Original Research Paper

Volume - 13 | Issue - 06 | June - 2023 | PRINT ISSN No. 2249 - 555X | DOI : 10.36106/ijar

Dental Science

SURGICAL MANAGEMENT OF RETROGRADE PERIIMPLANTITIS WITH THE ADJUNCTIVE USE OF PHOTOBIOMODULATION: A CASE REPORT

Dr Anisha Jose	Post Graduate Student, Department of Periodontology, Maratha N.G.H Institute of Dental Sciences and Research Centre, Belagavi, Karnataka
Dr Sandeep Katti*	Professor, Department of Periodontology, Maratha Mandal's N.G.H Institute of Dental Sciences and Research Centre, Belagavi, Karnataka*Corresponding Author
Dr Sanjeevini Hattarki	Reader, Department of Periodontology, Maratha Mandal's N.G.H Institute of Dental Sciences and Research Centre, Belagavi, Karnataka

ABSTRACT Dental implants have become one of the most popular treatment options for the replacement of a missing tooth due to their high aesthetics and close resemblance to a natural tooth. Although dental implants have a high success rate, they can be complicated by infections. Retrograde peri-implantitis is a clinically symptomatic periapical lesion that is diagnosed as a radiolucency that develops shortly after implant insertion, in which the coronal portion of the implant achieves a normal bone-implant interface. Many treatment options have been proposed over the year as a treatment modality including conservative approaches such as systemic antibiotics to surgical approach such as implant resection. This is one such case report where we try to surgically treat a case of peri-implantitis with the adjunctive use of a Diode Laser.

KEYWORDS : Retrograde peri-implantitis, Peri-implantitis, Diode Laser, Platelet rich-fibrin.

Introduction:

Dental implants are one of the fastest-growing treatment options in the field of dentistry. A close-to-natural option for the replacement of a lost tooth has attracted patients toward dental implants. Although dental implants have a high success rate, they can be complicated by infections[1].

Peri-implantitis is defined as a pathological condition affecting tissues around dental implants, with inflammation seen in the peri-implant soft tissue and loss of supporting bone. [2]

McAllister et al in 1992, were the first to describe the condition called retrograde peri-implantitis.3 It is defined as a clinically symptomatic periapical lesion that is diagnosed as a radiolucency that develops shortly after implant insertion, in which the coronal portion of the implant achieves a normal bone-implant interface.[4]

Sussman and Moss, in the year 1993 defined RPI as localized osteomyelitis secondary, due to endodontic pathology. In 1995, it was described as an active implant periapical lesion by Reiser and Nevins.5 A list of possible causes has been proposed over the years which include overheating during the osteotomy, peri apically involved adjacent teeth, bacterial remanence from the infected tooth that previously occupied the site, bone microfractures due to overloading or loading too soon, and insufficient implant length of an osteotomy.[5]

These can lead to the condition where there is coronal osseointegration but with apical radiolucency. In such situations, various treatment modalities can be put in place which includes surgical intervention and implant surface debridement using implacare tips. Use of laser debridement of the implant surface can also be applied. We present this case report present such a case along with the treatment and 3 months follow-up.

Background:

A 71-year-old, male patient, reported to the department of periodontology with the chief complaint of two missing teeth (45, 46) in the lower right posterior region. The patient gave a history of decay of the teeth to be the cause of the extraction. The patient has undergone multiple endodontic treatments prior. The patient gave no significant medical history.

The patient was advised of two single implants for the replacement of the 2 teeth. The patient was advised IOPAR and CBCT of the region. 2 single implants of size 3.5*11mm and 4*10 mm were planned.

The patient was given 1 gm of Amoxicillin and 500 mg of Diclomol 1 day before the surgery.

Implant# fixtures of dimensions 3.5*11mm and 4*10 mm were placed into the mandible. Cover screws were placed, and three simple interrupted sutures were placed.

