Clinical Cancer Investigation Journal-ISSN: 2278-0513

Dental Implant Complications: analyzing relevant risk factors

Abstract

Different aspects of evaluating the success of dental implants, such as biological complications, have made it difficult to judge their usefulness. This study aimed to evaluate the outcome after dental implant treatment, to evaluate the survival rate and the complication rate. Additionally, to identify risk indicators of these complications at the patient and implant level. Patients (250 people) undergoing treatment with dental implants (422 people) in five specialized clinics in Tehran were included in the study. All patients were examined after the completion of the implant treatment and the information obtained is based on the history with respect for privacy and their consent. Factors such as the type of implant used, as well as their dimensions and loading method, were not investigated. In total, 250 patients, 150 men, and 100 women, with an average age of 45.4 (range 19 to 75) years, 422 implants were implanted. Seventeen implants in 14 patients were lost. A remarkable statistic in these cases is that 8 patients are smokers. When analyzing the incident reports, it was observed that 63.2% of the incidents occurred in male patients, while 42.4% occurred in female patients. According to statistics, the presence of things like smoking, diabetes, heart disease, improper oral hygiene, previous infection, low bone quality, and grinding teeth are evident in implant failure. Finally, we recommend classifying the risk factors for a more detailed investigation. Many of these issues, such as an unhealthy lifestyle, can easily be corrected in the first step.

Keywords: *Dental Implant; Implant; complications Dental Implant*

Mostafa Chegini[1], Bardia Mortezagholi[2], Emad Movahed[3], Mojtaba Asefi[4*]

[1]*Department of Dentistry, School of Dentistry, Tehran University of Medical Sciences, Tehran Iran*

[2]*Dental Research Center, Faculty of Dentistry, Islamic Azad University of Medical Sciences, Tehran, Iran*

[3]*Dental Research Center, Faculty of Dentistry, Islamic Azad University of Medical Sciences, Tehran, Iran*

[4]*Department of Dentistry, School of Dentistry, Tehran University of Medical Sciences, Tehran Iran*

***Correspondence author:**
Email:
Mojtabaasesfi@gmail.com

Background:

More than 40 years have passed since the introduction of dental implants as a way to replace missing teeth. These days, using dental implants is a not unusual treatment, which is not only performed in specialized clinics or selected patient groups. Even though dental implant treatment has been practiced for decades and a large wide variety of research is done annually, just a few studies with a follow-up period of extra than 10 years had been published describing the prevalence of all complications [1]. Survival and success rates are commonly used as primary outcome measures in dental implant studies. Unfortunately, these terms have varied over time and in individual studies, hindering comparisons and making it difficult to draw evidence-based conclusions. Survival has been and still is defined as" implants and fixed prostheses in the mouth independent of natural and/ or specialized complications" [2,3]. The criteria that define the success of dental implants are constantly changing and presently include no mobility at the morning of the prosthetic phase, 2 absence of patient radiolucency around the implant, 3 absences of peri-implantitis with wrinkling, and complaints. private of the case [4,5].

Complications of dental implant treatment are not rare and the number of complications is different depending on the definition of the complication. There may be nevertheless no consensus on what should be included and reported as a complication, not for biological or technical complications [6].

Aesthetics additionally play a critical position in contemporary dentistry and emphasizes the need to include more factors in the evaluation of success standards for implant prostheses. The focus has shifted from implant survival to creating lifelike implant restorations with natural-looking peri-implant gentle tissues, thus confirming the importance of patient satisfaction with the final results. Objective criteria such as pink aesthetic score and white aesthetic score have been proposed to evaluate aesthetic outcomes, but they do not reflect the subjective opinion of the patient about the treatment outcome [7,8].

According to the text, the importance of the implant is discussed in various ways. In this study, we are trying to address aspects of dental implant treatment complications and problems that have not been addressed so far.

Material & Method:

A retrospective descriptive study was conducted to analyze variables associated with the incidence of complications and/or failure of dental implants. Five specialty dental clinics collaborated with the study and provided access to the information we'll talk about from 2018 to 2022.

