

# Management of a Patient Who Developed Uncontrolled Diabetes After Implant Placement: A Case Report

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## Abstract



**Background:** Diabetes is a serious metabolic disorder with complications including cardiovascular disease, kidney disease, eye disease, nerve disorders and delayed wound healing. Severe periodontal disease is another recognized complication of diabetes. Diabetes and poor glycemic control lead to an exaggerated oral tissue response.

**Method:** A case is presented describing a patient who was treated with dental implants to replace her lower incisors. Returning in 20 months, with an exaggerated tissue response, she was diagnosed with uncontrolled diabetes with concurrent severe periodontitis and peri-implantitis.

**Results:** The existing implant screw-retained fixed prosthesis was easily removed providing access for treatment of the implant fixtures which had developed peri-implantitis. The emergence profile of the prosthesis was modified before re-attaching it to the treated implant fixtures. An improved tissue response was obtained.

**Conclusion:** Diabetes and periodontal disease have a bidirectional relationship. Just as diabetes can worsen periodontitis, studies have shown that periodontitis has an adverse affect on the glycemic control of a diabetic. Diagnosing diabetes is the responsibility of the physician, but a dentist may be the first to notice the signs and symptoms of a poorly controlled or undiagnosed diabetic.

**KEY WORDS:** Dental implants, diabetes, management, prosthetics

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## INTRODUCTION

Diabetes is a metabolic disorder of insulin deficiency and/or dysfunction. This leads to a hyperglycemic state and causes a variety of metabolic abnormalities involving carbohydrates, fats and proteins. An estimated 17.9 million people (6%) in the United States have been diagnosed with diabetes and another 2% are undiagnosed diabetics.<sup>1</sup> It is the most common cause of blindness (retinopathy) and lower extremity amputation (neuropathy). Poor wound healing, end stage renal disease (nephropathy), myocardial infarction and stroke are other complications.<sup>2-4</sup>

Uncontrolled diabetes compounded with poor oral hygiene can lead to an increased risk of dental caries, xerostomia, taste disorders, candidiasis, gingivitis and periodontal disease.<sup>5,6</sup> About one-third of people with diabetes have severe periodontal disease.<sup>7</sup> Diabetes is not an absolute contraindication to implant treatment but most practitioners feel that a patient's glycemic levels must be well controlled before undergoing implant treatment.

This case report first describes the construction of a well-designed screw retained fixed implant prosthesis. Approximately two years later, the patient returned and presented with severe periodontal disease and implantitis. Upon referral to a physician, she was diagnosed with uncontrolled diabetes. Gradually with Phase I periodontal care and medication for her diabetes, we were able to control her periodontal and perimplant complications. The screw retained prosthesis allowed for easy removal, so its design could be modified to allow better patient access for cleansability.

## CASE REPORT

The patient is a 4'7" 175 pound non-smoking 50 year old female. Twenty months previously, an implant-retained FP-3 restoration to replace her lower incisors had been inserted. This is a fixed prosthesis to replace teeth crowns and has pink restorative material to replace bone and soft tissue.<sup>8</sup> Tissue colored porcelain provides a non-surgical alternative to replace tissue and enhance esthetics.<sup>9,10</sup> The construction of the screw-retained fixed prosthesis had progressed smoothly and the patient was very happy. The patient was instructed in oral hygiene including the use of floss threaders and a 3 month recare appointment was set.

## PATIENT DEVELOPS UNCONTROLLED DIABETES

The first sign of trouble was after patient missed her first scheduled recall appointment. After multiple calls and communication with other family members, we were finally able to schedule the patient 20 months after the prosthesis was placed. At this appointment, suppuration around several teeth, pyogenic granuloma, and epulis fissuratum lesions were noted (Figures 1, 2).<sup>11</sup> While oral hygiene was poor, the tissue response to local irritants was excessive, suggesting a possible disease-altering systemic complication.

Reviewing medical history with patient, it was apparent that she had not visited a physician in the last 3 years. Clinical and radiographic assessment concluded a relapse and worsening of periodontal disease and concurrent peri-implantitis (Figure 3). The patient was encouraged to visit her physician immediately. It took several months of building rapport before the patient could be convinced to visit her physician.



**Figure 1:** Patient returned after 20 months displaying severe periodontal disease, pyogenic granuloma and epulis fissuratum.

