



Case Report

Copyright © All rights are reserved by Bin Yang

Retrograde Peri-Implantitis Following Mandibular Implant Placement: A Multidisciplinary Diagnostic and Surgical Management Case Report

Bin Yang*, Mohamed Hindy, Polina Gubareva, Patrycja A Sobus, Jeffrey Drake and Xie Qian

University of Illinois Chicago College of Dentistry, Chicago, Illinois, USA

*Corresponding author: Bin Yang, University of Illinois Chicago College of Dentistry, Chicago, Illinois, USA.

To Cite This article: Bin Yang*, Mohamed Hindy, Polina Gubareva, Patrycja A Sobus, Jeffrey Drake and Xie Qian, Retrograde Peri-Implantitis Following Mandibular Implant Placement: A Multidisciplinary Diagnostic and Surgical Management Case Report. *Am J Biomed Sci & Res.* 2026 32(4) *AJBSR.MS.ID.004189*, DOI: [10.34297/AJBSR.2026.32.004189](https://doi.org/10.34297/AJBSR.2026.32.004189)

Received: 📅 October 02, 2026 **Published:** 📅 October 23, 2026

Abstract

Retrograde peri-implantitis is an uncommon inflammatory lesion involving the apical portion of a dental implant while the coronal portion may remain clinically integrated. Early diagnosis can be difficult because patients may have few symptoms and conventional two-dimensional radiographs may not fully define the lesion. This case report describes a 64-year-old man who underwent extraction and site preservation at mandibular site #29 followed by implant placement. Healing was initially uneventful. During the restorative phase, the patient reported a recurrent, asymptomatic gingival lesion adjacent to implant #29. The implant remained stable, with no bleeding on probing and probing depths of 3 mm or less. Periapical radiography revealed apical radiolucency. Cone-beam Computed Tomography (CBCT) demonstrated an apical defect extending toward the facial aspect of the implant and a separate radiolucent finding associated with adjacent tooth #28. Multidisciplinary evaluation by restorative dentistry, oral and maxillo-facial radiology, endodontics, and periodontics supported a diagnosis of retrograde peri-implantitis. Surgical exploration revealed buccal bone fenestration, granulation tissue, and exposed apical implant threads. Treatment included flap elevation, removal of granulation tissue, mechanical implant-surface debridement, irrigation, EDTA decontamination, bone grafting, and placement of a collagen membrane. This case highlights the complementary roles of clinical examination, periapical radiography, CBCT, and multidisciplinary assessment in diagnosing a clinically subtle apical peri-implant lesion

Keywords: Retrograde peri-implantitis, Periapical implant lesion, Dental implant, CBCT, Peri-implant disease, Guided bone regeneration

Introduction

Peri-implant inflammatory disease can involve the marginal or apical portion of a dental implant. Retrograde Peri-Implantitis (RPI), also described as a periapical implant lesion or apical peri-implantitis, is characterized by inflammatory bone loss around the apical portion of an implant while the coronal portion may remain clinically integrated. [1-5] This pattern differs from conventional peri-implantitis, in which inflammatory changes generally begin at the crestal bone. Peri-implantitis has been characterized as an inflammatory process around an implant, which includes both soft tissue inflammation and progressive loss of supporting marginal bone beyond biological bone remodeling [6, 7]. Although RPI reportedly has a lower prevalence than marginal peri-implantitis,

if left untreated it can lead to loss of dental implants [8]. Several factors have been proposed in the development of retrograde peri-implantitis. These include residual infection or granulation tissue at a previously extracted tooth site, endodontic pathology associated with an adjacent tooth, overheating or contamination during implant osteotomy preparation, and pre-existing pathology within the implant site [1,2,4]. The exact etiology may remain uncertain in an individual patient.

Diagnosis can also be challenging. Patients may have few symptoms, and conventional two-dimensional radiography can underestimate the extent or location of a lesion [1,3,5]. CBCT can provide additional three-dimensional information, although metallic artifacts around dental implants must be considered

during interpretation. Treatment and management of RPI can involve surgical approaches, including mechanical curettage of the bony defect, decontamination, and potential bone grafting [8]. There have been studies that report predictable and successful outcome of guided bony regeneration to replace lost apical bone around RPI lesions [2,3]. Proper management depends on accurate etiologic diagnosis and case specific local and systemic factors. This report describes a case of retrograde peri-implantitis involving a mandibular implant that was identified during the restorative phase. The case illustrates the diagnostic value of combining clinical examination, periapical radiography, CBCT, and multidisciplinary consultation and describes the subsequent surgical regenerative treatment.