The data sheet included various variables during the various stages of the implant treatment process, from the initial implant placement to the subsequent prosthetic rehabilitation in the following year. Records had been used anonymously and consent was acquired for the use of this method.

This study includes demographic variables related to the patient, including age and sex, medical history (mental

conditions, grinding teeth, drug use (recognized drug addiction and drug overdose including alcohol), and smoking habits (patients using more than analyzed five cigarettes). One smoker per day was considered), infectious diseases (HIV and other infectious conditions that may affect the patient's immune response), hygiene (if the patient brush at least twice daily Associated with poor plaque manage, poor hygiene was considered), diabetes. (controlled, under treatment), cardiovascular damage (including high blood pressure if treated with drugs), blood dyscrasias, blood coagulation disorders), dental history (presence of periodontal damage, previous antibiotic treatment), and other dental aspects, non-parallels of the implant, post-operative infections, implant placement after extraction, implant placement with sinus lift, and including biomaterials).

Factors such as the type of implants used as well as their dimensions and loading methods were not investigated in this study due to differences and inaccuracies in statistics.

Finally, all of the data was gathered from all 5 clinics, and the common and influencing factors found were arranged in tables.

Result:

A total of 250 patients, 150 men, and 100 women had placed 422 implants (101 patients had one implant, 76 patients had two implants, and the others had more than two implants). The average age of the patients in the accident reports was 45.4 (range 19-75) years, with the frequency of men (61.6%) being higher than women (38.4%). Table 1 examines the sample in terms of demographic characteristics. In 2019, the number of referrals for implant treatment decreased by 15.9% due to the spread of the Covid-19 pandemic.

Variable	Category	Frequency	Percentage
Qualitative sociodemographic characteristics			
Sex	Male	150	60
	Female	100	40
Ag e group	Up to 30	35	14
	From 31 to 45 years	98	39.2
	From 46 to 60 years	76	30.4
	Over 60 years	41	16.4
Clinic visit time	2018	84	33.6
	2019	36	14.4
	2020	24	9.6
	2021	56	22.4
	2022	50	20

Table 1. Sociodemographic characteristics of the sample

Table 2, 3 shows the general details presented in the incident reports of implant failure, which are classified according to the studied variables. Among these factors, smoking is the highest with 68.08 percent, followed by underlying diseases (60.8 percent). Underlying diseases are divided into more precise categories and diabetes (46.6%, total=152) is the most common among them. It should be noted that the statistics for these diseases are for people over 40 years old.

Variable	Category	Frequency	Percentage
Psychological disorder	Yes	12	4.8
	No	238	95.2
Bruxism	Yes	72	28.8
	No	178	71.2
Underlying diseases	Yes	152	60.8
	No	98	39.2
Infectious disease	Yes	15	6
	No	235	94

Periodontal pathologies	Yes	64	25.6
	No	186	74.4
Previous antibiotic treatment	Yes	32	12.8
	No	218	87.2
Smoker	Yes	172	68.8
	No	78	31.2
Drug user	Yes	20	8
	No	230	92

Table 2. Frequency of common risk factors or other related issues to dental implant failure

	Category	Frequency	Percentage
Underlying diseases (n=138)	Cardiovascular disease	52	34.2
	Diabetes	70	46.6
	Blood clotting disorders	20	13.1
	Kidney disease	10	6.1

There is no complete information about the prescription of antibiotics for the entire population. However, no complications were reported among 25 cases of antibiotic use during implant therapy.

The report of the complications of implant therapy is not very accurate except for the report of cases of fracture or failure of the implant (17 implant loss, 4.03%), especially in the case of cosmetic dissatisfaction that can have other reasons or even psychological roots.

Discussion:

Implant failure event reports can be considered a powerful tool for descriptive analysis of the factors that often appear in cases of implant treatment failure. Even as because of the extensive range of complications, there may be no possibility of an instantaneous correlation. In addition to the specific and scientifically proven cases, the personal pleasure of sufferers could have specific criteria.

