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Prognosis of Dental Implants In Diabetic Patients

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ABSTRACT

Background: This study had been carried out to evaluate the prognosis of dental implants in subjects suffering from diabetes mellitus.

Material and methods: A total of 100 individuals participated in the study, which was divided into two distinct groups. The first group comprised 50 healthy participants, while the second group consisted of 50 individuals diagnosed with diabetes. The study focused on patients who had partially missing maxillary and/or mandibular arches and subsequently received oral rehabilitation through dental implants. Relevant medical histories, dental radiographs, and clinical records were collected for these patients. The classification into healthy and diabetic groups was based on the evaluation of glycated haemoglobin (HbA1c) levels at the time of implant placement. According to the criteria established by the American Diabetes Association (ADA), individuals with HbA1c levels below 6.5% are categorized as non-diabetic (healthy), whereas those with levels exceeding 6.5% are classified as diabetic.

Results: There were 75 females and 25 males in this study. The success rate of dental implants in the control group as well as case group was 96% and 72%, accordingly. Most of the implants had been placed in the mandible (85%) as compared to maxilla (15%).

Conclusion: The findings of this study indicate that individuals with diabetes mellitus have a favourable prognosis regarding dental implants.

Keywords: *implant, diabetes, prognosis*

1. INTRODUCTION

The pandemic condition known as diabetes mellitus (DM) is growing at an alarming rate.[1] There are currently roughly 425 million adults living with diabetes, and by the year 2045, it is predicted that number would rise to 629 million, according to statistics on the global burden of DM just published (2017) by the International Diabetes Federation (IDF).[2] For many years, glycemic management has been the main concern for diabetic implant patients. Given the associations between glycemic management and microvascular and macrovascular problems, this seems acceptable.[3] Although there are many ways to detect blood sugar levels, glycated haemoglobin A1c (HbA1c) is increasingly employed and valuable as a diagnostic and therapeutic tool.[3] Diabetes Mellitus (DM) is a complex metabolic disorder characterised by abnormalities in insulin secretion, absorption, or both, leading to significant health challenges.[4] If not effectively managed, it can cause persistent hyperglycaemia. This, in turn, can give rise to a multitude of complications, including microvascular disorders, compromised bone metabolism, increased vulnerability to infections, and delayed wound healing.[4]

Therefore, it is important to assess and maintain optimal blood glucose control before undertaking invasive and potentially costly dental procedures, such as the placement of dental implants, to ensure their long-term success and durability. This study had been carried out to evaluate the prognosis of dental implants in subjects suffering from diabetes mellitus.

2. MATERIAL AND METHODS

A total of 100 individuals participated in the study, which was divided into two distinct groups: one comprising 50 healthy participants and the other consisting of 50 individuals diagnosed with diabetes. The study focused on patients who exhibited partial edentulism in the maxillary and/or mandibular arches and subsequently received oral rehabilitation through dental implants. Relevant medical histories, dental radiographs, and clinical records were collected for these patients. The classification of participants was based on their glycated haemoglobin (HbA1c) levels at the time of implant placement. According to the criteria established by the American Diabetes Association (ADA), individuals with HbA1c levels below 6.5% were categorized as non-diabetic (healthy), while those with levels exceeding 6.5% were classified as diabetic. Participants with an HbA1c level of exactly 6.5% were assigned to the control group, in line with these guidelines. Those with HbA1c levels ranging from 6.5% to 8% were identified as having well-controlled diabetes and were included in the case group. Conversely, patients with HbA1c levels below 8% were excluded from the study due to their classification as having poorly controlled or uncontrolled diabetes.Statistical analyses were performed utilizing SPSS software.

Figure 1&2 : Dental implant

3. RESULTS

There were 75 females and 25 males in the present study(Table 1). The success rate of dental implants in the control group as well as case group was 96% and 72%, accordingly. Most of the implants had been placed in the mandible 85% as compared to maxilla 15% in the present study (Table 2).

