

Harsukh Educational Charitable Society

International Journal of Community Health and Medical Research

Journal home page: www.ijchmr.com

doi: 10.21276/ijchmr

ISSN E: 2457-0117 ISSN P: 2581-5040

Index Copernicus ICV 2018=62.61

Original Research

Analysis of prognosis of dental implants in patients with type-2 diabetes mellitus: A retrospective study

Kaustubh Vilas Mahajan¹ Ojas Basavaraj Hanchanale² Sanket Dinkar Ingale¹ Sagar Prakash Kadam³

¹Lecturer, Department of Prosthodontics and Crown and Bridge. ²Lecturer, Department of Conservative dentistry and Endodontics. ³Lecturer, Department of Periodontology. Tatyasaheb Kore dental College and Research Center, Kolhapur, Maharashtra.

ABSTRACT

Background: Diabetes mellitus is a chronic disorder of carbohydrate metabolism characterized by hyperglycemia. Dental implants are frequently performed dental procedure these days. Hence; under the light of above mentioned data, we planned the present study to assess the prognosis of dental implants in diabetic patients. **Materials & methods:** A total of 58 diabetic patients who underwent prosthetic rehabilitation of missing mandibular first molar were included in the present study. A total of 58 age- and gender-matched healthy patients with negative history of diabetes and who also underwent prosthetic rehabilitation of missing mandibular first molar were also included in the present study as control group. Complete demographic details of all the patients were obtained from the data record files. Follow-up details of all the patients were also retrieved for assessing the prognosis of dental implants. **Results:** Out of 58 patients in the diabetic group, dental implant therapy was found to be successful in 55 patients (94.8 percent). Out of 58 patients in the control group, dental implant therapy was found to be successful in 56 patients (96.6 percent). **Conclusion:** Dental implants can be successfully placed in diabetic patients.

Key words: Dental implants, Diabetes, Success, Prognosis

Corresponding author: Dr Kaustubh Vilas Mahajan, Lecturer, Department of Prosthodontics and Crown and Bridge, Tatyasaheb Kore dental College and Research Center, Kolhapur, Maharashtra.

This article may be cited as: Mahajan KV, Hanchanale OB, Ingale SD, Kadam SP Analysis of prognosis of dental implants in patients with type-2 diabetes mellitus: A retrospective study. HECS Int J Comm Health Med Res 2019;5(3):44-46

INTRODUCTION

Diabetes mellitus is a chronic disorder of carbohydrate metabolism characterized by hyperglycemia, reflecting distortion in physiological equilibrium in utilization of glucose by tissue, liberation of glucose by liver and production-liberation of pancreatic anterior pituitary and adrenocortical hormone. Dental implants is frequently performed dental procedure these days.¹⁻³ The persistent hyperglycemia in diabetic individuals, inhibit osteoblastic activity and alters the response of parathyroid hormone that regulates metabolism of Ca and P, decreases collagen formation during callus formation, induces apoptosis in lining cells of bone and increases osteoclastic activity due to persistent inflammatory response.^{4,5}

Hence; under the light of above mentioned data, we planned the present study to assess the prognosis of dental implants in diabetic patients.

MATERIALS & METHODS

The present study was scheduled in the department of oral implantology. It included analysis of prognosis of dental implants in type-2 diabetes mellitus patients. A total of 58

diabetic patients who underwent prosthetic rehabilitation of missing mandibular first molar were included in the present study. A total of 58 age- and gender-matched healthy patients with negative history of diabetes and who also underwent prosthetic rehabilitation of missing mandibular first molar were also included in the present study as control group. Complete demographic details of all the patients were obtained from the data record files. Follow-up details of all the patients were also retrieved for assessing the prognosis of dental implants. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software. Chi-square test was used for assessment of level of significance. P-value of less than 0.05 was taken as significant.

