

Dental implant failures among dental practitioners in Saudi Arabia. A Cross sectional study

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Abstract

Aim: To assess dental implant failures among dental practitioners.

Methodology: Out of 120 dentists 100 practitioners responded to participate in this multi centric survey. Data about implant success was obtained from the practitioners. Three hundred fifty-eight dental implants in one hundred sixty patients were taken into consideration in this retrospective study. Dental implant failure rate was recorded based on gender, bone quality, implant length and implant width

Results: There were 12 (5.7%) implants in males and 8 (5.4%) dental implant failure in females. The prevalence rate found to be 20 (5.5%). Maximum implant failure 10 (14.2%) was seen with <8 mm implants followed by 6 (4.6%) with 8-11.5 mm and 4 (4.2%) in >11.5 mm dental implants. Maximum implant failure 7 (11.6%) was seen with <3 mm implants followed by 8 (7.9%) with 3-4.5 mm and 3 (1.7%) in >4.5 mm width dental implants. Maximum implant failure 6 (12.5%) was seen with type IV bone followed by type III 5 (5.1%), type II 5 (5%) and type I 4 (3.5%). Out of 20 dental implant failures, 15 were seen in patients with diabetes, 13 with hypertension and 14 with history of smoking. A significant difference was achieved ($P < 0.05$).

Conclusion: Maximum dental implant failure was seen with <8 mm long implant, <3.5 mm width implant, patients with diabetes, hypertension and smoking history and type IV quality bone.

Key words: dental implant, Failure, Implant length

Introduction

The prevalence of edentulism is rising as the geriatric population grows. There are numerous treatment options, including full dentures (CD), fixed partial dentures (FPD), and removable partial dentures (RPD) (1). The use of removable partial dentures has substantially decreased over time. The biggest disadvantage of this strategy is that the clasps used to construct RPD may abrade nearby teeth (2,3).

This challenge was overcome by FPD. But in order to replace a single tooth, it is required to give the teeth in front and back of the gap in the mouth crowns (4). Patient may have discomfort as a result. Cutting too much can occasionally make you more sensitive. For people who are completely toothless, full dentures are available. Patients may express concerns about their dentures loosening, the fit being uncomfortable, fungus (candida) growing under the denture base, flange irritability, and allergic responses(5-7)

Dental implant therapy is a boon with a high percentage of success. Dental implants completely address all of the aforementioned drawbacks. In the past few years, dental implants have become more popular than RPD, FPD, and CT (8,9). Failures do occur, despite the fact that the number

of dental implants is growing quickly. There are patient related failures and dental implant-related failures. It is additionally categorized as early and late failure. (10,11,12) In light of this, we designed the current study to evaluate dental implant failures encountered and experienced by Saudi dental professionals in their practice.

Methodology

A sum total of three hundred fifty-eight dental implants in one hundred sixty patients were taken from 100 dental private practitioners of Saudi Arabia into this retrospective study.

The inclusion criteria was patients with dental implants insertion between 5-10 years and those voluntarily agreed to be the part of the study. Exclusion criteria was those not giving consent and patients <18 years and >60 years.

The case history was retrieved from the past records. Parameters such as implant width, length, bone quality, smoking history, diabetes, hypertension were recorded. Patients' recall visit information such as radiographic data which comprised of peri-implantitis, amount of bone loss (>30%) were recorded. All cases were assessed using RVG (Schick) taken with paralleling technique. XCP instrument was used for holding the sensor in patients's mouth. Dental implant failure rate was recorded based on gender, bone quality, implant length and implant width. All findings of the study was compiled for statistical inference. Level of significance was set below 0.05.

Results

Out of 122 dentists in Saudi Arabia, 100 private practitioners responded to participate for this multi centric survey study. The response rate was 83%.

Table I shows that there were 90 males with 210 dental implants and 70 females with 148 dental implants. Table II shows that there were 12 (5.7%) implants in males and 8 (5.4%) dental implant failure in females. The prevalence rate found to be 20 (5.5%). A significant difference was achieved between both genders ($P < 0.05$). Table III shows that maximum implant failure 10 (14.2%) was seen with <8 mm implants followed by 6 (4.6%) with 8-11.5 mm and 4 (4.2%) in >11.5 mm dental implants. A significant difference was achieved between different implant length ($P < 0.05$). Table IV shows that maximum implant failure 7 (11.6%) was seen with <3 mm implants followed by 8 (7.9%) with 3-4.5 mm and 3 (1.7%) in >4.5 mm width dental implants. A significant difference was achieved between different implant width ($P < 0.05$). Table V shows that maximum implant failure 6 (12.5%) was seen with type IV bone followed by type III 5 (5.1%), type II 5 (5%) and type I 4 (3.5%). A non-significant difference was achieved between bone type and implant failure ($P > 0.05$). Table VI shows that out of 20 dental implant failures, 15 were seen in patients with diabetes, 13 with hypertension and 14 with history of smoking. A significant difference was achieved ($P < 0.05$).