The patient was advised to continue with the medication for 5 days and CHX mouthwash for 14 days.

Patient was recalled after 7 days for follow up and suture removal. The site had healed uneventfully.

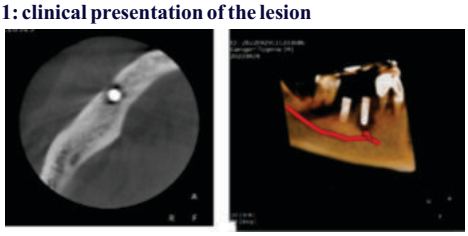
Three months later, the patient was called for follow up. On intra oral examination, a draining sinus was seen on the alveolar ridge. Radiographic gutta percha tracing was done of the draining sinus. It was traced to the buccal aspect of the implant.

Patient was prescribed antibiotics metronidazole 400 mg BID and Amoxicillin 500mg TID for 5 days.

Patient was also advised a CBCT of the region. The CBCT showed an Ill-defined, homogenous Radiolucency seen at the peri-implant area in relation to 45 tooth area. Buccal cortical plate perforation seen. Lesion is 3.5 mm to the upper border of mental foramen area suggestive of apical peri-implantitis. Bone loss seen in relation to implant 46 at the cervical third area of lingual aspect of implant. Bone loss can also be seen in relation to the buccal aspect of the implant involving cervical and middle third of the implant.

Seeing the clinical and radiographic presentation of the lesion surgical intervention was planned.

FIG 1: clinical presentation of the lesion



Osstem TS II implant

FIG 2: CBCT presentation of the lesion

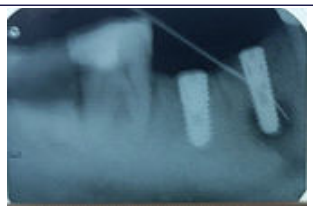


FIG 3 Radiographic presentation of the lesion

Surgical procedure:
A horizontal incision was made on the crest of the alveolar ridge extending from the distal aspect of 44 to the distal aspect beyond the draining sinus. A vertical releasing incision was placed from the mesial aspect beyond the mucogingival junction for a tension-free flap, better visibility, and accessibility to the site. Full thickness flap was then reflected. reflection it was observed that the buccal cortical plate was completely lost around the apex of the implant. (Figure. 4)

The granulation tissue around the implant was then removed using implacare tips*. Curettage of the bone surface was done using curettes*. (Figure 5)

FIG 4: Incision and exposure of implant surface

Once the PRF was prepared, it was cut into 2 sections, one was used to prepare a thin membrane and the second was cut into smaller sections and incorporated into the bone graft particles to prepare a sticky bone. (Figure 7)

FIG 8: placement of PRF membrane and sutures

This was then packed into the defect and the PRF membrane was then placed over the defect. The flaps were then approximated and then sutured using 5-0 Ethicon sutures (Figure 8)

Patient was then recalled 10 days post surgically for suture removal. Patient was then recalled after 1- and 3- months for follow up. Patient was evaluated clinically and radiographs were taken. (Figure 9)

FIG 9: 3 months post surgically presentation clinically and radiographically.

* Hu-friedy

FIG 10: 6 months post surgically presentation clinically and radiographically.

DISCUSSION:
The advancement in the research of implants during the past decades has made the usage of endosseous implants for replacement of missing teeth a part of the standard care making it one of the first line of treatment promising long-lasting rehabilitation.[6]

Although dental implant has majority of success rate in long term but failures do occur, which have been reported over the past years. Implant failures have been defined as a host tissue inadequacy in stabilizing or maintaining osseointegration.[7]

The complications associated with implant placement can be classified on a chronological basis: a) early complications, caused by surgical trauma, inadequate bone volume, a lack of primary stability, intrabony infection or bacterial contamination of the receptor zone; and

b) late complications which can be attributed to microbiological (peri-implantitis) and biomechanical changes (occlusal overload) Our case falls into the latter as the periapical radiolucency can be credited to microbial contamination.[8]

Retrograde peri-Implantitis (RPI) is defined as a clinically symptomatic periapical lesion which is diagnosed as a radiolucency that develops shortly after an implant insertion. With the implant achieving a normal bone– implant interface in the coronal portion of the implant.