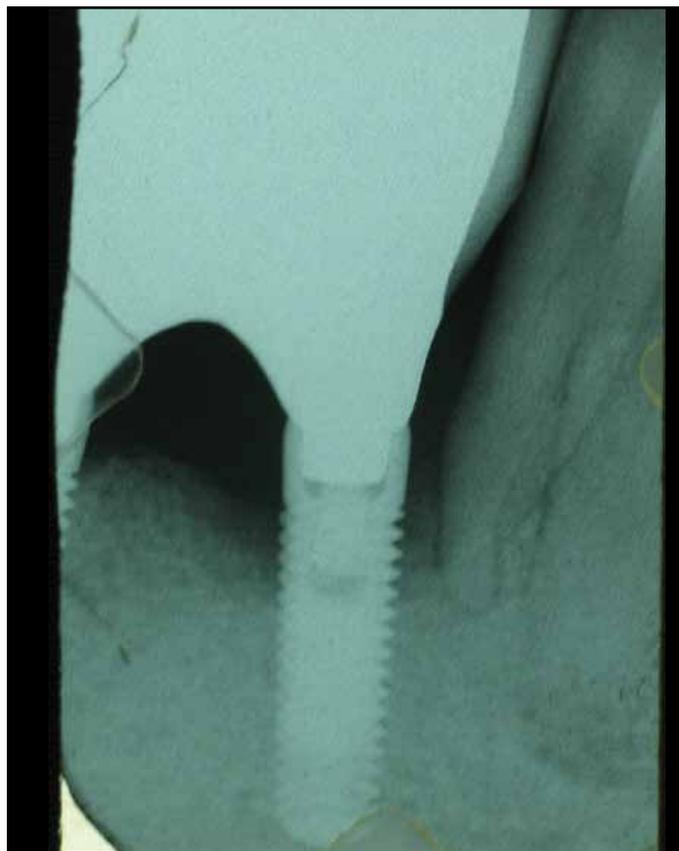


**Figure 2:** Inflamed tissue and an epulis fissuratum alongside the FP-3 pink porcelain.

It was subsequently determined by her physician that she had developed uncontrolled diabetes.

Over the next year, her oral health improved slowly, aided by her physician concurrently controlling her diabetes. Dental treatment consisted of root planing, scaling, curettage, oral hygiene instruction and motivation. The advantage of the screw retained prosthesis became quickly apparent. Access to the implant fixtures and adjacent teeth were easily obtained by unscrewing the prosthetic fixation screws and removing the prosthesis (Figure 4).

Upon removal of the prosthesis, the seriousness of the disease was obvious (Figure 5). To prevent collapse of the inflamed edematous tissue, healing collars were immediately placed (Figures 6, 7). Next, the prosthesis was placed in an ultrasonic cleaning solution followed by gentle mechanical debridement of the implant fixtures and teeth. Intrasulcular irrigation was performed with chlorhexidine, the tissue with the epulis



**Figure 3:** Radiograph displaying peri-implantitis.



**Figure 4:** Lingual view of screw-retained prosthesis. Chimneys provide for easy removal of prosthesis.

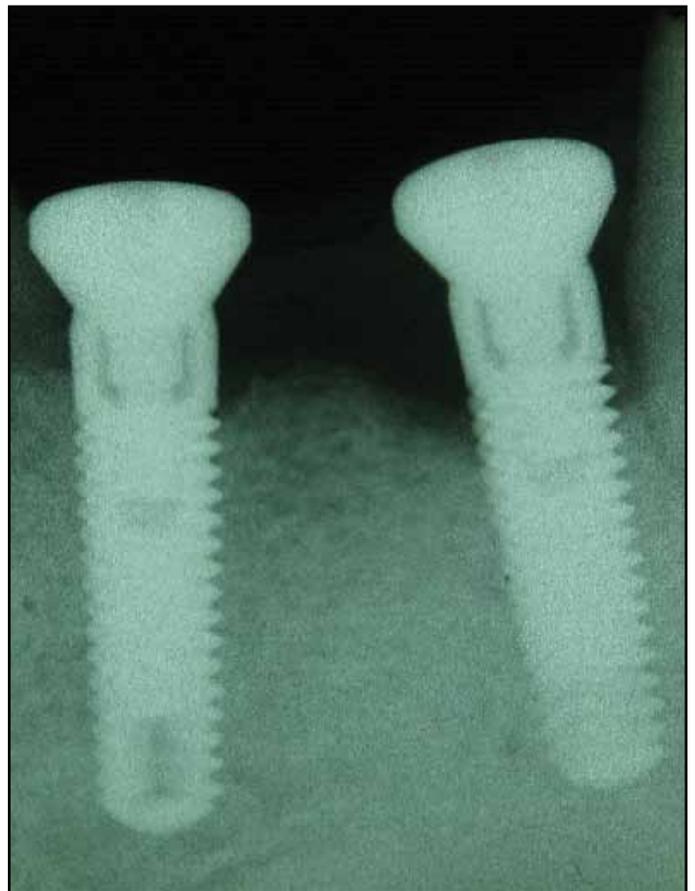


**Figure 5:** View of infected tissue and implant fixtures.



**Figure 6:** Healing collars are placed to prevent collapse of tissue while the tissues are treated and prosthesis is modified.

appearance was excised and the pink porcelain thinned in this area, eliminating any ridge lap. At a subsequent appointment, Atridox (Tolmar Inc., Fort Collins, CO, USA) (doxycycline hyclate 10%) was used as a localized chemotherapeutic agent around the implant fixtures after debridement.



