Evaluation for Survival of Dental Implants in Medically Compromised Patients

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Abstract

The present research was done to evaluate the failure rate of dental implant in medically compromised patients. This follow-up study included 40 patients in total, divided into two groups of 20 (group A had 20 medically compromised patients, and group B had 20 healthy persons), both genders, who had dental implants seven years prior. Failures were defined as any amount of bone loss surrounding the implant that was greater than 1 mm in the first year and greater than 0.3 mm in each subsequent year. Group A (medically compromised) had 42 dental implants and Group B (healthy subjects) had 44 implants. The most commonly seen medically compromised patients were diabetes (6) had 12 dental implants followed by cardiovascular diseases (5) had 11 implants, hypothyroidism (4) had 8 implants, organ transplant (3) had 6 implants and osteoporosis (2) had 5 dental implants. There were 12 (60%) in group A, and 2(10%) in group B, dental implant failures. At first year, in group A, mean bone loss around implant was 1.4 mm and 0.4 mm in group B. At 7 years of follow up, in group A, mean bone loss around implant was 2.8 mm and 1.2 mm in group B. The difference was found to be significant ($P < 0.001$).The success rate of dental implants is greater. However, conditions including hypothyroidism, diabetes, and CVS make treatment difficult. Diabetes was reported to have a greater failure rate among medically impaired patients.

Keywords: Dental implant, medically compromised

1. Introduction

These days, dental implants are commonly employed [1]. Dental implant therapy is the most effective therapeutic option for replacing missing teeth [2]. A dental implant is a surgical element that interacts with the jaw or skull's bone to support and serve as an orthodontic anchor for dental prostheses, such as crowns, bridges, dentures, and facial prostheses [3, 4]. One benefit of dental implants is that they guarantee the alveolar process will receive the masticatory forces. Dental implants also enhance the quality of life of the individual [3]. Local and systemic A number of criteria are crucial to the success of dental implants [2].In certain critically ill medical situations, dental implants do not osseointegrate [3]. A patient who is considered medically compromised (MCP) is one who is not in the same physical or mental condition as other individuals of the same age. The risk of surgical and medical problems during implant implantation and maintenance is significant for these patients. Therefore, in order to implement specific steps to lower the risk of complications, thorough surgical and medical histories as well as a clinical assessment are necessary [5].

Dental implant treatment might be complicated by a number of systemic illnesses, including diabetes mellitus, hypothyroidism, osteoporosis, thyrotoxicosis, bleeding disorders, smoking, xerostomia, CVS, etc. Cerebrovascular accident, drug addiction, heart transplant, myocardial infarction, immunosuppression, active cancer treatment, and mental health issues are all considered absolute contraindications [6,7].Individuals who have prosthetic valve replacements are typically at risk for endocarditis infection. Dental professionals should wait until first stabilisation because there is a significant risk of complications after a myocardial infarction or cerebrovascular accident. A fairly prevalent skeletal condition called osteoporosis is characterized by changes in the microstructure of bone and a decrease in bone density, which increases the risk of fractures. Osteoporosis may therefore hinder implant success. It has been proposed that patients' immunity is lowered by diabetes mellitus and other illnesses. The body's ability to mend itself declines, particularly in diabetics. Therefore, these patients should receive extra attention [8].The current research was done to evaluate failure rate of dental implant in medically compromised patients.

2. Materials and Method

In the Department of Prosthodontics and Implantology this retrospective investigation was done. Group A consisted of forty medically impaired individuals, regardless of gender, who had dental implants seven years prior. An equal number of healthy participants served as the control group (Group B). The patients' age range of 35 to 65 years, their complete medical and dental history, and the fact that they had undergone a dental implant seven years prior were the inclusion criteria. Patients having a history of radiation therapy or chemotherapy as well as incomplete medical records were excluded. The ethical committee of the institution accepted the study protocol. Information was taken from the patient's record file, including name, age, gender, and other details. Failures were defined as any amount of bone loss surrounding the implant that was greater than 1 mm in the first year and greater than 0.3 mm in each subsequent year. Any indications of infection near the implant structure that could cause instability or implant displacement were also noted. Subsequent radiographs were used to confirm the failure.

Patients were routinely summoned back, and panoramic and intra-oral periapical radiographs were obtained. The patient's case file contained the radiological result. The obtained data was statistically assessed with SPSS package (23.0 version, Inc.; Chicago, IL) using Mann‑Whitney test, chi square test at P value less than 0.05 was considered significant.

3. Result

Table 1 shows distribution of 40 patients in each group; group A (medically compromised) with 42 dental implants and Group B (healthy subjects) with 44 implants.Table 2 shows that, the most commonly seen medically compromised patients were diabetes (6) had 12 dental implants followed by cardiovascular diseases (5) had 11 implants, hypothyroidism (4) had 8 implants, organ transplant (3) had 6 implants and osteoporosis (2) had 5 dental implants. There were 12 (60%) in group A, and 2(10%) in group B, dental implant failures. Implant failure was 6 in diabetes 3 in cardiac conditions, 2 in

hypothyroidism, 1 with organ transport and no failure with osteoporosis cases. Chi‑ square test was applied which revealed significant difference in patients ($P < 0.05$).

