ORIGINAL RESEARCH

Assessment of risk factors of dental implant failure

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ABSTRACT:
Background: A dental implant is a surgical component that interfaces with the bone of the jaw or skull to support a dental prosthesis such as a crown, bridge, denture, facial prosthesis or to act as an orthodontic anchor. The present study was undertaken for assessing risk factors for failure of dental implants. **Materials & methods:** A total of 50 patients were enrolled in the present study. Complete demographic details were obtained. Pre-operative assessment of all the patients was done. Only those patients were enrolled which were scheduled to undergo prosthetic rehabilitation for missing mandibular first molar. Radiographs were taken preoperatively and treatment planning was done. Hematological and biochemical analysis of all the patients was done. All the implant procedures were carried out under local anaesthesia. Follow-up was done till a time period of 1 years and prognosis of dental implants was recorded. All the results were recorded and analyzed by SPSS software. **Results:**36 percent of the patients and 22 percent of the patients were diabetic and hypertensive while positive smoking habit was present in 38 percent of the patients. Dental implant failure occurred in 10 percent of the patients. Diabetes and positive smoking habit were found to be independent risk factor for failure of dental implants.
Conclusion: Diabetes and smoking habit were found to be significant risk factors for dental implant failure.
Key words: Dental implant, Failure.

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Introduction

A dental implant is a surgical component that interfaces with the bone of the jaw or skull to support a dental prosthesis such as a crown, bridge, denture, facial prosthesis or to act as an orthodontic anchor. 90%–95% has been reported as the success rate of implants over the 10 years. Although it has become the treatment of choice for most of the dentists, still, the complications arising from dental implant placement are the biggest challenge. Success of dental implants is commonly defined by implant survival. Implant failure probably results from multifactorial process. There are various causes related to early (overheating, contamination and trauma during surgery, poor bone quantity and/or quality, lack of primary stability, and incorrect immediate load indication), and late (periimplantitis, occlusal trauma, and overloading) failure. Ongoing marginal bone loss (MBL) could also put at risk implant survival in the long-term.[1-3]

Reported predictors for implant success and failure are generally divided into patient-related factors (e.g., general patient health status, smoking habits, quantity and quality of bone, oral hygiene maintenance, etc), implant characteristics (e.g., dimensions, coating, loading, etc), implant location, and clinician experience. Cluster behavior can occur in implant failure. The finding that implant failures are not randomly distributed in the treated populations and that implant loss clusters in specific high-risk groups and individuals was examined in a literature review.[4-

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[6]Hence; the present study was undertaken for assessing risk factors for failure of dental implants.

Materials & methods

The present study was conducted with the aim of assessing the risk factors of dental implant failure. A total of 50 patients were enrolled in the present study. Complete demographic details were obtained. Pre-operative assessment of all the patients was done. Only those patients were enrolled which were scheduled to undergo prosthetic rehabilitation for missing mandibular first molar. Radiographs were taken preoperatively and treatment planning was done. Hematological and biochemical analysis of all the patients was done. All the implant procedures were carried out under local anaesthesia. Follow-up was done till a time period of 1 year (till 2019) and prognosis of dental implants was recorded. All the results were recorded and analyzed by SPSS software. Chi-square test was used for evaluation of level of significance.

Results

In the present study, a total of 50 patients were enrolled. Mean age of the patients was 42.8 years. 56 percent of the patients belonged to the age group of less than 45 years. 58 percent of the patients were males while the remaining were females. 36 percent of the patients and 22 percent of the patients were diabetic and hypertensive while positive smoking habit was present in 38 percent of the patients. Dental implant failure occurred in 10 percent of the patients. Diabetes and positive smoking habit were found to be independent risk factor for failure of dental implants.