The scientific evidence on age as a risk factor for implant failure is still controversial. Several authors argue that there is no significant relationship between the age of the patient and the increased risk of implant failure [9]. However, other published studies have shown an increased risk of implant failure in patients over 60 years of age compared to patients over 40 years of age [10,11]. In their 2017 study, Cars et al. The risk of implant failure increases by 7 percent every 10 years.

In the present study, random reports of implant failure in smoking patients showed a higher percentage of male smokers than female smokers, even as non-smoking patient reports showed a better percentage of female smokers than male smokers. Regarding oral hygiene, poor oral hygiene was observed more in men than in women. However, more detailed information on smoking habits was not available, and the variety of cigarettes smoked in keeping with the day ought to have changed the results.

Chronic diseases have a negative impact on all aspects of life, especially in middle age. Paying attention to psychological factors is as important as physical factors and they cannot be separated from each other [12]. Now, in our discussion, we will analyze the impact of these cases.

Very few absolute medical contraindications have been suggested for dental implant placement, but these include patients with recent myocardial infarction, heart valve surgery, uncontrolled bleeding risk, or those using intravenous bisphosphonates [13,14].

Relative threat factors for either beforehand or late implant failure include tobacco use, diabetes mellitus, and compromised patient safety[15].

The occurrence of postoperative infections is usually associated with poor oral hygiene due to increased bacterial biofilm and subsequent infection of the peri-implant area, leading to bone loss leading to short- or long-term implant failure [16]. Because the role of oral microorganisms in implant failure is predictable, it is recommended that the use of antibiotics before oral implant surgery leads to a reduction in systemic bacteremia after oral surgery, along with a reduced risk of implant failure [17]. According to the results of the present study, 25 cases of patients who took antibiotics before or after implant therapy did not suffer serious complications.

While taking into account all the treatment issues, factors like antibiotic resistance, and even side effects of antibiotics, we are not allowed to use them for all patients.

Various factors affect the area where a dental implant is placed: bone density, which varies according to the area of bone, and occlusal forces generated during chewing or occlusal trauma, which varies according to the area to be placed. The implant in which it is placed is also different. In our study, fractures and complications were not confined to a specific site. On the other hand, bone quality is not a risk factor alone and should be considered as part of a whole [18,19].

Another variable that was analyzed was the number of failed implants reported in the same case report. Several authors state that the greater the number of implants placed during surgery, the greater the risk of implant failure. The reason for this may be due to the area covered by the surgery when placing more than one implant, which can affect the blood supply to the area, increase the surgical time, and increase the chance of wound contamination [20]. The significant point in our study is the effect of this factor. All 17 cases of total implant failure included cases with more than one implant.

The discussion about the survival rate and the risk factors involved in implant treatment is not limited to what we have said. Many factors that could be related were not examined in this study, so more research is needed.

Conclusion:

In order to find appropriate solutions to improve this treatment method, it is better to classify the existing risk factors. Many risk factors are related to the lifestyle of patients. Therefore, as the first line of reducing risk factors, it is possible to improve the level of information of patients by setting up the training protocol by dentists. In the next steps, improvement of things like surgical methods and implant materials will be on the agenda.

Acknowledgment:

We would like to acknowledge the technicians who participated in the sampling and the authorities who allowed sampling in their facilities. In addition, we are very grateful to anyone who accepted the costs of this study. We would also like to acknowledge all those who helped us by sharing their pearls of wisdom and helping us improve the manuscript.

Conflict of interest: There is no conflict of interest related to this journal.

Financial support: The financial support of this article was obtained by distributing the share of the authors with an equal and identical share for each person.

Ethics Statement: Before each step of the investigation, for moral issues, the consent decree and complete informing subscriptions were obtained and were caught from everyone who had taken participant in the study.

References:

1. von Stein-Lausnitz, Manja, et al. "Survival rates and complication behavior of tooth implant-supported, fixed dental prostheses: A systematic review and meta-analysis." *Journal of Dentistry* 88 (2019): 103167.