Table 3 shows that there were 12 (60%) in group A, and 2(10%) in group B, dental implant failures. At first year, in group A, mean bone loss around implant was 1.4 mm and 0.4 mm in group B. At 7 years follow up, in group A, mean bone loss around implant was 2.8 mm and 1.2 mm in group B. The difference was found to be significant ($P < 0.001$) with chi‑ square test.

Table 1: Distribution of patients

Groups	No of participants	No implants placed
Group A	20	42
Group B	20	44

Table2: Medically compromised patients and distribution of dental implants

Group A	No of participants	No implants placed	Implant failure
Diabetes mellitus	6	12	6
Cardiovascular dieses	5	11	3
Hypothyroidism	4	8	2
Organ transplant	3	6	1
Osteoporosis	2	5	0
Total	20	42	12

Table 3: Failure rate in both groups

Failure rate	Group A	Group B	p
Number	12	2	
Bone loss (mean mm) 2 years	1.4	0.4	0.001
Bone loss (mean mm) 7 years	2.8	1.2	

4. Discussion

When opposed to ill persons, implant implantation is quite straightforward and easy in healthy individuals [2].Implant failure can occur for a number of

causes, including infection of the tissues around the implant, osseointegration failure during early healing, and underlying medical problems [8].Dental surgeons find it difficult to place dental implants in medically challenged patients; therefore, before putting implants, more care must be given to these patients than to healthy ones. Dental implant failure rates in patients with poor health were evaluated by Parihar et al. They came to the conclusion that diabetes had a higher failure rate than other medically impaired conditions [2]. It matched our outcomes rather well. The survival rate of short dental implants in patients with poor health was evaluated by Jagadeesh et al. They came to the conclusion that, in comparison to healthy people, dental implant failure is more common in medically challenged patients [1]. Comparing individuals with different medical conditions to those in good health, Shetty et al. assessed the implant failure rate in these patients. They came to the conclusion that people with diabetes had a higher failure rate than those with other illnesses. Subjects in good health had higher implant survival rates than those with illnesses [8]. These results are consistent with our observations. The effectiveness of dental implants in patients with poor medical state was evaluated by Singh et al. They discovered that patients with poor health have a comparable success rate, which contradicts our findings [5]. In order to identify risk factors for dental implants, Manor Y et al. performed a retrospective study to evaluate the rate of complication and failure of dental implants in medically impaired patients. The scientists came to the conclusion that individuals with medical conditions can effectively choose dental implants because they have similar problems and failure rates as healthy patients [9]. The effectiveness of dental implants in individuals with poor health was assessed by Kachhadia R et al. They came to the conclusion that patients with seriously ill conditions had a higher rate of success [10]. Retrospective follow-up by Millesi et al. assessed the long-term prognosis of implant patients who were treated for osteoporosis, diabetes, and bisphosphonate medication. In contrast to our findings [11], they did not identify any substantial implant failures in any of the three groups during the follow-up visit. Nguyen et al. came to the conclusion from their research that SDIs are a dependable treatment, particularly for patients with compromised health, in order to prevent the need for sinus lifting or vertical bone grafting [12]. The effectiveness of dental implants in patients with poor health was assessed by Khajuria et al. Two percent of patients in group I and seven percent of patients in group II experienced dental implant failure [13]. According to Hedari et al., the known relative hazards associated with the prevalent medical condition and each of their individual therapies are what provide the psychosocial and functional benefits of a "implant restoration" [3]. To find out if patients with thyroid disorders are contraindicated for dental implants, Torrejon-Moya et al. performed a "systematic review and meta-analysis" [14].

Diz et al evaluated dental implant survival rates in patients with poor health. They came to the conclusion that, as dental implants may improve the quality of life and functional aspects of life for many of these patients, personalised medical control should be created before implant therapy [15]. Disorders like cardiovascular disease (CVD) impair blood flow, which might limit the amount of nutrients or oxygen that can reach the osseous tissue. Dental implant success is negatively impacted by conditions like diabetes, hypothyroidism, CVS, etc. Compared to other medical diseases, diabetes cases had a higher failure rate [2]. In diabetic and cardiovascular patients, it has been observed that bone remodelling surrounding the implant is very low and relatively less effective; nonetheless, patients with diabetes have a consistent rate of bone remodelling [3]. Further studies are needed to validate the results with larger sample size.

5. Conclusions

Diabetes was reported to have a greater failure rate among medically impaired patients. Compared to healthy persons, dental implant failure is more common in medically challenged patients. Careful case selection is required because individuals with impaired medical conditions are more likely to experience implant failure.

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