RESULTS

In the present research, analysis of a total of 116 patients was done who underwent prosthetic rehabilitation for missing mandibular first molar by dental implants. All these 116 patients were broadly divided into two study groups with 58 patients in each group- diabetic group and control group. Mean age of the subjects of the diabetic group and the implant group was 45.2 years and 44.6 years. 35 patients

among the diabetic group and 38 patients among control group were males while 21 patients among the diabetic group and 18 patients among the control group were females. In the present study, out of 58 patients in the diabetic group, dental implant therapy was found to be successful in 55 patients (94.8 percent). Out of 58 patients in the control group, dental implant therapy was found to be successful in 56 patients (96.6 percent). Infection at the

dental implant site and loosening of the dental implant were the two most common reasons for dental implant failure in the present study. No- significant results were obtained while comparing the prognosis of dental implants in between diabetic and non-diabetic patients.

Table 1: Demographic data

| Parameter | | Diabetic group | Control group |
|-------------------|--------------|----------------|---------------|
| Age group (years) | Less than 30 | 17 | 18 |
| | 30 to 50 | 29 | 30 |
| | More than 50 | 10 | 8 |
| Mean age (years) | | 45.2 | 44.6 |
| Gender | Males | 35 | 38 |
| | Females | 21 | 18 |

Table 2: Prognosis of dental implants

| Prognosis | Diabetic group | | Control group | | p- value |
|-----------|--------------------|------------|--------------------|------------|----------|
| | Number of patients | Percentage | Number of patients | Percentage | |
| Success | 55 | 94.8 | 56 | 96.6 | 0.25 |
| Failure | 3 | 5.2 | 2 | 3.4 | |

Table 3: Reasons for failure of dental implants

| Reasons | Diabetic group | Control group |
|----------------------------------|----------------|---------------|
| Infection at dental implant site | 2 | 0 |
| Loosening of dental implant | 1 | 1 |

DISCUSSION

Today, dental implants are one of the restorative methods to replace missing teeth. Improvements in implant design, surface characteristics, and surgical protocols made implants a secure and highly predictable procedure with a mean survival rate of 94.6 % and a mean success rate of 89.7 % after more than 10 years.⁶ Diabetes is a group of metabolic diseases in which there are high blood sugar levels over a prolonged period. When looking at the complications and side effects resulting from diabetes, it is important to know which type of diabetes the patient suffers from, if there is any therapy, which kind of therapy, the grade of glycemic control, and duration of the disease. The previously described micro- and macroangiopathies develop with the duration and repetitions of elevated glycemic periods.⁷⁻⁹

In the present research, analysis of a total of 116 patients was done who underwent prosthetic rehabilitation for missing mandibular first molar by dental implants. All these 116 patients were broadly divided into two study groups with 58 patients in each group- diabetic group and control group. Mean age of the subjects of the diabetic group and the implant group was 45.2 years and 44.6 years. 35 patients among the diabetic group and 38 patients among control group were males while 21 patients among the diabetic group and 18 patients among the control group were females. Dental implants have been recognized as an acceptable treatment method for the replacement of missing

teeth. A number of patient and procedure-related parameters determine the success of the implant treatment. Glycemic control is viewed as a critical variable in identifying whether patients with diabetes are eligible for implant therapy. Dental implant success has been dependent on direct bone-to-implant contact. The formation of bone on and around dental implants has been achieved by the normal mechanisms of bone repair. But, bone and mineral metabolism are altered in diabetes. Diabetes decreases the rate of bone formation and alters remodeling. The mechanism of altered bone metabolism has not been fully elucidated, but it may be best explained by collagen abnormalities in response to advanced glycosylation end products (AGE). Several induced diabetic rat model investigations have indicated that there is reduction in the rate of bone formation and a reduced amount of bone-to-implant contact. This may be because of changes in the wound-healing response following implant insertion in diabetic patients. The early failure of implants could be the result of a mechanical overload of a reduced percentage of bone-to-implant contact, immature bone, or incorrectly formed bone. All of these reasons for overload are most likely related to AGE formation.^{10- 13}

In the present study, out of 58 patients in the diabetic group, dental implant therapy was found to be successful in 55 patients (94.8 percent). Out of 58 patients in the control group, dental implant therapy was found to be successful in 56 patients (96.6 percent). Infection at the dental implant site and loosening of the dental implant were the two most common reasons for dental implant failure in the present

study. No- significant results were obtained while comparing the prognosis of dental implants in between diabetic and non-diabetic patients. Farzad P et al investigated how many diabetic patients and types of cases that are treated with dental implants in their clinic. Medical records from 782 patients were examined in patients treated by the Brånemark method for partial or total edentulism with implant supported bridges. From these records, 25 patients (3.2%) with diabetes before implant treatment (136 implants) were identified and further studied with respect to age, gender, type of diabetes, treated jaw, degree of edentulism, bone graft, implant survival, periimplant inflammation, bleeding on probing, and radiographic bone loss. Furthermore, the patients' opinion about the outcome of the treatment was registered. The implant success rate was 96.3% during the healing period and 94.1% 1 year after surgery. Of all 38 bridges, one was lost. Few complications occurred and all patients, except for one, were satisfied with the treatment.

