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Original Research Article.

To Evaluate Factors Affecting Success Rate of Dental Implants

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ABSTRACT

Background: Early failure represents a failure to establish osseointegration of dental implants, while late failure is the failure of either the established osseointegration or function of dental implants. Hence; the present study was planned for assessing the factors affecting the success rate of dental implants.

Materials & Methods: A total of 200 patients scheduled to undergo prosthetic rehabilitation of missing mandibular first molar were included. Complete demographic data of all the patients was recorded. A Performa was framed and smoking history along with other clinical parameters was recorded. Follow- up was done for a time period of one year and clinico-radiographic examination was carried out. Risk factors for implant failure were evaluated. All the results were recorded and analysed by SPSS software.

Results: Out of 200 cases, dental implant failure occurred in 4.5 percent of the patients. Out of 9 patients with dental implant failure, diabetes was present in 3 patients while hypertension was present in 2 patients respectively. Smoking history and Dyslipidaemia were found to be present in 6 patients and 2 patients respectively.

Conclusion: Overall, dental implant therapy is associated with very low failure rate. However; smoking is identified as a significant risk factor for dental implant failure.

Key words: Implant, Dental, Failure.

INTRODUCTION

An attractive alternative to conventional dentures and bridges became available with the introduction of implants into dental industry. At present, both single crown implants and implant-supported fixed partial dentures (FPDs) are the available options. The basis for dental implants is osseointegration, where osteoblasts grow and directly integrate with the titanium surface of the implants surgically placed inside the alveolar bone. Dental implants have gained wide popularity over the years as they are capable of restoring the function to near normal in both partial and completely edentulous arches.[1-3]

Early failure represents a failure to establish osseointegration of dental implants, while late failure is the failure of either the established osseointegration or function of dental implants. While early failure is solely biologic complications, late failure could have either biologic or mechanical complications. Biologic complications could be due to peri-implantitis, it usually involves the resorption of soft and hard tissue. Mechanical complications could be due to improper implant loading design, it could lead to the fracture of implant body, screw body or implant supra-structure.[4-6] Hence; the present study was planned for assessing the factors affecting the success rate of dental implants.

MATERIALS & METHODS

The present study was planned with the aim of assessing the factors affecting the success rate of dental implants.

A total of 200 patients scheduled to undergo prosthetic rehabilitation of missing mandibular first molar were included. Complete demographic data of all the patients was recorded. A Performa was framed and smoking history along with other clinical parameters were recorded.

All patients were recalled one day before the implant procedure and haematological examination was carried out. Blood sugar was also checked and patients were prepared for dental implant procedures. All the implant procedures were carried out under local anaesthesia.

All the procedures were carried out by skilled and experienced implantologists. Follow- up was done till a time period of one year and clinico-radiographic examination was carried out. Risk factors for implant failure were evaluated. All the results were recorded and analysed by SPSS software.
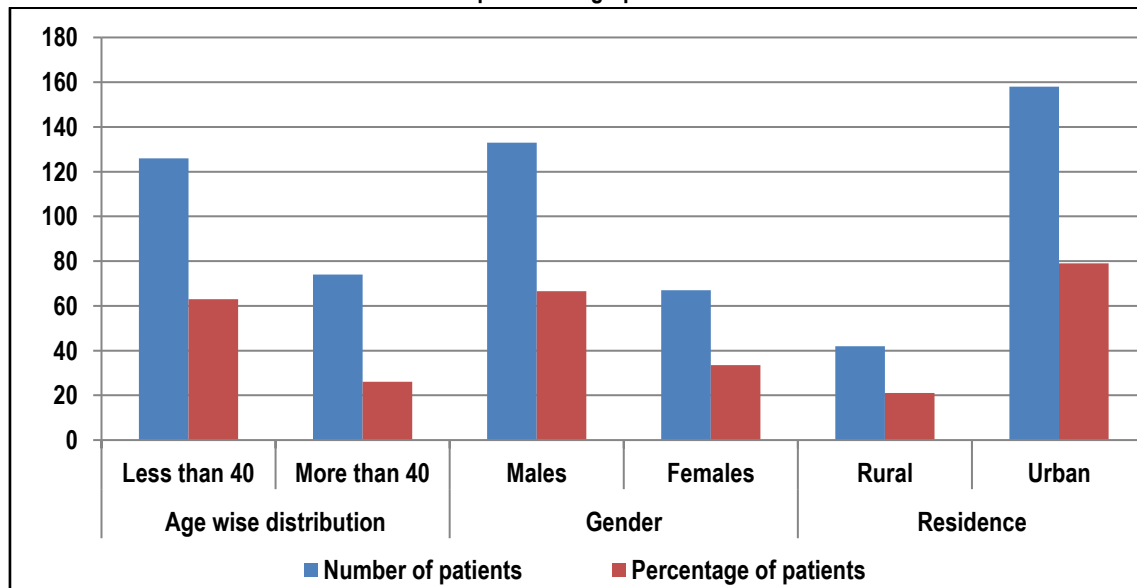
Graph 1: Demographic data

Table 1: Incidence of dental implant failure

Variable	Number of patients	Percentage of patients
Success	191	95.5
Failure	9	4.5

Table 2: Risk factors of dental implant failure

Variable		Dental implant failure
Diabetes	Present	3
	Absent	6
Hypertension	Present	2
	Absent	7
Smoking history	Present	6
	Absent	3
Dyslipidemia	Present	2
	Absent	7

RESULTS
A total of 200 patients were analysed. Mean age of the patients was 37.6 years. 63 percent of the patients belonged to the age group of less than 40 years. 66.5 percent of the patients were males while remaining were females. 79 percent of the patients were of urban residence while remaining had rural residence. Out of 200 cases, dental implant failure occurred in 4.5 percent of the patients. Out of 9 patients with dental implant failure, diabetes was present in 3 patients while hypertension was present in 2 patients respectively. Smoking history and Dyslipidemia were found to be present in 6 patients and 2 patients respectively.