Microbial contamination is considered the predominant causative factor for RPI, which can happen during insertion, premature loading leading to bone micro-fractures, or the presence of a pre-existing inflammation. Such lesions start at the implant apex but exhibit the capacity of spreading coronally, proximally, and facially.[9]

In the present case report the etiology of the lesion cannot be definitively asserted to one specific reason as none of the commonly seen etiologies could be identified such as an endodontically involved adjacent tooth or premature loading of the implant as the prosthetic rehabilitation of the implant had not taken place at the time of detection of the lesion.

The various treatment modalities suggested in the past for the management of retrograde periimplantitis can be categorised as:

(1) Nonsurgical treatment via systemic antibiotics.
(2) Resective treatments including debridement and detoxification of the implant surface using a chemical agent and intraoral apical resection of the implant apex; and
(3) Regenerative treatments including debridement, detoxification of the implant surface, intraoral apical resection of implant apex, and guided bone regeneration.[10]

In our case we followed the regenerative approach with the main aim at the removal of inflamed granulation tissue and cleaning the implant surfaces from bacteria colonization.[11]

Through debridement of the implant surface was of prime importance in our case. We used plastic disposable tips* for the debridement of the implant surface to avoid any damage to the implant surface but in case reports by Quaranta et al and Lin et al. stainless steel currettes have also been used for implant surface debridement as they have shown no concerns about scratching or roughening of the titanium at the apical portion of the implant.[11,12]

In a study by Kutlu et al, ultrasonic tips were used for implant surface debridement.[10]

Various studies have also advocated implant apicectomy as a treatment option for management RPI as studies in the past have suggested that curettage of the infection at the implant apical area was insufficient treatment for periapical lesions.[13,14]

It is indicated in cases with the implant extending into the maxillary sinus or nasal cavity where retention of the apical part of the implant could obstruct complete mechanical debridement of the granulation tissue.[15]

As regeneration of the lost bone around the implant is the goal of the surgical procedure GBR plays an important role in achieving this.

In this case we used a sticky bone (PRF + DMBM allograft) to pack

into the defect as sticky bone has its own body and can be easily molded into the required shape, thus offers easy handling and also prevents dispersion. Along with this we prepared PRF as a membrane to increases new bone formation due to the availability of growth factor enriched surrounding, thus leaving a positive effect on tissue healing.[15]

Bretz et al. has previously mentioned the successful management of implant periapical lesion with periapical surgery, curettage, chlorhexidine irrigation, placing demineralized bone, and covering the field with a reabsorbable collagen membrane.[13]

We also used laser photo-biomodulation (PBM) on the curetted bone surface as studies have shown that application of low levels of laser on the bone surface promotes bone healing, by the upregulation in the proteins synthesis and enzymes production leading to an increase in cell proliferation by stimulating neoangiogenesis and improving tissue oxygenation. Due to these stimulatory effects, PBM has been used to accelerate the process of bone consolidation.[16]

We did not find any similar studies where PBM was applied in the management of retrograde periimplantitis.

The absence of the use of any chemical agents such as chlorhexidine or tetracycline for the disinfection of the implant surface can be considered as a drawback. Use of Photodyanamic therapy was also an option that could have been applied.

The case has been followed up for 4 months and is under observation still with significant improvement of the intraoral lesion seen. Complete resolution of the sinus tract is seen with resolution of the radiolucency surrounding the implant is seen to a certain extent.

