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# Evaluation of Dental Implants Failure Rate of in Patients with Various Medical Conditions

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## ABSTRACT

**Introduction:** Dental implants are nowadays gaining importance for replacement of missing teeth. They are usually considered the ideal treatment for tooth loss. The success of a dental implant is based on patient and implant factors. Patient factors such as oral hygiene condition, a medical condition can influence the outcome of the dental implant.

**Objectives:** The present study was done to evaluate the dental implant failure rate in medically compromised patients over a healthy individual.

**Methods:** This retrospective study included 55 medically compromised and 40 healthy patients of both genders who underwent dental implants 5 years ago. Quantity 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 measured as failures.

**Results:** There was 16 (27.6 %) in group I (medically compromised), and 3 (0.05 %) in group II (healthy patients) showed dental implant failures. In the first year, in the group, I, mean bone loss around the implant was 1.18 mm and 0.4 mm in group II. Up to 5 years, in the group, I, mean bone loss around the implant was 2.5 mm and 1.3 mm in group II. The difference found to be significant ( $P < 0.05$ ).

**Conclusion:** Higher failure rate was found in diabetes patients among the medically compromised group.

**Key Words:** Dental, Diabetes, Failure, Implant, Medically Compromised

## INTRODUCTION

Dental implants are nowadays gaining importance for replacement of missing teeth. The usual reason for tooth loss can be dental caries and periodontal diseases.<sup>1</sup> Nowadays dental implant therapy is considered the most preferred method for replacement of teeth. The implant therapy is usually done in the age group of 40 to 60 years. Therefore, patients who require dental implant treatment are usually related to some systemic comorbidities.<sup>2</sup>

The success rate of the implant is depending on both patient factor and dental implant and bone quality. Implant quality such as implant type, length, bone quality such as bone height and bone type determines the implant success. Patient factors such as smoking habit, associated systemic conditions such as diabetes mellitus, hypothyroidism, bleeding

disorders, smoking, xerostomia, osteoporosis, cardiovascular conditions etc., can influence the outcome of implant treatment.<sup>3,4</sup> The absolute contraindications for dental implant treatment include; cardiac transplant, myocardial infarction, cerebrovascular accident, active treatment of malignancy, immunosuppression, psychiatric disorders and drug abuse.<sup>5</sup> The present retrospective study was done to evaluate the dental implant failure rate in medically compromised individuals.

## MATERIALS AND METHODS

This retrospective study was accomplished in the Department of Periodontics and Oral Implantology. Total of 95 patients was included in the study in that 55 were medically

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compromised patient (Group -I) had 58 dental implants and 40 healthy patients (Group-II as the control group) had 60 implants. Both groups included male and female participants. The started after obtaining approval from the institutional ethics committee. The study included implants placed from 2004 to 2015 duration. Follow up was recorded for 5 years till 2019. Informed consent was obtained from all the participants. Inclusion criteria comprised of patients age ranged 35-60 years, patients with comprehensive medical and dental history and healthy patients who received dental implant 5 years ago. Exclusion criteria involved patients with chemotherapy or radiation therapy history and improper patient record.

All participants demographic profile and implant type and duration, radiographic evaluation of bone loss, failure and success rate was recorded. Quantity of bone loss around the implant over 1 mm of bone loss in the first year and over 0.3 mm bone loss on radiographic evaluation every subsequent year were counted as failures. Any signs of infection close to the implant structure resulting in instability and displacement of the implant were also recorded as a failure. Based on subsequent radiographs, confirmation of failure was made. Patients were regularly recalled and intra- oral periapical radiographs, as well as panoramic radiographs, were taken. The radiographic outcome was recovered from the patient case record.

The obtained data were statistically assessed with SPSS package version 20.0, Inc.; Chicago, IL using Mann-Whitney test, and chi-square test at  $P$  value less than 0.05.

## RESULTS

Table 1 shows that most commonly seen medically compromised patients were diabetes (19) with 25 dental implants followed by osteoporosis (14) with 12 dental implants, hypothyroidism (10) with 10 dental implants, organ transplant (8) with 10 dental implants and ectodermal dysplasia (4) with 3 dental implants. Chi-square test was applied which revealed a significant difference in patients ( $P < 0.05$ ).

