Vishal Partap Singh
MDS, Prosthodontics 2ⁿᵈ year,
Institute of dental sciences and
technology Modinagar, Uttar
Pradesh, India

Aditi Sharma
Lecturer, Department of
Prosthodontics, Indira Gandhi
Govt. dental hospital, Jammu
and Kashmir, India

Beneetu Atri
House Surgeon, Department Of
Prosthodontics, Indira Gandhi
Govt. Dental Hospital, Jammu
and Kashmir, India

Risk factors associated with dental implant failures

Vishal Partap Singh, Aditi Sharma and Beneetu Atri

Abstract
Background: The use of dental implants is now a widely accepted treatment modality for fully and partially edentulous patients. The present study was conducted to assess risk factors associated with dental implant failure.
Materials & Methods: This study was conducted in the department of Prosthodontics. It included 25 dental implants. Data regarding name, age, gender, diameter of implant and bone quality were considered and evaluated.
Results: A total of 25 patients were included in the present study which underwent prosthetic rehabilitation for missing mandibular first molar by dental implants. Out of 25 dental implants, failure of dental implants occurred in 3 cases.
Conclusion: Dental implant failure is one of the challenges for dentist. Factors such as implant diameter, quality of bone play important role in survival rate of dental implants. Dental implant with diameter < 3.75mm and in type II bone showed maximum failures.

Keywords: Bone quality, dental implant, failure

Introduction

The use of dental implants is now a widely accepted treatment modality for fully and partially edentulous patients. The success of this approach is rooted in the inherent ability of some dental materials, titanium in particular, to osseointegrate, thereby creating direct bone-to-implant contact. Further improvements toward the successful osseointegration of dental implants have involved modifications to both surface topography and surface chemistry [1].

Earlier the missing teeth were used to be replaced by either removable or fixed partial denture. Nowadays, dental implants have evolved as new treatment modality for the majority of patients and are expected to play a significant role in oral rehabilitation in the future. The success rate of 90%-95% has been reported over the 10 years.[2] Pain, infection and hemorrhage and occasionally neuropathy are early complications of implant. Implants have got failure rates also.

A few studies have reported long-term results, showing more favorable survival statistics for solid screw over hollow cylinder implants, for mandibular sites over maxillary, and lower survival statistics for patients presenting with a history of periodontitis. Long-term results of implants placed with guided bone regeneration, and outcomes for the treatment of atrophic posterior maxilla have also been reported [3].

Due to recent advancements in the field of implants, there use is increasing day by day. This is now becoming the treatment of choice of missing teeth and it has got high patient compliance. However, apart from it, failures in implants are also common. It can be divided into early failure and late failure according to failure time. First, early failure is one that failed osseointegration within several weeks or several months. It was due to bone necrosis, surgical trauma, bacterial infection, inadequate initial stability and early occlusal loading. Late failure is failure that turns up after functional loading of several period of time. It takes place because of infection and excessive loading [4]. The present study was conducted to assess risk factors associated with dental implant failure.

Materials & Methods

This study was conducted in the department of Prosthodontics. It comprised of 250 dental implants. Data regarding name, age, gender, diameter of implant and bone quality were retrieved from the patient's record file.

Correspondence
Vishal Partap Singh
MDS, Prosthodontics 2ⁿᵈ year,
Institute of dental sciences and
technology Modinagar, India

Results thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Results

A total of 25 patients were included in the present study which underwent prosthetic rehabilitation for missing mandibular first molar by dental implants. Out of these 25 patients, 14 were males and the remaining were females. Majority of these patients were above 40 years of age. Out of 25 dental implants, failure of dental implants occurred in 3 cases.

Discussion

The reasons for implants failure are lack of osseointegration during early healing, infection of the peri-implant tissues and breakage. The contraindications of implant placement are children & adolescents, epileptic patients, endocarditis, osteoradionecrosis, smoking and diabetes. Absolute contraindications consists of myocardial infarction and cerebrovascular accident, bleeding disorder, cardiac transplant, immunosuppression, active treatment of malignancy, drug abuse, and psychiatric illness, and intravenous bisphosphonate (BPs) use. There are many difficulties to figure out the cause of implant success and failure because it is affected by many various factors [5]. The present study was conducted to assess various risk factors associated with dental implant failure. Out of these 25 patients, 14 were males and the remaining were females. Majority of these patients were above 40 years of age. Out of 25 dental implants, failure of dental implants occurred in 3 cases. Mohajerani H *et al.* evaluated the risk factors for early implant failure. This 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 [6]