**Figure 7:** Radiograph with healing collars in place.



**Figure 8:** View of prosthesis before modification.



**Figure 9:** View of prosthesis after modification.



**Figure 10:** Oral view of slenderized prosthesis to facilitate oral hygiene. A metal collar is visible in this retracted view.



**Figure 11:** View with prosthesis off and healing taking place.

After 6 months of monitoring, it was decided to remove the prosthesis for the 3<sup>rd</sup> time and continue to modify its emergence profile<sup>12-14</sup> to allow for better patient oral hygiene access. This was accomplished by attaching the prosthesis to an abutment holder with the appropriate implant analog. At the lab bench, a more

bulbous design (Figure 8) was converted to a more slender design (Figure 9). This modification sacrificed some esthetics but health improved (Figures 10, 11). This metal collar will not be visible in normal function since the lip functions as a curtain. Eighteen months after the patient was first diagnosed with uncon-



**Figure 12:** View of patient 18 months after first diagnosed with uncontrollable diabetes.

trolled diabetes, in spite of less than ideal home care, a healthier state is achieved (Figure 12).

## DISCUSSION

It has been estimated that many patients with diabetes may have the disease at least 10 years before it is diagnosed clinically.<sup>7</sup> The oral cavity may exhibit the first signs and symptoms of an undiagnosed or poorly controlled diabetic.<sup>5</sup> This certainly was the case with this patient who returned 26 months after initial treatment.

Periodontal disease is a recognized and well documented complication of diabetes. This has been determined by epidemiologic and animal model studies.<sup>15-17</sup> Diabetes is believed to promote periodontitis due to an exaggerated inflammatory response to a sulcular microflora that has been found to be equivalent in both periodontal patients with and without diabetes.<sup>18</sup> This altered immunity as a result of hyperglycemia may be the patho-

physiologic basis for the increase prevalence and severity of periodontal disease.<sup>19</sup>

Diagnosing diabetes is the responsibility of the physician, but the dentist plays an important role. The dentist may be the first to notice the signs and symptoms of a poorly controlled diabetic. Often patients do not have a physician or are non-compliant as was the case with this patient. Much time was spent on education and encouraging her to seek proper medical care. As health care providers, we must often function as psychologists and listen carefully to our patients.

Just as diabetes has been shown to worsen periodontitis, it has been demonstrated that periodontitis and oral infection may have an adverse effect on the glycemic control in diabetic patients. When a diabetic patient receives treatment for periodontal disease, resolution of inflammation and improved glycemic control may be obtained.<sup>20,21</sup> Mealy suggested that many physicians are unaware of the inter-relationship between periodontal disease and diabetes.<sup>5</sup> They are aware that other infections can wreak havoc with glycemic control, but may not understand that periodontal disease, which dentists treat every day, may have a major impact on glycemic control.

Physicians and dentists must better communicate in order to diagnose and optimize their diabetic patient's systemic and oral health. It appears obvious that diabetes may create a less than ideal environment for implant placement.<sup>22,23</sup> However, Klokkevold<sup>24</sup> performed a systematic review of the dental literature and did not find a lower percentage of implant success between patients with and without diabetes. Such optimistic results may

have been obtained perhaps because trial subjects typically are well-controlled diabetics with good glycemic levels. Physicians measure diabetic control with HbA1c (glycated hemoglobin) and the American Diabetes Association recommends HbA1c level < 7%.<sup>25</sup>

## CONCLUSION

This case report clearly documents how uncontrolled diabetes can worsen a patient's periodontal and perimplant situation. Periodontal disease and diabetes seem to have a bi-directional relationship. Periodontitis is a complication of diabetes and glycemic control is difficult to obtain if an infection such as periodontal disease is present.

The easily removable screw retained prosthesis provided excellent access for periodontal and perimplant treatment. It also made possible the modification of the tissue side of the prosthesis. By slenderizing the prosthesis's emergence profile, the patient's oral hygiene was facilitated. ●

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### Disclosure

The author reports no conflicts of interest with anything mentioned in this article.

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