

Case Report

Surgical management of peri-implantitis in adjunction with BlueM oxygen therapy: a case report with 5-years follow-up

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ABSTRACT

Peri-implantitis is an inflammatory disease associated with plaque accumulation in peri-implant tissues, and can cause implant failure. Several surgical and nonsurgical protocols have been proposed to treat patients with peri-implantitis. In this case report, we describe the surgical management of peri-implantitis with the use of BlueM oxygen therapy after mechanical debridement of dental implant surface. Although, several conventional anti-infective modalities have been employed to treat peri-implantitis, the application of topical oxygen therapy can be very effective. The case demonstrated good results with the maintenance of peri-implant bone level and absence of clinical signs of inflammation.

Keywords: Dental implants, Peri-implantitis, Bone level, Oxygen therapy

INTRODUCTION

Today, dental implants are the most clinical protocols for treating patients with partial or complete edentulous arches, because it is providing much valuable and effective masticatory function and esthetics.^{1,2} However, peri-implant diseases can be developed in association with the accumulation of pathogenic biofilms in the peri-implant tissues. Peri-implantitis is characterized by the progressive bone loss around dental implants, in presence of clinical signs such as bleeding on probing, suppuration, and deep pockets.^{3,4}

According to different clinical trials and reviews, treatment should be including the resolution of acute inflammation with the help of mechanical/chemical disinfection of implant surface and the surrounding tissues. Afterwards, reconstructive surgery (using bone grafts might be indicated for some cases.^{5,6}

Although chlorhexidine is widely used in the treatment of peri-implantitis, there is an increase awareness of its side

effects on bone cells as well as on the surface topography of dental implants.⁷ Chlorhexidine can cause cell cytotoxicity, in turn, can hinder the potential of bone healing around implants. Therefore, it can be recommended to discourage chlorhexidine for treating peri-implantitis cases.⁷

Recently, an oxygenating product, known as BlueM oxygen gel, has been developed by Dr. Peter Blijdorp and co-workers.^{8,9} The BlueM formula is formed by chemical complexation of sodium perborate with specific carriers such as glycerol and cellulose, which provides controlled and slow release of oxygen.¹⁰ Indeed, the active oxygen formula by BlueM is based on different antimicrobial mechanisms of action than other disinfectant agents. Clinically, the BlueM oxygen gel showed potential antimicrobial efficacy against the colonization and growth of pathogenic biofilms that associated with peri-implantitis.^{8,11} In a recent study by Shibli et al BlueM oxygen gel showed a significant potential for selective inhibition of oral bacteria and can help to reduce the pathogenic microbial composition in biofilms around

implants.¹² This may be a valuable strategy to manage peri-implantitis cases. However, it is imperative that researches have to produce more evidence supporting the potential therapeutic effects of BlueM oxygen agents in preventing and treating peri-implant infections.

The aim of this case report is to present the management of peri-implantitis case using and to describe surgical debridement in conjunction with BlueM oxygen protocol. We ensure that the work has been reported in line with the SCARE 2020 criteria.¹³

CASE REPORT

In 2017, a female patient, aged 67 years old, presented at our dental clinic (Tandheelkunding centrum, Moergestel, The Netherlands) to check the status of a dental implant placed in area of #46, more than 10 years before. She was reporting mild pain and bleeding while brushing in the site of this implant. The patient was systemically healthy, nonsmokers, and asked for a treatment that may allow her to maintain the implants in site. We obtained written informed consent from the patient for diagnostics, treatment, and use of photographs.

Clinical examination revealed the presence of local inflammation (with evident redness and swelling), without any evidence of significant tissue retraction. Probing depth was more than 4 mm, with extensive bleeding on probing and suppuration. On radiograph imaging, there was >50% bone loss around the implant (Figure 1). The implant showed no mobility.

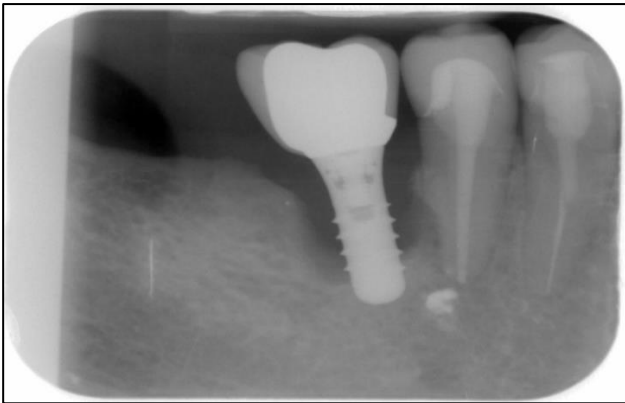


Figure 1: Pre-operative radiograph confirmed Peri-implantitis with >50% bone loss.

We decided to perform surgical procedure in order to treat the pathology. First, we opened a flap around the infected implant and completely removed the granulation tissue from the bone and implant. Then, ultrasonic/sonic cleaning of the implant surface was done with a titanium tip. Thereafter, we proposed the use of topical applications of BlueM oral gel (blue@m, bluecare europe, The Netherlands). BlueM gel was applied directly in the defect and on implant surface for 2-3 minutes, then rinsed thoroughly with physiological saline. This

procedure was repeated 3 times. Thereafter, the flap was closed and another amount of BlueM gel was applied over the sutures. The patient was instructed to apply BlueM oral gel at the surgical site, 2-3 times daily, with a special syringe. The patient was also given BlueM mouthwash with the advice to rinse 3-4 times daily.