Case Presentation

Patient History and Initial Treatment

A 64-year-old male presented to the University of Illinois Chicago College of Dentistry in January 2018 for a comprehensive oral examination. His medical history included arthritis, hypertension, and stomach ulcers. He reported no known allergies and denied smoking, alcohol consumption, and recreational drug use. His chief

concern was, "I would like to fix my teeth." Clinical and radiographic examination of the lower-right quadrant demonstrated missing teeth #29 and #32 and a remaining root tip at #28. The existing prosthesis extended from #28 to #31. The treatment plan included restoration of teeth #28 and #31, extraction and site preservation at #29, and implant-supported single-tooth restorations at sites #29 and #30. In April 2019, tooth #29 was extracted. The extraction site was degranulated and irrigated, followed by site preservation with mineralized cortical allograft material and a collagen membrane.

During the same appointment, a 4.8 × 11-mm Astra OsseoSpeed EV implant was placed at site #30 using a ridge-expansion protocol. A periapical radiograph obtained at that time demonstrated a radiolucency associated with tooth #28 but no evident radiolucency at the #29 extraction site. In September 2019, a 4.2 × 11-mm Astra Osseo Speed EV implant was placed at site #29, and implant #30 was uncovered. The radiograph obtained on the day of surgery showed no apparent radiolucency surrounding implant #29. Implant #29 was uncovered in December 2019, and a healing abutment was placed. The patient was subsequently monitored according to the implant follow-up protocol, with no clinical signs or symptoms of infection (Figure 1).



Figure 1: Baseline and surgical-phase periapical radiographs showing the mandibular right posterior region (a), extraction/site preservation at #29 (b), and subsequent implant placement at sites #29 and #30 (c).

Restorative Phase and Detection of the Lesion

Restorative treatment of implants #29 and #30 was performed between July and December 2020. An open-tray implant impression was obtained, followed by custom-abutment try-in. Screw-cementable lithium-disilicate crowns were planned, with extraoral laboratory cementation intended to minimize residual subgingival cement. Vertical bitewing radiographs were obtained during the restorative process to verify seating of the implant components. At the crown-delivery appointment in January 2021, the patient reported a recurrent gingival lesion adjacent to implant #29. He described it as a "bump" that periodically increased and decreased

in size without pain. Clinical examination demonstrated an approximately 2 × 2-mm pus-filled lesion near the gingival margin. Implant #29 was clinically stable. No implant mobility or bleeding on probing was detected, and probing depths did not exceed 3 mm. A periapical radiograph revealed an incidental radiolucent lesion involving the apical region of implant #29. Gutta-percha tracing of the gingival lesion remained near the gingival margin and did not trace directly to the implant apex. No comparable apical radiolucency was observed around implant #30. Because the two-dimensional image did not adequately define the lesion, CBCT examination was recommended (Figure 2).



Figure 2: Clinical appearance and periapical radiographic findings at the January 2021 restorative visit. The recurrent gingival lesion was clinically asymptomatic, while the periapical radiograph demonstrated an apical radiolucency associated with implant #29.

CBCT and Multidisciplinary Assessment

CBCT demonstrated a radiolucent defect involving the apical portion of implant #29. The lesion extended toward the facial aspect of the implant. A thin radiopaque boundary suggested that part of the facial cortical plate might remain intact. A separate radiolucent finding was also observed near the apex of tooth #28. The CBCT findings required cautious interpretation because high-contrast artifacts around the titanium implant could affect visualization of the implant-bone interface. The periapical radiograph was therefore interpreted together with CBCT and the clinical findings. The patient was evaluated by specialists in oral and maxillofacial radiology, endodontics, periodontics, and restorative

dentistry. Radiologic evaluation suggested that the distal marginal radiolucency could represent marginal peri-implant inflammation, whereas the apical lesion was consistent with either a retrograde infectious process or facial cortical perforation. Endodontic evaluation considered the radiolucency associated with tooth #28. However, a direct pathologic communication between tooth #28 and implant #29 was not established, and the finding associated with #28 was not considered evidence of an active endodontic infection at that time. After integration of the clinical and radiographic findings, the periodontal evaluation was consistent with retrograde peri-implantitis involving implant #29. Surgical exploration, debridement, implant-surface decontamination, and regenerative therapy were recommended (Figure 3).