Table 2 shows that there were 16 (27.6 %) in group I (medically compromised), and in group II (healthy patients), there were 3 (0.05 %) dental implant failures. In the first year, in the group, I, mean bone loss around the implant was 1.18 mm and 0.4 mm in group II. Up to 5 years, in the group, I, mean bone loss around the implant was 2.5 mm and 1.3 mm in group II. The difference with chi-square test found to be significant  $P < 0.05$ ).

## DISCUSSION

Placement of implants, in medical condition, is challenging. Implant placement in healthy subjects is quite simple and easy compared to medically compromised individuals. In

medically compromised conditions such as in patients with diabetes, hypothyroidism, hypertension, severe bleeding disorders etc., special care has to be considered before positioning the implant.

Ageing has an outcome on biological activity via altering the degenerative, inflammatory, and remodelling phases of the healing process.<sup>6</sup> It makes inflammatory phase prolonged and reduces new tissue formation in the regenerative phase by decreasing angiogenesis and the number of mesenchymal stem cells, which are the progenitors of new bone formation.<sup>7</sup> The present study was done to evaluate the dental implant failure rate in medically compromised individuals.

We found higher implant failure rate in medically compromised individual. In contrast to our findings, Santosh et al.<sup>8</sup> observed no changes in failure or success of dental implants amongst medically compromised compared to control groups. Kachadia et al. evaluated implant success rate in a retrospective study on medically compromised over control group on 3 years' follow-up and found a fair amount of success in patients with pre-existing medical conditions.<sup>9</sup> Neves et al. assessed the probable risk factors for implant failure and peri-implant pathology in systemically compromised patients. They concluded that there will be no absolute contraindications for implant treatment for systemically compromised patients.<sup>10</sup>

Nguyen et al. suggested from their study that short dental implant as a reliable treatment option, particularly for medically compromised patients to exclude vertical bone grafting or sinus lifting.<sup>11</sup> Ata- Ali J, et al.<sup>12</sup> done a meta-analysis on implant survival rates and determined that there was no negative consequence of bisphosphonates on dental implant survival rate and their use does not reduce their success rate.

Circumstances such as cardiovascular diseases (CVD) reduces the blood flow, which may limit nutrients or oxygen in the osseous tissue. Hence, it is assumed to have a greater risk of osseointegration failure. In diabetes mellitus, hyperglycemia lessens the number of osteoclasts, clot quality, and collagen production, which are important for bone regeneration.<sup>13</sup>

Khajuria et al. assess outcomes of dental implants in medically compromised patients. medically compromised patients have higher implant failure rates as compared to the healthy one.<sup>14</sup> Beikler and Flemming in their review on implants in the medically compromised patient stated that pre-and post-operative management that may contribute to the outcome of implant-supported rehabilitation in such patients.<sup>15</sup> Similar to our result Parihar et al. also found higher failure rate in diabetes patients.<sup>16</sup> Our study indicates that higher failure rate with medically compromised conditions and there is a need for proper case selection and careful monitoring to improve the success rate. Further long term studies are needed for patients with other medical conditions with a larger sample size for a longer duration of the evaluation.

## CONCLUSION

Dental implants have a greater success rate. However, hypothyroidism, diabetes, cardiovascular conditions etc., carry a challenge to treatment. The higher failure rate was found in diabetes patients among the medically compromised group.

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### Authors contribution

1. PMSI- Manuscript preparation
2. SR- Investigation
3. TMS- Editing
4. RM- Data collection
5. GNS- Evaluation
6. BM-Editing
7. DJ- Editing

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**Table 1: Medically compromised patients and distribution of dental implants**

Medical conditions	Number of patients	Implants in number	P
Diabetes	19	25	0.041
Hypothyroidism	10	10	
osteoporosis	14	12	
Organ transplant	8	10	
Ectodermal dysplasia	4	3	

**Table 2: Failure rate in both groups**

Failure	Group I	Group II	P
Number	16	3	0.001
Mean bone loss in mm after 1 years	1.18	0.4	0.02
Mean bone loss in mm after 5 years	2.5	1.3	0.001

Statistical comparison using Chi square test