

Assessment of failure rate of dental implants in medically compromised patients

Anuj Singh Parihar¹, Sudha Madhuri², Raghu Devanna³, Geeta Sharma⁴,
Rohit Singh⁵, Kaushik Shetty⁶

¹Department of Periodontics, People's Dental Academy, Bhopal, Madhya Pradesh, ²Department of Prosthodontics, Government Dental College and Hospital, Vijaywada, Andhra Pradesh, ³Department of Preventive Dentistry, Orthodontic Division, Faculty of Dentistry, Taif University, Taif, Saudi Arabia, ⁴Department of Oral Pathology, Sarjug Dental College, Darbhanga, Bihar, ⁵Department of Prosthodontics Crown and Bridge and Implantology, Patna Dental College and Hospital, Patna, Bihar, ⁶Department of Orthodontics, AB Shetty Memorial Institute of Dental Sciences, Daralakatte, Mangalore, Karnataka, India

ABSTRACT

Background and Aims: The present study was conducted to assess failure rate of dental implant in medically compromised patients. **Methods:** This study comprised of 68 medically compromised patients of both genders who underwent dental implants 5 years ago (Group I). Equal number of healthy subjects was taken as control (Group II). Amount of bone loss around the implant over 1mm of bone loss in the first year and over 0.3 mm bone loss every subsequent year were considered as failures. **Results:** The age group of 30-40 comprised of 25 patients in group I and 35 in group II, 40-50 years had 27 in group I and 23 in group II and 50-60 years had 16 in group I and 10 in group II. Medically compromised patients were diabetes (25) with 30 dental implants followed by osteoporosis (16) with 17 dental implants, hypothyroidism (12) with 14 dental implants, organ transplant (10) with 12 dental implants and CVD (5) with 7 dental implants. Chi-square test was applied which revealed significant difference in patients ($P < 0.05$). In group I, there were 18 (22.5%) and in group II, there were 4 (5.56%) dental implant failures. The difference with chi-square test found to be significant ($P < 0.05$). **Conclusion:** Among medically compromised conditions, higher failure rate was found in diabetes.

Keywords: Dental implant, failure, medically compromised patients

Introduction

Dental implant (DI) is generally considered to be the ideal treatment for tooth loss. The common reason for tooth loss can be dental caries and periodontal diseases.^[1] The best treatment modality for replacement of teeth is dental implant therapy. The prevalent age-range for implant therapy has been reported above 40 years or between 51 and 60 years. Therefore, the patients

who required dental implant therapy are usually associated with systemic comorbidities.^[2]

Type of bone, amount of bone, length of edentulous jaw segment, hidden pathologies such as root pieces, inflammatory processes etc., play vital role in implant success.^[3] Systemic conditions such as hypothyroidism, diabetes, mellitus, bleeding disorders, thyrotoxicosis, xerostomia, smoking, osteoporosis, CVS etc., are few conditions which pose challenge to dental implant treatment.^[4] Absolute contraindications consist of myocardial infarction and cerebrovascular accident, cardiac transplant, immunosuppression, active treatment of malignancy, drug abuse, and psychiatric disorders.^[5] The present study was

Address for correspondence: Dr. Kaushik Shetty,
Department of Orthodontics, AB Shetty Memorial Institute
of Dental Sciences, Daralakatte, Mangalore, Karnataka, India.
E-mail: dr.anujparihar@gmail.com

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conducted to assess failure rate of dental implant in medically compromised patients.

Methods

This retrospective study was conducted in department of Periodontology and Implantology. It comprised of 68 medically compromised patients of both genders who underwent dental implants 5 years ago (Group I). Equal number of healthy subjects was taken as control (Group II). Inclusion criteria comprised of patients age ranged 30-60 years, patients with comprehensive medical and dental history and patients who received dental implant 5 years ago. Exclusion criteria consisted of patients with history of chemotherapy or radiation therapy and incomplete patient record. The study protocol was approved from ethical committee (No- 612/18).

Data such as name, age, gender etc., were retrieved from the patient's record file. Amount of bone loss around the implant over 1 mm of bone loss in the first year and over 0.3 mm bone loss every subsequent year were considered as failures. Any signs of infection close to the implant structure leading to instability and displacement of the implant were also recorded. The confirmation of failure was made based of subsequent radiographs. Patients were regularly recalled and intra- oral periapical radiographs as well as panoramic radiographs were taken. The radiological finding was retrieved from patient case record.

The obtained data was statistically evaluated with SPSS package (21.0 version, Inc.; Chicago, IL) using Mann-Whitney test, chi square test at *P* value less than 0.05 was considered significant.

Results

Table 1 shows distribution of 68 patients in each group; group I (medically compromised) with 80 dental implants and Group II (healthy subjects) with 72 implants.

Table 2 shows that age group 30-40 comprised of 25 patients in group I and 35 in group II, 40-50 years had 27 in group I and 23 in group II and 50-60 years had 16 in group I and 10 in group II. Mann Whitney test was applied which showed significant difference in distribution of patients in both groups (*P* < 0.05).