Discussion

Among various complications, bleeding from implant site, infection, and pain are early complications of implant. Dental implant failure is quite common. Lack of osseointegration during early healing, infection of the peri-implant tissues, and breakage are the reasons for implants failure. There are few indications and contraindications for implant placements. The contraindications of implant placement are patients with epilepsy, children and adolescents, patients having endocarditis, history of osteoradionecrosis, smokers, and diabetic patients. Absolute contraindications are patients with history of myocardial infarction, cerebrovascular accident, patients with history of bleeding, history of heart transplant, immune suppression, active treatment of malignancy, drug abusers, and psychiatric illness.[7-9]Hence; the present study was undertaken for assessing risk factors for failure of dental implants.

In the present study, a total of 50 patients were enrolled. Mean age of the patients was 42.8 years. 56 percent of the patients belonged to the age group of less than 45 years. 58 percent of the patients were males while the remaining were females. Mohajerani H et al evaluated the risk factors for early implant failure.

Table 1: Demographic and clinical data

Parameter		Number of patients	Percentage of patients
Age group (years)	Less than 45	28	56
	More than 45	22	44
Gender	Males	29	58
	Females	21	42
Diabetic	Present	18	36
	Absent	32	64
Hypertensive	Present	11	22
	Absent	39	78
Positive smoking habit	Present	19	38
	Absent	31	62

Table 2: Prognosis of dental implants

Prognosis	Number of patients	Percentage of patients
Successful	45	90
Failure	5	10

Table 3: Risk factor for implant failure

Risk factor	Odd Ratio	p- value
Age	0.713	0.12
Gender	0.338	0.82
Diabetes	5.750	0.00*
Hypertension	0.173	0.95
Smoking habit	6.128	0.00*

*: Significant

Their retrospective cohort study was conducted on two groups of patients, the patients with a failed implant before loading and those without a failed implant. Age, gender, implant type, implant surface, implant length, bone type, type of surgery (one- or two-stage) and immediate (fresh socket) or delayed placement of implant were the variables to be assessed in this study. Out of the 1,093 evaluated implants, 73 cases (6.68%) failed in early stages. The two groups were significantly different in terms of implant surface, fresh socket placement, prophylactic use of antibiotics, and bone density (p< 0.05). Age, gender, implant height, implant type (cylindrical or tapered) and one-stage or two-stage placement were not significantly different between the two groups (p> 0.05). It seems that prophylactic antibiotic therapy, implant surface, bone density and placement in fresh extraction socket may contribute to dental implant failure.[7]

In the present study, 36 percent of the patients and 22 percent of the patients were diabetic and hypertensive while positive smoking habit was present in 38 percent of the patients. Dental implant failure occurred in 10 percent of the patients. Diabetes and positive smoking habit were found to be independent risk factor for failure of dental implants. Previous studies have found that the implant brand does not appear to significantly influence the late-failure rate, as also found by Manor et al. In contrast, a subsequent study reported on in 2015 found that a Straumann implant with an SLA surface produced a significantly more favorable outcome than several other rare implant brands (which have not been widely used and even discontinued in the market), such as Biomet 3i, CrescoTi, XiVE, Frialit and Lifecore. Jemt et al. found that the NobelActive conical connection implant recently exhibited a significantly higher late-failure rate than other implant types, but that implant system had been used to treat more-complicated conditions than the other implant systems in that study. It is therefore difficult to interpret these results due to the differences in clinical used and clinician experience among the studies. While it is feasible that the implant brand could impact the late-failure rate of dental implant, we believe that the available evidence indicates there is no significant effect.[8-10] Renouard in 2006 conducted a structured review based on Medline and hand search database during 1990–2005 period studies (53 studies) to evaluate the relationship between implant survival rates and their length and diameter. Published studies relevant to following factors were recorded: (i) implant length and diameter, (ii) implant survival rates, and (iii) criteria for implant failure which were placed in healed sites. He concluded that increased implant failure was associated with shorter and wider implant due to poor bone density and operator skill; however, short or wide implant may be considered in unfavorable site such as lesser bone density.[11]

Conclusion

Diabetes and smoking habit are important and significant risk factors for dental implant failure.

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