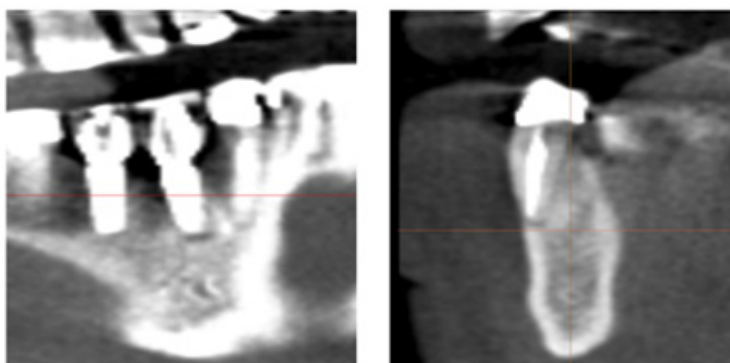


Figure 3: CBCT views of implant #29 demonstrating the apical radiolucent defect and its facial extension. A separate radiolucent finding was observed near the apex of tooth #28.

Surgical Management

Surgical treatment was performed in March 2021. A semilunar incision was made, and a full-thickness mucoperiosteal flap was elevated to expose the affected area. Flap reflection revealed facial cortical fenestration adjacent to the apical portion of implant #29. Granulation tissue was present within the defect, and several apical implant threads were exposed. The granulation tissue was removed by curettage. The exposed implant surface

was mechanically debrided using titanium brushes, followed by irrigation and surface decontamination with an EDTA solution. After debridement and decontamination, the osseous defect was grafted with deproteinized bovine bone mineral (Bio-Oss). A resorbable collagen membrane (Bio-Gide) was placed over the graft as part of a guided bone-regeneration approach, and the surgical site was closed. The implant was retained rather than removed because it remained clinically stable and the lesion was localized primarily to the apical region (Figure 4, 5).



Pre-tx site #29



Post flap reflection: buccal bone fenestration, degranulation tissue, exposed apical implant threads



Post curettage and cleaning procedures

Figure 4: Intraoperative findings after flap reflection, demonstrating buccal bone fenestration, granulation tissue, and exposed apical implant threads at site #29.



Bio-oss grafting material placement



Bio guide membrane placement



Post-tx site

Figure 5: Surgical management of the defect, including debridement and implant-surface cleaning followed by bone graft placement and coverage with a resorbable collagen membrane.

Discussion

Retrograde peri-implantitis represents a clinically important but relatively uncommon complication of implant therapy. Unlike conventional marginal peri-implantitis, the disease process occurs primarily at the implant apex while the coronal portion of the implant may remain clinically integrated [1-4]. This feature can make early recognition difficult. The present case demonstrates this diagnostic challenge. Implant #29 appeared to heal normally after placement and remained clinically stable during the restorative phase. The patient did not report pain, and routine clinical parameters did not initially suggest substantial peri-implant disease. The recurrent gingival lesion ultimately prompted additional investigation, and the apical radiolucency was identified on periapical imaging.

The etiology of retrograde peri-implantitis is often multifactorial and cannot always be established definitively. *Quirynen, et al.* [4] identified several possible predisposing conditions, including residual infection at an extraction site and pathology associated with adjacent teeth. *Dahlin et al.* [2] similarly described potential contributions from local pre-existing pathology and surgical factors. Residual pathology at previous #29 tooth site was considered as one possible explanation in the present case. However, the

extraction site had been degranulated and grafted, and subsequent radiographs before implant placement did not demonstrate an obvious lesion. An additional concern was the radiolucent finding associated with neighboring tooth #28. Multidisciplinary endodontic assessment did not demonstrate active communication between the #28 apical region and the implant lesion. Therefore, a definitive etiologic relationship could not be established.

This uncertainty is clinically relevant. A radiographic lesion adjacent to an implant should not automatically be attributed to peri-implantitis without evaluating nearby teeth, previous extraction sites, surgical anatomy, and possible endodontic disease. Multidisciplinary assessment can be particularly useful when the source of an apical implant lesion is unclear. The case also demonstrates the complementary value of two-dimensional and three-dimensional imaging. Periapical radiography initially identified the apical radiolucency, whereas CBCT provided additional information regarding the facial extension of the lesion and possible cortical involvement. However, CBCT evaluation around metallic implants is susceptible to beam-hardening and related artifacts. CBCT findings should therefore be interpreted together with conventional radiographs and clinical examination rather than in isolation.