The postoperative period was completely uneventful, and the patient was followed-up after 1 month, 3 months, 6 months, 1-year, and 5-years to evaluate the evidence of further bone resorption and the absence of signs and symptoms of inflammation (bleeding on probing, suppuration, swelling, and redness).

The probing index after treatment was clearly decreased around implants. After 6 months, the clinical situation of the soft tissue was stable and without signs of inflammation. At 1-year follow-up, we appreciated no further bone resorption (Figure 2).

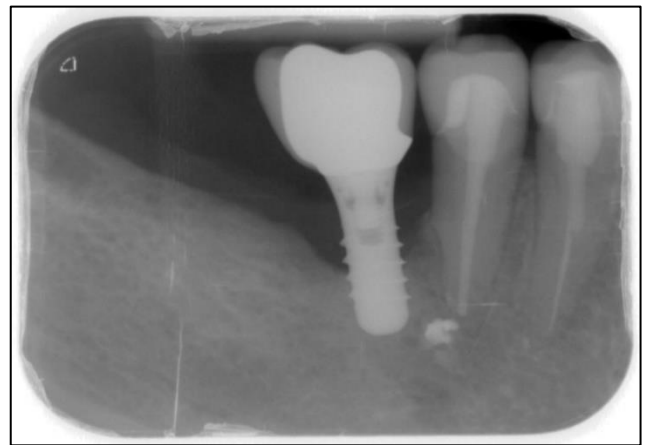


Figure 2: One-year follow-up showed improvement and no further bone resorption.

Five years later from the surgery, radiographic examination showed a significant bone gain around implant (Figure 3).

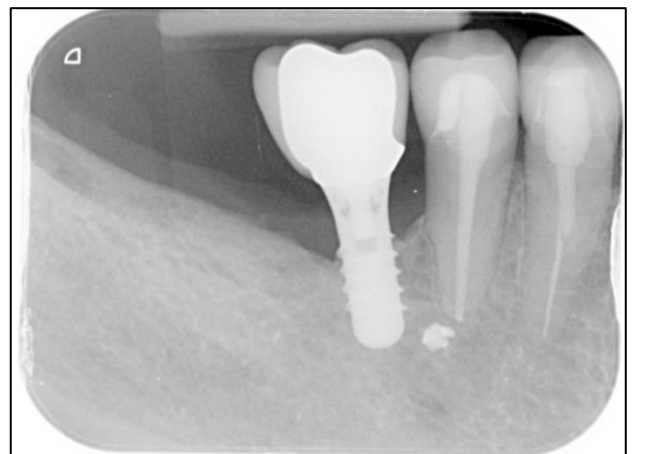


Figure 3: At 5-year follow-up, peri-apical radiograph showed a significant bone gain around implant.

DISCUSSION

In the recent years, peri-implantitis presents a significant clinical problem for dental patients. Therefore, there is a high demand for predictable treatment protocols. Based on the presented case report with 5-years follow-up, the surgical approach for implant surface instrumentation using an ultrasonic scaler with titanium tip, combined with the application of BlueM gel for 2-3 minutes repeated 3-times, has shown positive results.

Indeed, poor oral hygiene can lead to biofilms accumulation around dental implants, which is the primary factor for mucositis and peri-implantitis.^{1,2} Peri-implantitis is a multifactorial implant-related infection that shares similar clinical descriptions and etiological factors of periodontitis.^{3,4} Therefore, it should be highlighted the important of periodontal indexes to adequately control and treat early signs of tissue inflammation around dental implants. Mainly, mechanical/chemical control of bacterial biofilm is highly recommended in cases of peri-implant mucositis. However, peri-implantitis cases may require surgical treatments to prevent the loss of dental implants and the spreading of infection.^{5,14}

To treat peri-implantitis, the primary objective of the initial therapy is controlling the infection via mechanical/chemical decontamination of the infected implant surface and surrounding tissues. Then, the aim of surgical phase is to conducive peri-implant bone/tissue healing.^{6,15} Several conventional anti-infective modalities have been employed to treat peri-implantitis.^{7,16} For instance, ultrasonic scaling with titanium tip is commonly used to clean the infected implant surface. As shown in our case report, the treatment protocol was preceded by mechanical (ultrasonic) debridement of the implant surface. Titanium tip is gentler to the implant surface and can cause less risk of damage to the surface.¹⁶ However, there is no guarantee that the mechanical ultrasonic debridement can entirely remove microbial biofilm and fully decontaminate the implant surface and surrounding tissues.¹⁷ Therefore, additional chemical anti-biofilm therapies have been suggested in literature.^{15,16} According to previous case reports, many authors have demonstrated the clinical advantages of using antiseptic agents after mechanical cleaning of dental implant area for 12 months.¹⁷ Additionally, the surgical access for implant surface cleaning remains the main effective option in treatment of peri-implantitis, thus allowing to prevent further bone loss. As in our work, a minimal surgical flap including the application of BlueM oxygenated gel was facilitated. We observed a significant improvement in peri-implant bone up to 5-years follow-up.

The benefit of active oxygen (BlueM) was mentioned in several recent works.^{8,9} The topical application of active oxygen can be involved in reducing inflammation, suppressing disease progression, and promote tissue healing (i.e., protein synthesis, cellular proliferation,

angiogenesis, and the restoration of vessels).¹⁰ Accordingly, the protocol of topical oxygen therapy by BlueM can be recommended for the management of peri-implantitis.

CONCLUSION

Obviously, the present study showed a clinical advantage of the use of surgical treatment of peri-implant disease in combination with the application of BlueM oxygen gel. Clinical trials involving many participants are needed to provide support to the obtained results. Indeed, BlueM oxygen gel looks promising, owing to its ease of use and positive influence on tissue healing around dental implants.

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