DISCUSSION
Endosseous dental implants are successfully used to replace the missing teeth. Despite the predictability of success of dental implants, a small group of patients may experience implant failure.

Success of dental implants depends on the site of implant placement, the patient's conditions, surgeon's experience, the precision of surgical technique, and type of implants. Failure of endosseous dental implants may occur prior to occlusal loading with a prosthetic superstructure or later after loading. Based on chronological criteria, the biological failures can be classified into "early failures" (due to unsuccessful osseointegration, indicating impaired bone healing) and "late failures" (due to loss of osseointegration).[7-9] Hence; the present study was planned for assessing the factors affecting the success rate of dental implants. A total of 200 patients were analysed. Mean age of the patients was 37.6 years. 63 percent of the patients belonged to the age group of less than 40 years. 66.5 percent of the patients were males while remaining were females. Mohajerani H et al evaluated the risk factors for early implant failure. 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 seemed that prophylactic antibiotic therapy, implant surface, bone density and placement in fresh extraction socket may contribute to dental implant failure.[8]

In the present study, 79 percent of the patients were of urban residence while remaining had rural residence. Out of 200 cases, dental implant failure occurred in 4.5 percent of the patients. S K Chuang et al identified the risk factors associated with dental implant failure. The cohort was composed of 677 patients who had 2349 implants placed. Based on the adjusted multivariate model, factors associated with implant failure were tobacco use, implant length, staging, well size, and immediate implants (p <or= 0.05). In the setting of correlated survival observations, we recommend adjusting for the correlation of the observations to provide statistically valid and efficient results.[9]

In the present study, out of 9 patients with dental implant failure, diabetes was present in 3 patients while hypertension was present

in 2 patients respectively. Smoking history and Dyslipidemia were found to be present in 6 patients and 2 patients respectively. Krisam J et al evaluated early failure and possible risk factors for failure of dental implants placed under practice-based conditions. Nine out of 186 implants (4.8%) placed in 106 participants failed before incorporation of the final prosthesis. The use of shorter implants (< 10 mm) and the need for augmentation procedures were associated with a greater risk of early implant failure. Implants placed in the dental practice with a specialization in implantology heal successfully. The use of augmentation procedures and of implants shorter than 10 mm seems to be associated with a greater risk of early implant failure.[10] Moy PK et al analysed the rates of dental implant failure to determine associated risk factors. Smoking (RR = 1.56), diabetes (RR = 2.75), head and neck radiation (RR = 2.73), and postmenopausal estrogen therapy (RR = 2.55) were correlated with a significantly increased failure rate. Overall, implant failure was 8.16% in the maxilla and 4.93% in the mandible (P < .001). Overall, dental implant failure is low and there are no absolute contraindications to implant placement.[11]

CONCLUSION

Overall, dental implant therapy is associated with very low failure rate. However; smoking is identified as a significant risk factor for dental implant failure.

REFERENCES

1. Murray H, Locker D, Kay EJ. Patterns of and reasons for tooth extractions in general dental practice in Ontario, Canada. Community Dent Oral Epidemiol. 1996;24:196–200.
2. Elkhaweldi A, Lee DH, Wang W, Cho SC. The survival rate of RBM surface versus SLA surface in geometrically identical implant design. J Oral Bio. 2014; 1: 8–15.
3. O'Sullivan D, Sennerby L, Meredith N. Influence of implant taper on the primary and secondary stability of osseointegrated titanium implants. Clin Oral Implants Res. 2004; 15: 474–80.
4. Reich E, Hiller KA. Reasons for tooth extraction in the Western states of Germany. Community Dent Oral Epidemiol. 1993;21:379–83.
5. Ong G, Yeo JF, Bhole S. A survey of reasons for extraction of permanent teeth in Singapore. Community Dent Oral Epidemiol. 1996;24:124–7.
6. Kim HK, Lee EY, Kim JJ. Five-year retrospective radiographic follow-up study of dental implants with sandblasting with large grit, and acid etching-treated surfaces. J Korean Assoc Oral Maxillofac Surg. 2015; 41: 317–21.
7. De Rouck T, Collys K, Cosyn J. Immediate single-tooth implants in the anterior maxilla: a 1-year case cohort study on hard and soft tissue response. J Clin Periodontol.2008;35:649–57.
8. Mohajerani H, Roozbayani R, Taherian S, Tabrizi R. The Risk Factors in Early Failure of Dental Implants: a Retrospective Study. J Dent (Shiraz). 2017;18(4):298-303.
9. S K Chuang, L J Wei, C W Douglass, T B Dodson. Risk factors for dental implant failure: a strategy for the analysis of clustered failure-time observations. J Dent Res. 2002 Aug;81(8):572-7.
10. Krisam J, Ott L, Schmitz S, et al. Factors affecting the early failure of implants placed in a dental practice with a specialization in implantology - a retrospective study. BMC Oral Health. 2019;19(1):208.
11. Moy PK, Medina D, Shetty V, Aghaloo TL. Dental implant failure rates and associated risk factors. Int J Oral Maxillofac Implants. Jul-Aug 2005;20(4):569-77.