CONCLUSION

Under the light of above obtained data, the authors conclude that dental implants can be successfully placed in diabetic patients. However; further studies are recommended in future for better exploration of results.

REFERENCES

1. Santana RB, Xu L, Babakhanlou C, Amar S, Graves DT. A role for advanced glycation end products in diminished bone healing in type 1 Diabetes. *Diabetes*. 2003;52:150–210.
2. Gooch HL, Hale JE, Fujioka H, Balian G, Hurwitz SR. Alterations of cartilage and collagen expression during fracture healing in experimental diabetes. *Connect Tissue Res*. 2000;41:81–5.
3. Anner R, Grossmann Y, Anner Y, Levin L. Smoking, diabetes mellitus, periodontitis, and supportive periodontal treatment as factors associated with dental implant survival: a long-term retrospective evaluation of patients followed for up to 10 years. *Implant Dent*. 2010;19(1):57–64.
4. Busenlechner D, Furhauser R, Haas R, Watzek G, Mailath G, Pommer B. Long-term implant success at the Academy for Oral Implantology: 8-year follow-up and risk factor analysis. *J Periodontal Implant Sci*. 2014;44(3):102–8.
5. Morris HF, Ochi S, Winkler S. Implant survival in patients with type 2 diabetes: placement to 36 months. *Ann Periodontol*. 2000;5(1):157–65.
6. Moraschini V, Poubel LA, Ferreira VF, Barboza Edos S. Evaluation of survival and success rates of dental implants reported in longitudinal studies with a follow-up period of at least 10 years: a systematic review. *Int J Oral Maxillofac Surg*. 2015;44(3):377–88.
7. He H, Liu R, Desta T, Leone C, Gerstenfeld LC, Graves DT. Diabetes causes decrease osteoclastogenesis, reduced bone formation and enhanced apoptosis of osteoblastic cells in bacteria stimulated bone loss. *Endocrinology*. 2004;145:447–52.
8. Liu R, Bal HS, Desta T, Behl Y, Graves DT. Tumor necrosis factor alpha mediates enhanced apoptosis of matrix-producing cells and impairs diabetic healing. *Am J Pathol*. 2006;168:757–64.
9. Jadhav RD, Sabane AV, Gandhi PV, Thareja A. Dental implant in diabetic patients: Statement of facts. *Indian J Oral Sci* 2015;6:47-50
10. Oates TW, Jr, Galloway P, Alexander P, Vargas Green A, Huynh-Ba G, Feine J, et al. The effects of elevated hemoglobin A(1c) in patients with type 2 diabetes mellitus on dental implants: survival and stability at one year. *J Am Dent Assoc*. 2014;145(12):1218–26.
11. Katyayan PA, Katyayan M, Shah RJ. Rehabilitative considerations for dental implants in the diabetic patient. *J Indian Prosthodont Soc* 2013;13:175-83.
12. Aguilar-Salvatierra A, Calvo-Guirado JL, Gonzalez-Jaranay M, Moreu G, Delgado-Ruiz RA, Gomez-Moreno G. Peri-implant evaluation of immediately loaded implants placed in esthetic zone in patients with diabetes mellitus type 2: a two-year study. *Clin Oral Implants Res*. 2015;27(2):156–61.
13. Oates TW, Dowell S, Robinson M, McMahan CA. Glycemic control and implant stabilization in type 2 diabetes mellitus. *J Dent Res*. 2009;88(4):367–71.
14. Farzad P1, Andersson L, Nyberg J. Dental implant treatment in diabetic patients. *Implant Dent*. 2002;11(3):262-7.