Table I Distribution of patients based on gender

Gender	Number	Implant number
Male	90	210
Female	70	148
Total	160	358

Table II Assessment of dental implant failure based on gender

Gender	Implant number	Failure	P value
Male	210	12 (5.7%)	0.052
Female	148	8 (5.4%)	
Total	358	20 (5.5%)	

Significance $P < 0.0.5$, Mann Whitney test

Table III Assessment of dental implant failure based on implant length

Implant length (mm)	Implant number	Failure	P value
<8	70	8 (14.2%)	0.021
8-11.5	128	6 (4.6%)	
>11.5	160	4 (4.2%)	

Significance $P < 0.0.5$, Mann Whitney test

Table IV Assessment of dental implant failure based on implant width

Implant width (mm)	Implant number	Failure	P value
<3	60	7 (11.6%)	0.015
3-4.5	126	10 (7.9%)	
>4.5	172	3 (1.7%)	

Significance $P < 0.0.5$, Mann Whitney test

Table V Assessment of dental implant failure based on bone quality

Bone quality	Implant number	Failure	P value
Type I	112	4 (3.5%)	0.74
Type II	100	5 (5%)	
Type III	98	5 (5.1%)	
Type IV	48	6 (12.5%)	

Significance $P < 0.0.5$, Mann Whitney test

Table VI Assessment of dental implant failure based on medical status & smoking

Parameters	Variables	Number	P value
Diabetes	Present	15	0.01
	Absent	5	
Hypertension	Present	13	0.04
	Absent	7	
Smoking	Present	14	0.05
	Absent	6	

Discussion

Dental implant placement in edentulous site demands careful assessment. A survival rate of >95% over 5 years is considered as successful therapy. However, certain factors determined

dental implant failure. We recruited 160 patients with 358 dental implants and their failure rate was determined.

We observed that the prevalence rate of dental implant failure found to be 20 (5.5%). There were 12 (5.7%) implants failure in males and 8 (5.4%) dental implant failure in females. Albrektson et al found 3.7% failure rate in their patients. In our study the failure rate found to be higher (13).

We observed that maximum implant failure 10 (14.2%) was seen with <8 mm implants followed by 6 (4.6%) with 8-11.5 mm and 4 (4.2%) in >11.5 mm dental implants. We observed that maximum implant failure 7 (11.6%) was seen with <3 mm implants followed by 8 (7.9%) with 3-4.5 mm and 3 (1.7%) in >4.5 mm width dental implants.

We found that that maximum implant failure 6 (12.5%) was seen with type IV bone followed by type III 5 (5.1%), type II 5 (5%) and type I 4 (3.5%). Lindquist et al found that there was 1 implant failure in type I quality bone, 50 with type II quality bone, 30 with type III quality b, 30 showed failure. (14) Out of 200 implants placed in bone with type IV quality, 5 showed failure.

Our results showed that out of 20 dental implant failures, 15 were seen in patients with diabetes, 13 with hypertension and 14 with history of smoking. Smoking leads to poor wound healing due to diminished phagocytic activity and chemotactic migration. Calcium absorption is also reduced in smokers leading to hight implant failure. Diabetes affects osteoblastic differentiation owing to their alteration in parathyroid hormone. Patients with history of diabetes also possess hypertension in most of the cases. (15) It is evident that it interferes with healing and osseointegration process reducing fibroblast activity, altering macrophage function, and decreased collagen synthesis. Manor et al found 66 failed implants failure in patients with diabetes and hypertension amounting for 16.63% (16). A careful assessment of dental implant site such as bone quality, selection of appropriate implant length and width is essential to ensure higher survival rate. The shortcoming of the study is small sample size and implant failure based on site, arch and prosthetic failure was not discussed.

Conclusion

Maximum dental implant failure was seen with <8 mm long implant, <3.5 mm width implant, patients with diabetes, hypertension and smoking history and type IV quality bone.

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