Berberi AN *et al* evaluated the marginal bone loss around titanium implants placed in fresh extraction sockets using two loading protocols after a 5-year follow-up period. A total of 36 patients received 40 titanium implants (Astra Tech) intended for single-tooth replacement. Implants were immediately placed into fresh extraction sockets using either a one-stage (immediate loading by placing an interim prosthesis into functional occlusion) or a two-stage prosthetic loading protocol (insertion of abutments after 8 weeks of healing time). Marginal bone levels relative to the implant reference point were evaluated at four time intervals using intraoral radiographs: at time of implant placement, and 1, 3, and 5 years after implant placement. Measurements were obtained from mesial and distal surfaces of each implant (α = 0.05). One-stage immediate implant placement into fresh extraction sockets resulted in a significant reduction in marginal bone

loss (p < 0.002) compared to the traditional two-stage technique. Whereas mesial surfaces remained stable for the 5-year observation period, significant marginal bone loss was observed on distal surfaces of implants after cementation of interim prostheses (p < 0.007) and after 12 months (p < 0.034). Within the limitations of this study, immediate loading of implants placed into fresh extraction sockets reduced marginal bone loss and did not compromise the success rate of the restorations.[7] Mura P reported on the 5-year clinical and radiologic outcome of patients treated with Replace Select Tapered TiUnite implants when used according to an immediate loading protocol in postextraction sites. In routine practice, 56 consecutive patients were treated with 79 implants. The patients, 23 males and 33 females, had a mean age of 50.9 years, range 21-76 years, at implant placement. Forty-seven implants were placed in the maxilla and 32 implants were placed in the mandible. All implants were placed in postextraction sites and were immediately loaded. Provisional restorations were delivered within 2 hours from surgery and all were in occlusion. Forty-three patients received a single implant while in the remaining 13 patients the implants were splinted. Definitive prosthetic restoration was delivered within 1 to 4 months following implant placement. Evaluations of soft tissue health and marginal bone remodeling were conducted. An independent radiologist performed the radiographic evaluation using the top of the implant as the reference point with negative values indicating a level below the reference point. Forty-eight patients, accounting for 66 implants, have passed the 5-year follow-up. No implants have failed resulting in a 5-year cumulative implant survival rate of 100%. Three patients, with six implants, withdrew during the course of the follow-up; one patient passed away and two patients moved. Five patients with seven implants did not show up at 5 years recall. At the 5-year follow-up, majority of the implants that were followed demonstrated normal periimplant mucosa and no visible plaque. The mean bone level at 5-year follow-up was -2.45mm (SD 1.29, n=63) demonstrating a level in line with the first thread. Mean marginal bone loss from implant inserting to 5 years was 0.56 mm (SD 1.98, n=63). In regard with complications, a fracture of the ceramic crown was reported 5 years after implant insertion in a patient who developed bruxism. No other biologic nor mechanical complications were reported. This retrospective 5-year follow-up study of 56 patients treated with implants immediately placed in postextraction sockets and immediately loaded demonstrates good treatment outcome with regard to implant survival, soft tissue condition, and marginal bone response [8].

Table 1: Age and gender wise distribution of implants

Age group	Male	Female	P value
<40 years	4	4	
41-60 years	5	4	1
>60 years	5	3	
Total	14	11	

Table 2: Distribution of patient according to success and failure of dental implants

Parameter	Dental implants (n)	P- value
Success	22	0.52
Failure	3	

Table 3: Risk factor for failure of dental implants

Parameter	Calcium hosphare caoted	Osseo speed	P- value
Success dental implant cases	2	1	0.01
Failed dental implant cases	14	8	

Conclusion

Dental implant failure is one of the challenges for dentist. Factors such as implant diameter, quality of bone play important role in survival rate of dental implants. Dental implant with diameter < 3.75mm and in type II bone showed maximum failures.

References

1. Buser D, Mericske-Stern R, Bernard JP, Behneke A, Behneke N, Hirt HP, *et al*. Long-term evaluation of non-submerged ITI implants. Part 1: 8-year life table analysis of a prospective multi-center study with 2359 implants. Clin Oral Implants Res. 1997; 8:161-72.
2. Adell R, Eriksson B, Lekholm U, Branemark PI, Jemt T. Longterm follow-up study of osseointegrated implants in the treatment of totally edentulous jaws. Int J Oral Maxillofac Implants. 1990; 5:347-59.
3. Cochran DL, Buser D, Ten Bruggenkate CM, Weingart D, Taylor TM, Bernard JP, *et al*. The use of reduced healing times on ITI implants with a sandblasted and acidetched.
4. (SLA) surface: early results from clinical trials on ITI SLA implants. Clin Oral Implants Res. 2002; 13:144-53.
5. Buser D, Weber HP, Lang NP. Tissue integration of non-submerged implants. 1-year results of a prospective study with 100 ITI hollow-cylinder and hollow-screw implants. Clin Oral Implants Res. 1990; 1:33-40.
6. Buser D, Mericske-Stern R, Bernard JP, Behneke A, Behneke N, Hirt HP *et al*. Long-term evaluation of non-submerged ITI implants. Part 1: 8-year life table analysis of a prospective multi-center study with 2359 implants. Clin Oral Implants Res. 1997; 8:161-72.
7. Mohajerani H, Roozbayani R, Taherian S, Tabrizi R. The Risk Factors in Early Failure of Dental Implants: a Retrospective Study. Journal of Dentistry. 2017; 18(4):298-303.
8. Berberi AN, Tehini GE, Noujeim ZF, Khairallah AA, Abousehlib MN, Salameh ZA. Influence of surgical and prosthetic techniques on marginal bone loss around titanium implants. Part I: immediate loading in fresh extraction sockets. J Prosthodont. 2014; 23(7):521-7.
9. Mura P. Immediate loading of tapered implants placed in postextraction sockets: retrospective analysis of the 5-year clinical outcome. Clin Implant Dent Relat Res. 2012; 14(4):565-74.