Table 1: gender-wise distribution of subjects

Gender	Number of subjects	Percentage
Males	25	25%
Females	75	75%
Total	100	100%

Table 2: Prognosis of dental implants in the case group and control group

Group	Success rate
Control group	96%
Case group	72%

4. DISCUSSION

Diabetes mellitus (DM) represents a significant global health crisis, characterized by a concerning increase in prevalence. According to recent statistics published in 2017 by the International Diabetes Federation (IDF), approximately 425 million adults are currently affected by diabetes, with projections suggesting that this figure could rise to 629 million by the year

2045.[5] This escalating prevalence is associated with higher mortality rates, a decline in quality of life, and substantial financial burdens borne by both individuals and governments. Furthermore, there is a notable increase in the number of infants born to mothers with diabetes, with estimates indicating that one in five live births in the Middle East and North Africa (MENA) region occurs under such conditions. In light of its rising prevalence, gestational diabetes has been recognized as a distinct category, alongside the established types 1 and 2 DM. In Saudi Arabia, the situation is particularly alarming, as the country ranks seventh globally, with an estimated 39 million individuals living with diabetes.[6,7] The dental implants are the replacement methods for missing teeth. The implant design with advancements, surface characteristics, and surgical protocols, this treatment has become a safe and highly predictable procedure, associated with a mean survival rate of 94.6% and a success rate of 89.7% after ten years[8,9].This study had been carried out to evaluate the prognosis of dental implants in subjects suffering from diabetes mellitus.In this study, there were 75 females and 25 males in this study. The success rate of dental implants in the control group as well as case group was 96% and 72%, accordingly.

Most of the implants had been placed in the mandible (85%) as compared to maxilla (15%). **Sharma A et al (2002)[10]**evaluated the prospects for dental implants in people with diabetes. Thirty patients in all were enrolled. The age range was from 40 to 60. Out of 30, 8 men and 22 women were present. HbA1c values were calculated. HbA1c levels and the ratio of problems to implant numbers were shown to be correlated. Data were gathered. Software called SPSS was used to analyses the results. Thirty patients in all were enrolled. In follow-up cases, the stratification levels of HbA1c were investigated. The implant failure rate in 8.0–8.9 was 90.91%, with 2 implants failing. The survival rate in 11.0-11.9 was 75%. Others had a 100% success rate. Patients with diabetes have higher implant survival rates and fewer problems. **Andrade CAS et al (2022)[11]** evaluated the survival rate, success rate, and peri-implant biological changes of immediately loaded dental implants (ILs) placed in type 2 diabetic patients (DM2). The present study was registered on PROSPERO and followed the PRISMA checklist. The search was performed by the first reviewer in January 2021. The electronic databases used were MEDLINE via PubMed, Cochrane, BVS, Web of Science, Scopus, LIVIVO, and gray literature. The risk of bias analysis was performed using an instrument from the Joanna Briggs Institute. A total of 3566 titles and abstracts were obtained. The qualitative synthesis included 7 studies, while the quantitative synthesis included 5 studies[11]. The meta-analysis of IL in individuals with DM2 compared to nondiabetic individuals showed no significant difference among the groups regarding the survival rate of dental implants (RR = 1.00, 95% CI 0.96–1.04; $p = 0.91$; $I^2 = 0\%$), even if the patient had poor glycaemic control (RR = 1.08, 95% CI 0.87–1.33; $p = 0.48$; $I^2 = 70\%$). Meta-analysis of marginal bone loss in IL compared to conventional loading in DM2 patients also showed no significant difference (mean difference = − 0.08, 95% CI − 0.25–0.08; $p = 0.33$; $I^2 = 83\%$).Type-2 diabetes mellitus does not seem to be a risk factor for immediately loaded implants if the glycaemic level is controlled, the oral hygiene is satisfactory, and the technical steps are strictly followed. Duration of diabetes significantly affected the success of dental implant, observed in one study[12]. Among these 23 studies, eight reported a 100% success rate of dental implants in patients with type 2 diabetes. Our study results are in agreement with previous literature.[13,14,15]

5. CONCLUSION

The findings of this study indicate that individuals with diabetes mellitus have a favourable prognosis regarding dental implants.

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