Table 3 shows that most commonly seen medically compromised patients were diabetes (25) with 30 dental implants followed by osteoporosis (16) with 17 dental implants, hypothyroidism (12) with 14 dental implants, organ transplant (10) with 12 dental implants and CVD (5) with 7 dental implants. Chi- square test was applied which revealed significant difference in patients (*P* < 0.05).

Table 4 shows that there were 18 (22.5%) in group I, and in group II, there were 4 (5.56%) dental implant failures. At first

Table 1: Distribution of patients

Groups	Group I (Medically compromised)	Group II (Control) (Healthy)
Number	68	68
Implants	80	72

Table 2: Age wise distribution of patients

Age group (years)	Group I	Group II	<i>P</i>
30-40	25	35	0.01
40-50	27	23	0.14
50-60	16	10	0.72

Mann-Whitney test, *P*<0.05 was significant

Table 3: Medically compromised patients and distribution of dental implants

Medically compromised patients	Number of patients	Number of implants	<i>P</i>
Diabetes	25	30	0.051
Hypothyroidism	12	14	
Osteoporosis	16	17	
Organ transplant	10	12	
CVD	5	7	

Test used: Chi- square test, *P*<0.05 was significant

Table 4: Failure rate in both groups

Failure	Group I	Group II	<i>P</i>
Number	18	4	0.001
Bone loss (mean) (mm) 1 st year	1.21	0.5	0.02
Bone loss (mean) (mm) upto 5 years	2.7	1.4	0.001

Chi- square test, *P*<0.05 was significant

year, in group I, mean bone loss around implant was 1.21 mm and 0.5 mm in group II. Upto 5 years, in group I, mean bone loss around implant was 2.7 mm and 1.4 mm in group II. The difference with chi- square test found to be significant (*P* < 0.05).

Discussion

Due to recent advancements in the field of implants, there use is increasing day by day. For placement of implants, medical condition plays a vital role. The placement is quite simple and easy in healthy individual as compared to unhealthy subjects. In medically compromised patients such as patients with hypertension, diabetes, hypothyroidism, severe bleeding disorders etc., special care has to be done before placing implant.

Aging has an effect on biological activity via altering the inflammatory, regenerative, and remodeling phases of healing process.^[6] It makes inflammatory phase prolonged and decreases new tissue formation in the regenerative phase by reducing angiogenesis and the number of mesenchymal stem cells, which are the progenitors of new bone formation.^[7] The present study was conducted to assess failure rate of dental implant in medically compromised patients.

We found that most commonly seen medically compromised patients were diabetes (25) with 30 dental implants followed by osteoporosis (16) with 17 dental implants, and CVD (5) with 7 dental implants. We found that in group I, there were 18 (22.5%) and in group II, there were 4 (5.56%) dental implant failures. At first year, in group I, mean bone loss around implant was 1.21 mm and 0.5 mm in group II. Upto 5 years, in group I, mean bone loss around implant was 2.7 mm and 1.4 mm in group II. Whereas Santosh *et al.*^[8] found no difference in success or failure of dental implants among medically compromised over control groups. Kachadia *et al.*^[9] found that group A had 331 implants intact and in the healthy condition which accounted for 83.37% implant success. Group B had 287 implants intact and in the healthy condition which accounted for 89.96% implant success. Neves *et al.*^[10] included a total of 721 systemically compromised patients (422 women, 299 men). After 7.3 years of average follow-up time, they found that increased age (patients over 40 years of age) as a risk factor for implant failure (OR = 2.63) and hepatitis as a risk factor for peri-implant pathology (OR = 3.74). Diabetes was associated with higher risk of implant failure and peri-implant pathology similar to our results.

Nguyen *et al.* concluded from their study that SDIs provide a reliable treatment, especially for medically compromised patients to avoid sinus lifting or vertical bone grafting.^[11] Ata- Ali J, *et al.*^[12] did a meta-analysis on the impact of bisphosphonates on implant survival rates and concluded that there is no negative effect of bisphosphonates on dental implant survival rate and their use does not reduce their success rate.

Conditions such as cardiovascular diseases (CVD) compromise the blood flow, which may restrict oxygen or nutrients in the osseous tissue. Therefore, it is hypothesized to have higher risk of osseointegration failure. In diabetes mellitus, hyperglycemia reduces clot quality, number of osteoclasts, and collagen production, which are the keys of bone regeneration.^[13]

Dental implant Procedure is a treatment of choice for missing teeth. Diabetes, hypothyroidism, CVS etc., have negative influence on success of dental implants. The present study was conducted to assess failure rate of dental implant in medically compromised patients. Higher rate of failure was found in diabetes case compared to other medical conditions. For the primary care, this study guide for careful case selection in medically compromised condition for dental implant to achieve long-term prognosis.

Conclusion

Dental implants have higher success rate. However, diabetes, CVS, hypothyroidism etc., pose challenge to treatment. Among medically compromised conditions, higher failure rate was found in diabetes.

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Conflicts of interest

There are no conflicts of interest.

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