To assess risk factors of dental implants failures

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Abstract
Introduction: The present study was conducted to assess risk factors associated with dental implant failure.
Materials and Methods: This study was conducted in the department of Prosthodontics. It included 150 dental implants. Data regarding name, age, gender, diameter of implant and bone quality were considered and evaluated.
Results: Out of 150 patients, (with 180 implant) male were 77 (60.5%) with 96 (64%) dental implants and female were 73 (39.4%) with 84 (36%) dental implants. There were 34 (10.5%) dental implant failure of which 22 (11.8%) were in male and 12 (8.3%) in female. The difference found to be significant (P< 0.05). Maximum dental implant failure was seen in with <10 mm in (15%) length. The difference found to be significant (P< 0.05). Maximum dental implant failure was seen in dental implant with <3.75 mm width in (14.8%). Maximum dental implant failure was seen with type IV bone in (15.7%).
Conclusion: Dental implant failure was high in dental implant with length <10.0 mm, with <3.75 mm width, type IV bone and among male.

Keywords: Bone quality, Dental implant, Failure.

Introduction
With the advent in modern dentistry, there are plenty options for replacing missing teeth. Patient with missing few or multiple teeth can be managed well with either fixed prosthesis or removable prosthesis.[1]

Removable prosthesis either removable partial denture (RPD) or complete denture are treatment options for elderly patients.[2] Dental implants have been proved useful in providing better treatment modality. Nowadays implant supported complete denture has gained importance. These are preferred in patients with resorbed rides where retention is compromised and hence with dental implants patient can easily eat and function properly subject to sufficient bone quality and quality at implant site.[3]

Dental implant that lasts for atleast 5 years is regarded as successful treatment. Studies have revealed that survival rate of 95% dental implants in 5 years. Dental implant treatment in partially and completely edentulous patients is considered best option. Dental implants need to be placed where they have high success rate. A survival rate of 95% in 5 years has been considered successful implant therapy.[4]

Patient related factors and dental implant related factors play an important role in deciding outcome of treatment.[5] Mechanical, biological or iatrogenic factors are considered to be etiology for early or late failure of dental implants. Bone quantity such as sufficient height, width and bone quality is patient related factors whereas dental implant size such as length, width, prosthetic part and implant design is dental implant related factors.[6] The present study was conducted to assess risk factors for dental implant failures.

Materials and Methods
This retrospective study was conducted in department of Prosthodontics. The study consisted of 150 patients of both genders (180 dental implants). All patients who received dental implants in last 5 years irrespective of gender were included in the study.

Exclusion criteria
Pregnant women, drug abusers, patients with periodontal pathology and alcoholics and smokers.

Patient data such as name, age, gender etc. was recorded. Patients records was retrieved from the department. Factors such as length of implant, diameter, location of implant, and bone quality were recorded. The presence of mobility of dental implant, pain or discomfort, peri- implant radiolucency, >2 mm bone loss around dental implant was regarded as implant failure.

Statistical analysis
Data was entered in MS excel sheet and was assessed using SPSS version 20 (IBM. Chicago, USA). Chi square test was used for the study. P value <0.05 was considered statistical significant.

Results
Table 1 shows that out of 150 patients, male were 77 (60.5%) with 96 (64%) dental implants and female were 73 (39.4%) with 84 (36%) dental implants. Table 2 shows that there were 34 (10.5%) dental implant failure of which 22 (11.8%) were in male and 12 (8.3%) in female. The difference found to be significant (P< 0.05).

Maximum dental implant failure was seen in with <10 mm length. It was 15%) with <10 mm dental implant length followed by 10.5 % in 10-11.5 mm and 9.8% in >11.5 mm dental implant. The difference found to be significant (P< 0.05).

Maximum dental implant failure was seen in dental implant with <3.75 mm width. It was 14.8% in dental implant with <3.75 mm followed by 9.8% in 3.75- 4.5 mm and 9.1%

with >4.5 mm. The difference found to be significant (P< 0.05).

Maximum dental implant failure was seen with type IV bone. It was 15.7% with type IV bone followed by 15.7% with type III bone, 10.9% with type II and 8.5% with type I bone. The difference found to be significant (P< 0.05).

Table 1

Gender	Number of patients	Number of implants
Male	77 (60.5%)	96 (64%)
Female	73 (39.4%)	84 (36%)
Total	150 (100%)	180 (100%)

Table 2

Gender	Number	Failure	P value
Male	96	22 (11.8%)	0.001
Female	84	12 (8.3%)	
Total	180	34 (10.5%)	

Chi square, p< 0.05, significant

Discussion

Dental implants need to be placed where they have best success rate. Success rate may be judged based on bone quality, quantity, dental implant length, width, design and systemic health of patients.[7] Osseointegration between dental implant and bone determines the survival rate. Bone quality and quantity is the limiting factors that determine success of dental implant. Poor quality bone such as seen in type IV and III leads to failure and thus they should be inserted after considering bone quality.[8] The present study was conducted to assess risk factors for dental implant failures.

In present study, out of 150 patients, male were 77 (60.5%) with 96 (64%) dental implants and female were 73 (39.4%) with 84 (36%) dental implants. We found that there were 34 (10.5%) dental implant failure out of 180 dental implants. Mohajerani et al[9] in their retrospective cohort study parameters such as implant type, surface, implant length, bone type, type of surgery and immediate (fresh socket) or delayed placement of implant were evaluated in 1,093 implants. It was seen that 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 ($p> 0.05$).

We found that maximum dental implant failure was seen in with <10 mm length (15%). It was found that dental implant with <3.75 mm width was seen in 14.8% cases. We found that maximum dental implant failure was seen with type IV bone 15.7% followed by 15.7% with type III bone, 10.9% with type II and 8.5% with type I bone.

Raikar et al[10] in their study revealed that maximum implants failures (55) was seen in age group > 60 years whereas 20 failed implants were seen in age group <40 years. Dental implants with length >11.5 mm (40/700) showed maximum failure rates followed by implants with <10 mm (20) and 10–11.5 mm (60). There was failure rate of 3.3% (mandibular posterior), 2.2% (maxillary posterior), 2.1% (maxillary anterior), and 1% (mandibular anterior). 0.3% implant failure was noted in type I bone followed by 1.95% in type II, 3% in type III and 0.8% in type IV bone.

Olmedo et al[11] in their study assessed the association between possible risk factors and early implant failure. Type of edentulism, localization, area, diameter, length, bone quality, expansion mechanisms, sinus augmentation techniques, bone regeneration, and implant insertion and presence of pain/inflammation at 1 week postsurgery were studied. It was found that early implant failure was significantly associated with the male sex, severe periodontal disease, short implants, expansion technique and postoperative pain/inflammation at 1 week post-surgery.

Lin et al[12] in their study on 18,199 patients who received 30,959 dental implants. Results showed that males, patients aged ≥41 years, and mandibular anterior location were risk factors for early implant loss. In the case of late implant loss, males, patients aged ≥41 years, bone augmentation and short implants were correlated with a significantly increased failure rate.

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 IV bone showed maximum failures among male.

Future Scope

Assessment of various risk factors of dental implant failure, the failure rate may be minimized. Large scale studies are required to substantiate the results.

Source of Funding

None.

Conflict of Interest

None.

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