CONCLUSION:

The management of Peri implant lesions has always been a challenge, Retrograde peri-implantitis being one of them. With this case report we tried to propose the use of laser photo-biomodulation as an adjunct to the surgical regenerative approach for the management of a case of retrograde peri-implantitis. With the follow-up still underway we can see significant improvement in the clinical symptoms, but to draw definitive conclusions a longer follow up needs to be done.

REFERENCES:

1. Flanagan D. Apical (retrograde) peri-implantitis: a case report of an active lesion. Journal of Oral Implantology. 2002 Apr;28(2):92-6.
2. Schwarz F, Derks J, Monje A, Wang HL. Peri-implantitis. Journal of clinical periodontology. 2018 Jun;45:S246-66.
3. McAllister BS, Masters D, Meffert RM. Treatment of implants demonstrating periapical radiolucencies. Pract Periodontics Aesthet Dent 1992;4:37-41
4. Mohamed JB, Alam MN, Singh G, Chandrasekaran SC. The management of retrograde peri-implantitis: a case report. J Clin Diagn Res. 2012 Nov;6(9):1600-2. doi: 10.7860/JCDR/2012/4168.2575. PMID: 23285472; PMCID: PMC3527812.
5. Singh R, Pandey V, Kumar V, et al. Retrograde periimplantitis-a review of literature and an update. JAMDSR 2016;4(2):47.
6. Baqain ZH, Moqbel WY, Sawair FA. Early dental implant failure: risk factors. British Journal of Oral and Maxillofacial Surgery. 2012 Apr 1;50(3):239-43.
7. Luongo R, Faustini F, Vantaggiato A, Bianco G, Traini T, Scarano A, Pedullà E, Bugea C. Implant Periapical Lesion: Clinical and Histological Analysis of Two Case Reports Carried Out with Two Different Approaches. Bioengineering. 2022 Mar 29;9(4):145.
8. Ata-Ali J, Candel-Marti ME, Flichy-Fernández AJ, Peñarrocha-Oltra D, Balaguer-Martinez JF, Peñarrocha MA Peri-implantitis: Associated microbiota and treatment. Med Oral Patol Oral Cir Bucal. 2011 Nov 1;16 (7):e937-43.
9. Quirynen M, Vogels R, Alsaadi G, Naert I, Jacobs R, Steenberghe DV. Predisposing conditions for retrograde peri-implantitis, and treatment suggestions. Clinical oral implants research. 2005 Oct;16(5):599-608.
10. Kutlu HB, Genc T, Tozum TF. Treatment of refractory apical peri-implantitis: a case report. Journal of Oral Implantology. 2016 Feb;42(1):104-9.
11. Quaranta A, Andreana S, Pompa G, Procaccini M. Active implant peri-apical lesion: a case report treated via guided bone regeneration with a 5-year clinical and radiographic follow-up. Journal of Oral Implantology. 2014 Jun;40(3):313-9.)
12. Lin S, Mayer Y. Treatment of a large periradicular lesion of endodontic origin around a dental implant with enamel matrix protein derivative. J Periodontol. 2007;78:2385–2388)
13. Bretz WA, Matuck AN, de Oliveira G, Moretti AJ. Treatment of retrograde peri-implantitis: Clinical report. Implant Dent. 1997;6:287–290.
14. Ayangco L, Sheridan PJ. Development and treatment of retrograde peri-implantitis involving a site with a history of failed endodontic and apicoectomy procedures: A series of reports. Int J Oral Maxillofac Implants. 2001;16:412–417
15. Kökdere NN, Baykul T, Findik Y. The use of platelet-rich fibrin (PRF) and PRF-mixed particulated autogenous bone graft in the treatment of bone defects: An experimental and histomorphometrical study. Dent Res J (Isfahan) 2015;12:418–24)
16. Magri AM, Parisi JR, de Andrade AL, Rennó AC. Bone substitutes and photobiomodulation in bone regeneration: A systematic review in animal experimental studies. Journal of Biomedical Materials Research Part A. 2021 Sep;109(9):1765-75