2. Howe, Mark-Steven, William Keys, and Derek Richards. "Long-term (10-year) dental implant survival: A systematic review and sensitivity meta-analysis." *Journal of Dentistry* 84 (2019): 9-21.

3. Roy, Margaux, et al. "Removal of osseointegrated dental implants: a systematic review of explantation techniques." *Clinical oral investigations* 24 (2020): 47-60.

4. Cheng, Qian, et al. "Clinical Outcomes Following Immediate Loading of Single-Tooth Implants in the Esthetic Zone: A Systematic Review and Meta-Analysis." *International Journal of Oral & Maxillofacial Implants* 35.1 (2020).

5. Assaf, André, Moustapha Saad, and Saleh Hijawi. "Use of narrow-diameter implants in the posterior segments of the jaws: A retrospective observational study of 2 to 11 years." *The Journal of Prosthetic Dentistry* (2022).

6. Moraschini, V., et al. "Evaluation of survival and success rates of dental implants reported in longitudinal studies with a follow-up period of at least 10 years: a systematic review." *International Journal of Oral and maxillofacial surgery* 44.3 (2015): 377-388.

7. Pohl, Veronika, et al. "Esthetic Outcomes for Immediate Implant Placement with Immediate provisionalization in the Anterior Maxilla with Buccal Dehiscence: Results of a Comparative Pilot Study." *International Journal of Oral & Maxillofacial Implants* 37.3 (2022).

8. Rupchandani, Ruchika. "Do immediately placed implants have better outcomes when placed with a minimal split-thickness envelope flap?." *Evidence-Based Dentistry* 22.4 (2021): 126-127.

9. Clauser, Tommaso, et al. "Risk of early implant failure in grafted and non-grafted sites: A systematic review and meta-analysis." *International Journal of Oral Implantology* 15.1 (2022).

10. Iorio-Siciliano, Vincenzo, et al. "Soft tissue stability related to mucosal recession at dental implants: a systematic review." *Quintessence international* 51.1 (2020).

11. Hasegawa, T., et al. "Survival of Brånemark System Mk III implants and analysis of risk factors associated with implant failure." *International Journal of Oral and maxillofacial surgery* 46.2 (2017): 267-273.

12. Ahmadi, Rojina Rashidi, et al. "Psychological Stress and Type 2 Diabetes: A Review of the Bidirectional Link in the

Onset and Progression of the Disease." *IJCMCR. 2022; 20 (1)* 2.
13. Esimekara, Jane-Frances Onyinye, et al. "Dental implants in patients suffering from autoimmune diseases: A systematic critical review." *Journal of Stomatology, oral and maxillofacial surgery* (2022).
14. Gómez-de Diego, Rafael, et al. "Indications and contraindications of dental implants in medically compromised patients: an update." *Medicina oral, patologia oral y cirugia bucal* 19.5 (2014): e483.
15. Albrektsson, Tomas, et al. "Implications of considering peri-implant bone loss a disease, a narrative review." *Clinical Implant Dentistry and Related Research* 24.4 (2022): 532-543.
16. Sbricoli, Luca, et al. "Systemic Diseases and Biological Dental Implant Complications: A Narrative Review." *Dentistry Journal* 11.1 (2022): 10.
17. Chatzopoulos, Georgios S., and Larry F. Wolff. "Dental implant failure and factors associated with treatment outcome: A retrospective study." *Journal of Stomatology, Oral and Maxillofacial Surgery* 124.2 (2023): 101314.
18. Choi, Yong-Geun, et al. "Epidemiology of Implant Mortality Disparity Among Intraoral Positions and Prosthesis Types." *International Journal of Oral & Maxillofacial Implants* 32.3 (2017).
19. Brignardello-Petersen, Romina. "Very low-quality evidence suggests that there are no differences in implant failure and bone loss between machined and rough surface dental implants in patients with periodontitis." *The Journal of the American Dental Association* 150.8 (2019): e120.
20. Yang, Yong, et al. "The survival rates and risk factors of implants in the early stage: a retrospective study." *BMC Oral Health* 21.1 (2021): 293.