics of study population (n=3260).

Age (range)	26-58 years (%)
Gender	
Males	2610 (80.00)
Females	650 (20.00)
Jaw involved	
Maxilla	2265 (69.48)
Mandible	995 (30.52)
Smoking status	
Smoker	964 (29.57)
Non-smoker	2296 (70.43)

Table 2: Correlation between rate of implant failure and smoking status.

Smoking status	Implant failure n=132 (%)	Implant survived n=3128 (%)	P value
Smoker (964)	84 (63.63)	880 (28.13)	0.036 (significant)
Non-smoker (2296)	48 (36.37)	2248 (71.87)	

Table 3: Correlation was found between implant failure rate and years of smoking (n=964).

Years of smoking	Implant failure (%)	Implant survived (%)	P value
<10 years	26 (30.95)	350 (36.30)	0.023 (significant)
More than 10 years	58 (69.05)	614 (63.70)	

Table 4: Correlation between number of cigarettes consumed and implant failure (n=964).

Number of cigarettes	Implant failure (%)	Implant survived (%)	P value
<20 packets/year	38 (45.23)	388 (40.24)	0.062 (non-significant)
More than 20 packets/year	46 (54.77)	576 (59.76)	

Bain and Moy, were the pioneer to assess the effect of smoking on the failure rate of the dental implant. They compared the results between smokers and non-smokers patients in which implants were placed. He found that overall failure rate of 5.92% and specifically implant failure in smokers was 11.28% as compared to 4.76% in non-smokers.⁶

The present study revealed that 63.63% implants failed in smokers, whereas 36.37% failed in smokers (Figures 1 and 2).

Similar kind of results has also been obtained by Schwartz-Arad *et al.*,⁷ in his study, who compared complication and survival rate in relation to dental implants among smokers and non-smokers by analyzing data of 959 implants placed in 261 patients in 3 years. They further subdivided patients in non-smokers, mild smokers (up to 10/day) and heavy smokers (>10/day). Smokers were also categorized according depending on duration in two groups <10 years and >10 years. In their study they found, 4% implant failure in smokers and 2% in non-smokers.⁸

The present study also showed that 69.05% of implants survived in subjects having more than 10 years which is

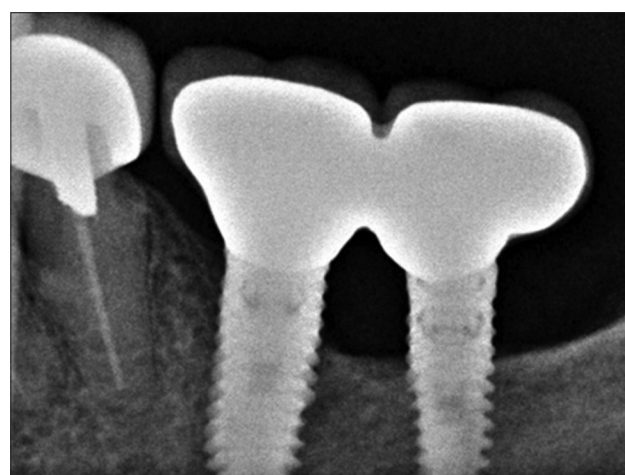


Figure 1: Extensive bone loss around dental implant in smoker.



Figure 2: Dental implant in non-smoker.

statistically higher as compare to subjects with smoking habit <10 years (30.95%).

Present study showed that implant failure is higher than subjects consuming cigarettes more than 20 packets/year than subjects having <20 packets/year but this difference is statistically non-significant. DeLuca *et al.*,⁹ carried out a case-control study consisting of 226 patients including 113 consecutive patients with immediately dental implant cases and 113 randomly selected controls with late implant loading. In their study, 20.8% of patient's had habit of smoking. Average time of smoking was 23.8 ± 10.9 years and average amount of cigarette per day was 16.5 ± 8.9 . They observed no significance difference between case and control regarding smoking habit.

Bone healing around implant is a complicated process which involves series of events consisting of synthesis and activation of, growth factors, matrix proteins, angiogenic stimulators, cytokines that further coordinates the restoration of bone mechanical stability at the peri-implant interface. The mechanism by which cigarette smoking acts as a risk factor for implant loss is still elusive, and there is need to have further research.¹⁰ Several studies have suggested smoking as a crucial factor in early implant failure. Smoking is a significant although not the only important factor in the failure of implants.

Conclusion

This study has proved that smoking has a significant effect on survival of implants. Duration of habit plays a major role, whereas quantity of tobacco does not have a major influence on implant failure. Implant patients should be informed about adverse effects of tobacco.

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