Surgical exploration ultimately confirmed facial bone fenestration, granulation tissue, and exposed apical implant threads. These findings supported the diagnosis of an active apical peri-implant lesion. Because the implant remained stable, an implant-preservation strategy was selected. The treatment combined removal of inflammatory tissue, mechanical implant-surface debridement, chemical decontamination, and guided bone regeneration. Previous reports have described surgical debridement and regenerative procedures as potential approaches for localized retrograde peri-implant lesions when the implant remains stable [1-4]. Implant removal may be necessary when extensive bone destruction, persistent infection, or loss of implant stability prevents preservation. An important limitation of this case report is the absence of sufficiently documented long-term postoperative clinical and radiographic follow-up in the available case record. Therefore, this report does not establish long-term regenerative success. Its principal contribution is the diagnostic sequence and multidisciplinary decision-making process that led to recognition and treatment of a relatively uncommon peri-implant complication.

Clinical Significance

A stable implant can develop apical inflammatory disease without deep peri-implant probing depths or significant pain. A recurrent sinus tract or localized gingival swelling around an implant should therefore prompt radiographic investigation even when conventional clinical parameters appear normal. Periapical radiographs remain useful for identifying changes around implants, while CBCT may help characterize the three-dimensional extent of a suspected lesion when conventional imaging is inconclusive. Clinicians should also evaluate adjacent teeth and previous extraction sites before assigning an etiology to an apical implant lesion. Collaboration among restorative dentists, periodontists, endodontists, and oral and maxillofacial radiologists can be valuable when clinical and imaging findings do not identify a single obvious source.

Conclusion

Retrograde peri-implantitis can occur after apparently uneventful implant placement and may remain clinically subtle during its early stages. In this case, a recurrent asymptomatic gingival lesion led to identification of an apical radiolucency around a clinically stable mandibular implant. Periapical radiography and CBCT provided complementary diagnostic information, while multidisciplinary evaluation helped differentiate potential implant-related and endodontic sources. Surgical exploration confirmed facial bone fenestration, inflammatory granulation tissue, and exposed apical implant threads. The lesion was treated with debridement, implant-surface decontamination, bone grafting, and guided bone regeneration while retaining the implant. This case emphasizes careful radiographic surveillance, evaluation of neighboring teeth, and timely multidisciplinary intervention when

retrograde peri-implantitis is suspected.

Declarations

Patient Consent for Publication

Written informed consent for publication of the patient's clinical information and images was obtained.

Conflict of Interest

The authors declare no conflict of interest related to this case report.

Funding

No specific funding was received for this work.

Acknowledgments

The authors acknowledge the faculty, residents, students, and staff of the University of Illinois Chicago College of Dentistry who contributed to the multidisciplinary diagnosis and management of this patient.

Author Contributions

Confirm author contributions before submission. Suggested format: Dr. Yang prepared the case report and manuscript; Drs. Hindy, Gubareva, Sobus, Drake and Xie contributed to clinical evaluation, multidisciplinary interpretation, treatment, and critical manuscript review. All authors reviewed and approved the final manuscript

References

1. Blaya-Tárraga JA, Cervera-Ballester J, Peñarrocha-Oltra D, Peñarrocha-Diogo M (2017) Periapical implant lesion: A systematic review. *Med Oral Patol Oral Cir Bucal* 2(6): e737-e749.
2. Dahlin C, Nikfarid H, Alsén B, Kashani H (2009) Apical peri-implantitis: Possible predisposing factors, case reports, and surgical treatment suggestions. *Clin Implant Dent Relat Res* 11(3): 222-227.
3. Peñarrocha-Diogo M, Maestre-Ferrín L, Cervera-Ballester J, Peñarrocha-Oltra D (2012) Implant periapical lesion: Diagnosis and treatment. *Med Oral Patol Oral Cir Bucal* 17(6): e1023-e1027.
4. Quirynen M, Vogels R, Alsaadi G, Naert I, Jacobs R, et al. (2005) Predisposing conditions for retrograde peri-implantitis, and treatment suggestions. *Clin Oral Implants Res* 16(5): 599-608.
5. Ramanauskaite A, Juodzbals G (2016) Diagnostic principles of peri-implantitis: A systematic review and guidelines for peri-implantitis diagnosis proposal. *J Oral Maxillofac Res* 7(3): e8.
6. Ramanauskaite A, Juodzbals G, Tözüm TF (2016) Apical/Retrograde Periimplantitis/Implant Periapical Lesion: Etiology, Risk Factors, and Treatment Options: A Systematic Review. *Implant Dent* 25(5): 684-697.
7. Berglundh T, Persson L, Klinge B (2002) A systematic review of the incidence of biological and technical complications in implant dentistry reported in prospective longitudinal studies of at least 5 years. *J Clin Periodontol* 197-212; discussion 232-233
8. Neely AL, Kim M, