

Long-Term Survival of Dental Implants in a Patient With Periodontitis and Diabetes Mellitus: An Eight-Year Follow-Up Case Report

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Abstract

Dental implants are now a standard solution for replacing missing teeth, even in patients with a history of chronic periodontitis. India is often referred to as the "diabetic capital of the world," a title that reflects the country's alarming rates of diabetes prevalence. However, the risk of complications, such as peri-implantitis and implant failure, remains a concern for these patients. This clinical case investigates the long-term success and survival of dental implants in patients with chronic periodontitis and diabetes mellitus. Results from an eight-year follow-up suggest that with appropriate periodontal treatment, careful implant placement, and regular maintenance, dental implants can remain functional and stable, even in individuals with chronic periodontal disease and diabetes mellitus.

Categories: Dentistry

Keywords: dental implant survival, long term survival, type i diabetes mellitus, dental implantology, periodontal disease (pd)

Introduction

Periodontitis is a chronic inflammatory condition that leads to the progressive destruction of tooth-supporting structures, including the alveolar bone [1]. If left untreated, it can lead to mobility of teeth and subsequently tooth loss. The complications can be compounded by the presence of systemic diseases, e.g., diabetes mellitus (DM). DM, particularly when poorly controlled, has systemic effects on wound healing, immune function, and bone metabolism. Elevated blood glucose levels impair collagen formation, reduce neutrophil function, and delay bone healing [2].

Dental implants have become the gold standard for replacing missing teeth, offering a permanent, functional, and aesthetic solution. However, their long-term success can also be influenced by several factors, including underlying health conditions [3]. The presence of DM may affect osseointegration, the process by which the dental implant fuses with the bone [2]. Thus, the simultaneous presence of periodontitis and DM can cumulatively affect the implant success [4]. These patients are often at an increased risk for developing peri-implantitis following dental implant placement due to the potential transfer of periodontal pathogens to the implant site [5]. This further compromises the stability of dental implants [6]. This raises the question of whether implants should be considered in patients with a history of periodontal disease and DM.

Studies have shown that patients with a history of periodontitis and DM may be more susceptible to biological complications around implants, such as peri-implantitis and implant failure, when compared to healthy patients [7]. Despite these concerns, implant therapy has been shown to be successful in periodontally compromised as well as in diabetic patients, provided that adequate treatment and maintenance protocols are followed [8].

The aim of this case report is to present a patient with long-term survival of dental implants even when complexed by periodontitis and long-standing DM.

Case Presentation

A 42-year-old male presented to the outpatient Department of Subharti Dental College and Hospital, Meerut, India, with a chief complaint of inability to chew food. He gave a history of type 2 DM for which he was on medication for the past 10 years. The patient's fasting blood glucose levels were 130mg/dL and HbA1c was 6.7. This indicates that the DM was controlled. On oral examination, there was generalized periodontitis (stage III, grade B). Severe attachment loss and grade III mobility was present on mandibular teeth #31 and #43. Teeth #41 and #42 were missing (Figure 1). The reason for poor oral hygiene was inadequate awareness and careless approach towards dental care.

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FIGURE 1: Pre-operative view

Treatment planning

Meticulous phase I periodontal therapy comprising of scaling and root planing, oral hygiene instructions, and chlorhexidine mouthwash. Phase 2 periodontal therapy comprised of full mouth flap surgery. The extraction of the hopeless teeth and immediate implant placement were planned for the mandibular anterior region.

Surgical phase

After phase I therapy, informed consent was duly signed by the patient. At the follow-up visit, the gingival inflammation had subsided but the pockets still persisted. Full mouth flap surgery, i.e., open flap debridement using Kirkland flap design was performed except for the mandibular anterior region. The patient was put on the maintenance phase. After three months, the patient was deemed stable for oral hygiene maintenance. The patient was advised to undergo cone beam computed tomography, to determine the availability of the bone and pre-plan the angulation for implant placement.

Pre-medication (amoxicillin 625 mg, deflazacort 6mg) was prescribed to the patient 24 hours before the procedure. On the day of surgery, rabeprazole, Diclofenac 50 mg, and serratiopeptidase 15mg were given one hour prior to the procedure. After the administration of local anesthesia, 4% Articaine with epinephrine 1:1,00,000 (Septanest, Septodont), atraumatic extraction of #43 and #31 was performed using luxators (Figures 2, 3). The flap was reflected (Figure 4), and implant (Spiral™, AlphaBio Tec, Petah Tikva, Israel) of size 4.75*10 mm and 4.75*11.5 mm was placed (Figures 5, 6). Figure 7 shows the radiograph of the implants immediately after they were placed. Over the implants, the cover screws were placed (Figure 8). The freeze-dried bone allograft (Tata Memorial Hospital, Mumbai, Maharashtra, India) was placed on the defect site (Figure 9), and flaps were approximated with 3-0 polyglycolic acid suture (PGA)/polylactic acid (PLA) suture (Lotus Surgicals, Dehradun, Uttarakhand, India) (Figure 10).



FIGURE 2: Teeth #43 and #31 extracted



FIGURE 3: Extracted teeth

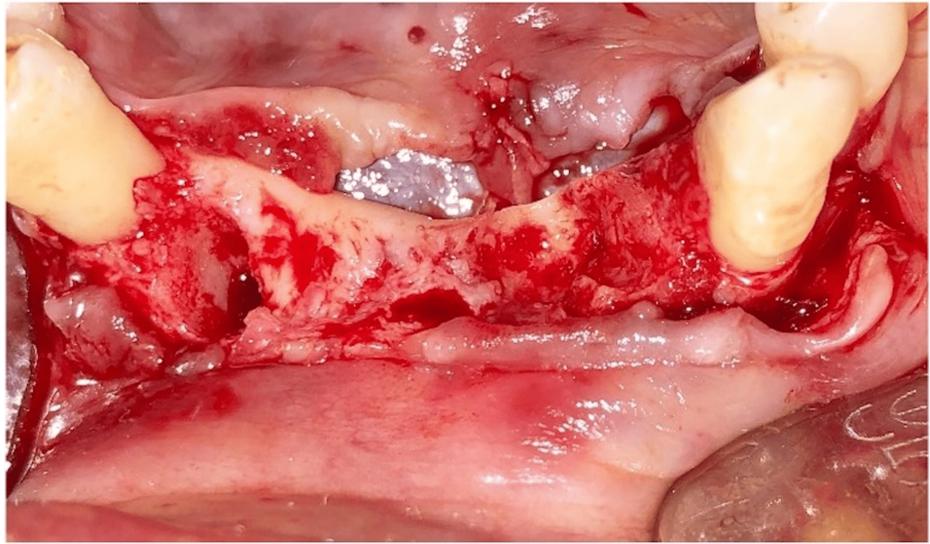


FIGURE 4: Flap reflection



FIGURE 5: Implant placement

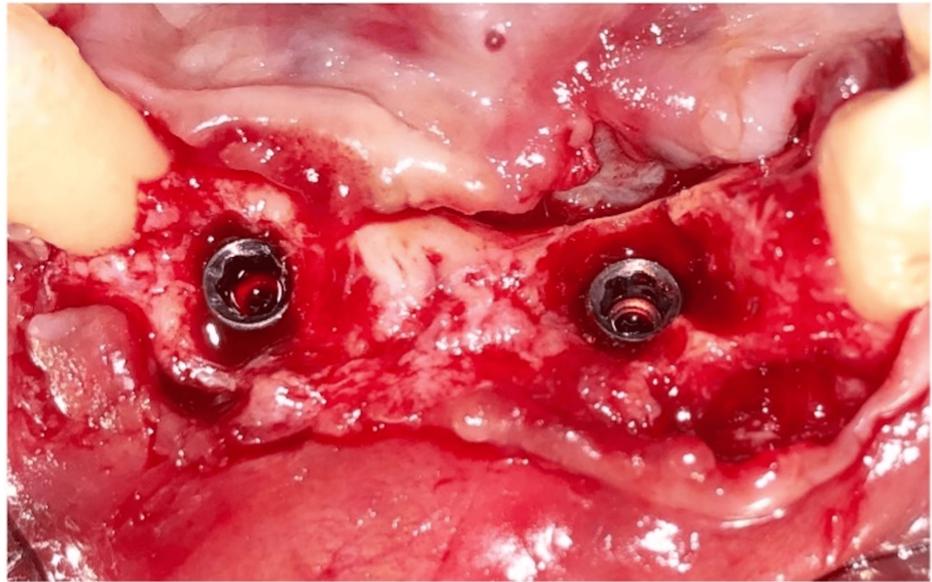


FIGURE 6: Sub-crestal placement of the implant



FIGURE 7: Radiograph immediately after implant placement.

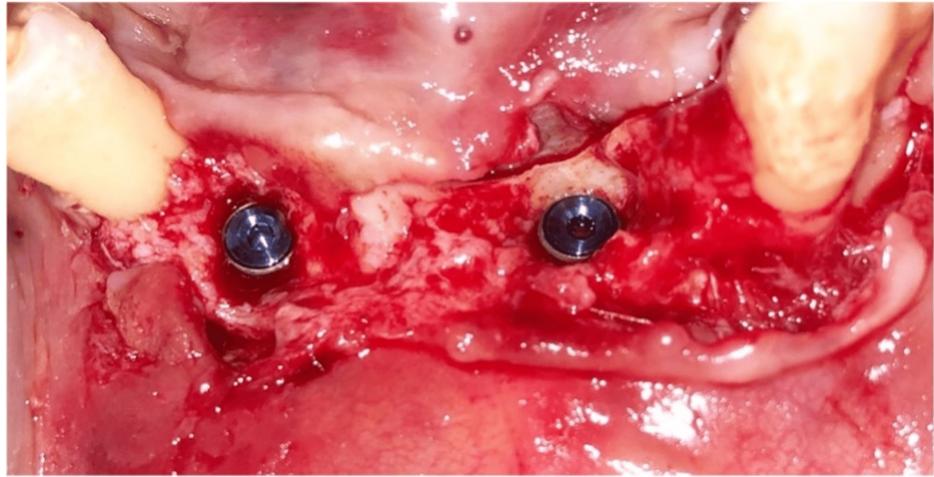


FIGURE 8: Cover-screws placed on the implants

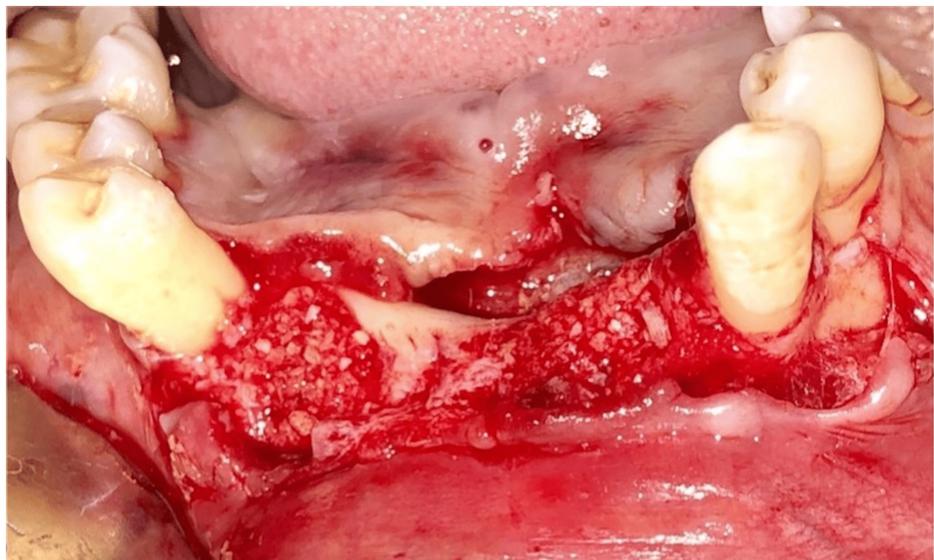


FIGURE 9: Bone grafting.



FIGURE 10: Sutures placed (PGA/PLA)

PGA, polyglactin; PLA, polylactic acid

A provisional Maryland prosthesis (Figures 11, 12) was provided after two weeks, and the patient was instructed to use a 0.12% chlorhexidine rinse twice daily for additional hygiene control.



FIGURE 11: Maryland prosthesis for provisionalization



FIGURE 12: Lingual view of the Maryland prosthesis

Second-stage surgery

The patient was recalled for second-stage surgery after five months. After clinical and radiographical evaluation, a mid-crestal incision (Figure 13) was made under local anesthesia, and after cover screws removal, healing abutments (gingival formers) were inserted (Figure 14) and the flap was approximated using PGA/PLA suture (Figure 15).



FIGURE 13: Second-stage surgery: mid-crestal incision

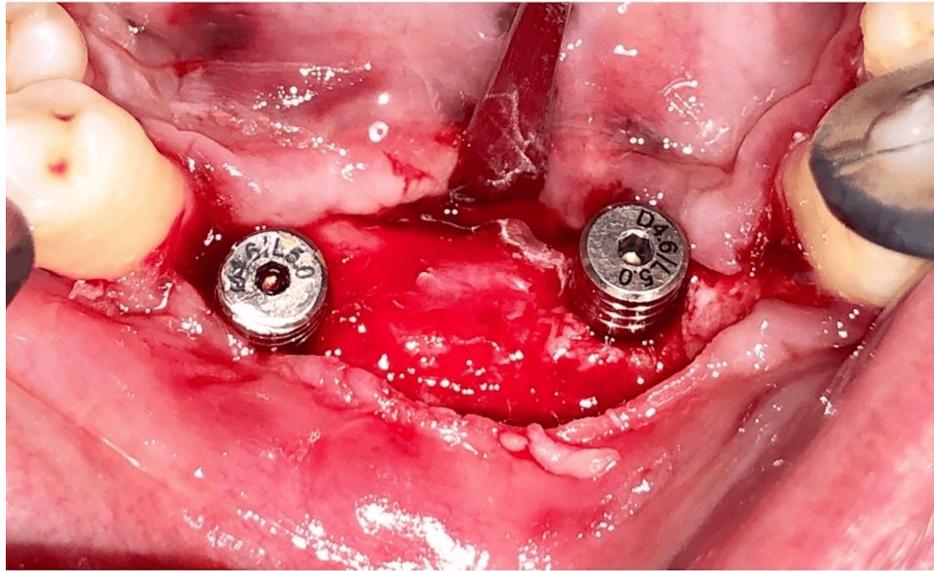


FIGURE 14: Gingival formers in place



FIGURE 15: Suturing

Prosthetic phase

After two weeks of healing, the peri-implant collar, which forms around implants, was assessed (Figure 16). Impressions were made (Figure 17), and final screw-retained metal-ceramic prostheses were delivered (Figures 18-20). The patient was instructed to follow proper oral hygiene measures.

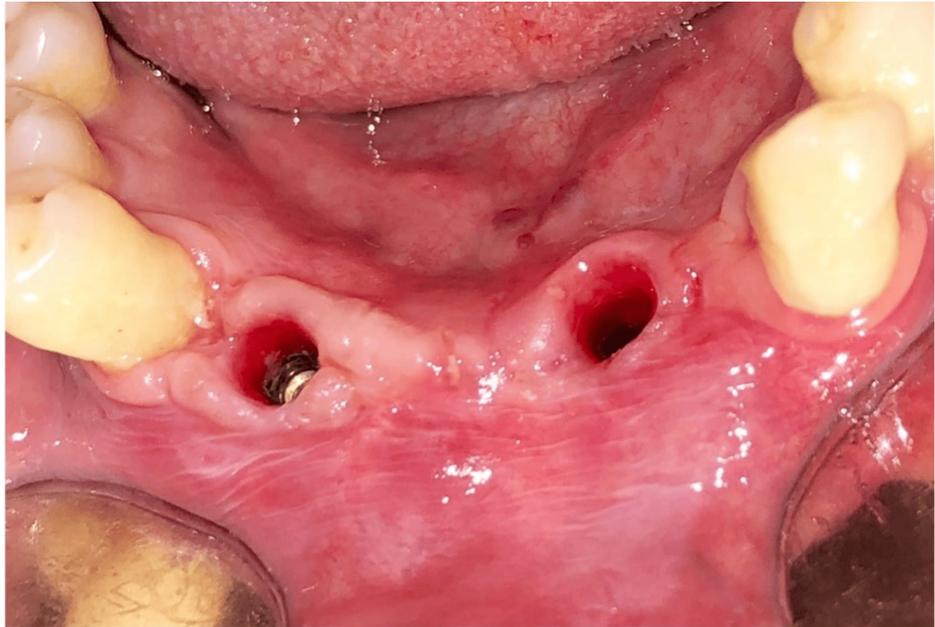


FIGURE 16: Gingival collar formation after two weeks



FIGURE 17: Impression made



FIGURE 18: Prosthesis fabricated



FIGURE 19: Try-in of the prosthesis on cast.



FIGURE 20: Final prosthesis (screws retained)

Follow-up and results

Over the eight-year follow-up period, the patient showed stable periodontium and healthy implant with no sign of inflammation at the peri-implant area. The patient was closely monitored for clinical and radiographic changes, including full-mouth plaque score, bleeding index, probing pocket depth, and marginal bone loss (Figures [21-23](#)).

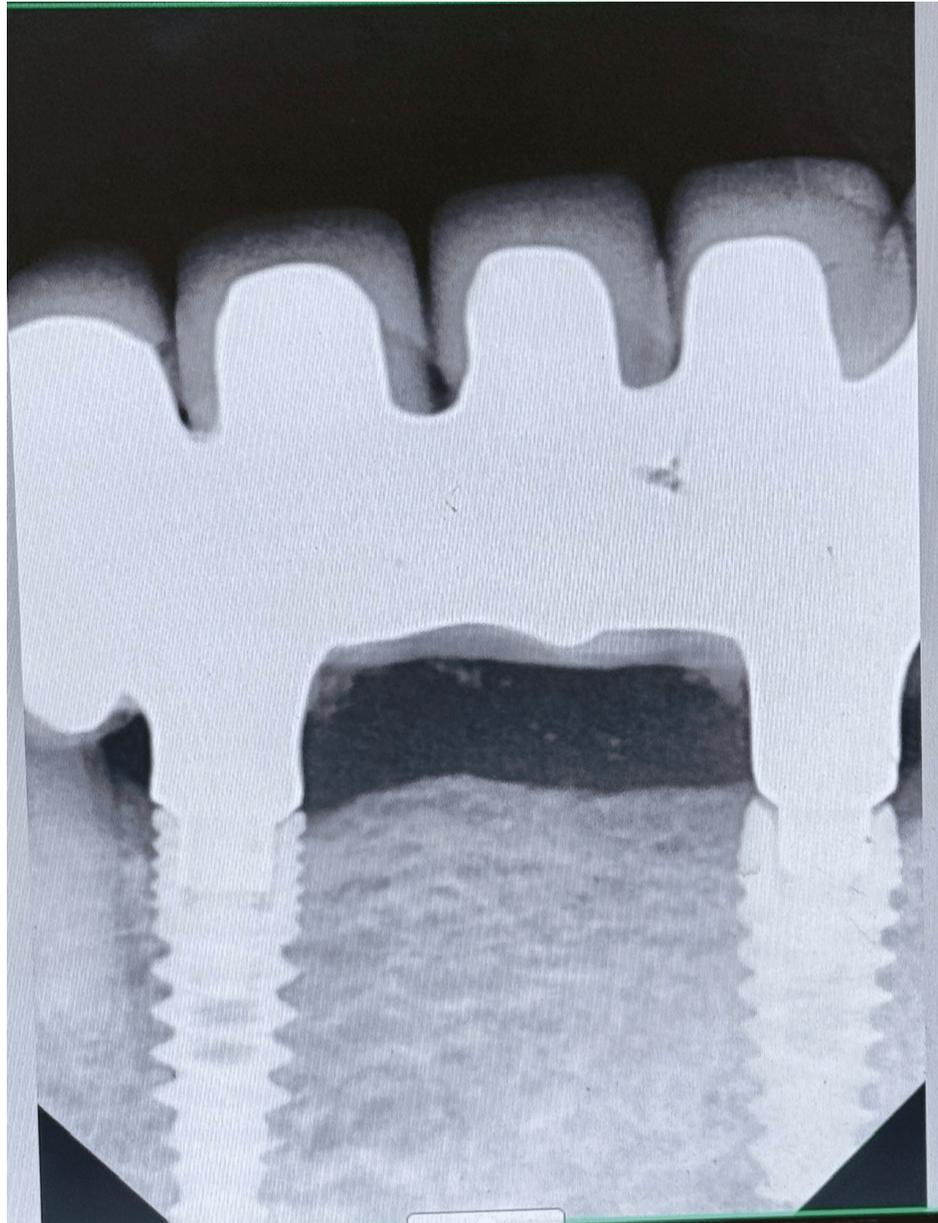


FIGURE 21: Radiovisiography of the implant site at the eight-year follow-up



FIGURE 22: Lingual view at the eight-year follow-up



FIGURE 23: Facial view at the eight-year follow-up

At the eight-year follow-up, no implant loss was seen, and there were no complications such as ceramic fracture or abutment unscrewing. Radiographic analysis confirmed a healthy peri-implant environment, with bone levels stable within normal limits.

Discussion

The outcomes of implant treatment in periodontally compromised patients have been widely debated. Our clinical report supports previous findings that while chronic periodontitis can complicate implant therapy, it does not necessarily prevent long-term implant success [9].

The patient in this study experienced stable implant survival and minimal complications over eight years of follow-up. A history of periodontitis is associated with increased risk for peri-implantitis and bone loss, but with proper periodontal treatment and maintenance, it can result in favorable outcomes [10]. Patients with a history of periodontitis had lower implant survival rates than patients without a history of periodontitis and are more prone to biological complications such as peri-implant mucositis and peri-implantitis [11].

This could be possibly due to factors such as microbial colonization and the inflammatory response in these patients [12].

Clinical outcomes of dental implant treatment in patients with generalized aggressive periodontitis for a follow-up period of more than five years were assessed, which showed a remarkable survival rate of 95.9% to almost 100% [13].

Our findings align with previous research indicating that while periodontitis may increase the risk of implant failure, a structured maintenance program can mitigate these risks. Regular follow-up visits, professional cleaning, and reinforcement of oral hygiene protocols are essential for ensuring long-term success in periodontally compromised patients [14].

Finally, in the present situation, though the patient has no keratinized gingiva, the patient was able to maintain oral hygiene. Thus, if a careful prophylaxis program is maintained, the position of the soft tissue remains static and stable [15].

Further research with a larger sample size and longer follow-up periods is needed to definitively conclude the long-term impact of periodontitis on implant survival.

Conclusions

This clinical report demonstrates that dental implants can function successfully for more than eight years in patients with chronic periodontitis provided that proper periodontal treatment and maintenance are followed. Partially edentulous patients exhibit stable implant survival, suggesting that implants can be a viable option for individuals with chronic periodontitis when managed correctly. Regular periodontal maintenance and strict oral hygiene practices are essential to the long-term success of these implants.

Additional Information

Disclosures

Human subjects: Consent for treatment and open access publication was obtained or waived by all participants in this study. University Ethical Committee issued approval NA. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

References

1. Bartold PM, Van Dyke TE: Periodontitis: a host-mediated disruption of microbial homeostasis. unlearning learned concepts. *Periodontol 2000*. 2013, 62:205-17. [10.1111/j.1600-0757.2012.00450.x](https://doi.org/10.1111/j.1600-0757.2012.00450.x)
2. Graves DT, Liu R, Oates TW: Diabetes-enhanced inflammation and apoptosis: impact on periodontal pathosis. *Periodontol 2000*. 2007, 45:128-37. [10.1111/j.1600-0757.2007.00219.x](https://doi.org/10.1111/j.1600-0757.2007.00219.x)
3. Adler L, Buhlin K, Jansson L: Survival and complications: a 9- to 15-year retrospective follow-up of dental implant therapy. *J Oral Rehabil*. 2020, 47:67-77. [10.1111/joor.12866](https://doi.org/10.1111/joor.12866)
4. Klokkevold PR, Han TJ: How do smoking, diabetes, and periodontitis affect outcomes of implant treatment? . *Int J Oral Maxillofac Implants*. 2007, 22 Suppl:173-202.
5. Renvert S, Persson GR: Periodontitis as a potential risk factor for peri-implantitis . *J Clin Periodontol*. 2009, 36 Suppl 10:9-14. [10.1111/j.1600-051X.2009.01416.x](https://doi.org/10.1111/j.1600-051X.2009.01416.x)
6. Dubey RK, Gupta DK, Singh AK: Dental implant survival in diabetic patients; review and recommendations . *Natl J Maxillofac Surg*. 2013, 4:142-50. [10.4103/0975-5950.127642](https://doi.org/10.4103/0975-5950.127642)
7. Wagner J, Spille JH, Wiltfang J, Naujokat H: Systematic review on diabetes mellitus and dental implants: an update. *Int J Implant Dent*. 2022, 8:1. [10.1186/s40729-021-00399-8](https://doi.org/10.1186/s40729-021-00399-8)
8. Nibali L, Gkraniats N, Mainas G, Di Pino A: Periodontitis and implant complications in diabetes . *Periodontol 2000*. 2022, 90:88-105. [10.1111/prd.12451](https://doi.org/10.1111/prd.12451)
9. Durrani F, Shukla A, Painuly H: Implant therapy in patients with chronic periodontitis: a short follow-up with a successful outcome. *J Adv Periodontol Implant Dent*. 2019, 11:39-45. [10.15171/japid.2019.007](https://doi.org/10.15171/japid.2019.007)
10. Ramanaukaite A, Baseviciene N, Wang HL, Tözüm TF: Effect of history of periodontitis on implant success: meta-analysis and systematic review. *Implant Dent*. 2014, 23:687-96. [10.1097](https://doi.org/10.1097)
11. Zhang Q, Guo S, Li Y, Li Z, Wang D, Zhang K: Analysis of risk indicators for implant failure in patients with chronic periodontitis. *BMC Oral Health*. 2024, 24:1051. [10.1186/s12903-024-04806-5](https://doi.org/10.1186/s12903-024-04806-5)
12. Serroni M, Borgnakke WS, Romano L, Balice G, Paolantonio M, Saleh MH, Ravidà A: History of periodontitis as a risk factor for implant failure and incidence of peri-implantitis: a systematic review, meta-analysis, and trial sequential analysis of prospective cohort studies. *Clin Implant Dent Relat Res*. 2024, 26:482-508. [10.1111/cid.13330](https://doi.org/10.1111/cid.13330)
13. Kim KK, Sung HM: Outcomes of dental implant treatment in patients with generalized aggressive periodontitis: a systematic review. *J Adv Prosthodont*. 2012, 4:210-7. [10.4047/jap.2012.4.4.210](https://doi.org/10.4047/jap.2012.4.4.210)
14. King E, Patel R, Patel A, Addy L: Should implants be considered for patients with periodontal disease? . *Br*

- Dent J. 2016, 221:705-11. [10.1038/sj.bdj.2016.905](https://doi.org/10.1038/sj.bdj.2016.905)
15. Lindhe J, Nyman S: Alterations of the position of the marginal soft tissue following periodontal surgery . J Clin Periodontol. 1980, 7:525-30. [10.1111/j.1600-051x.1980.tb02159.x](https://doi.org/10.1111/j.1600-051x.1980.tb02159.x)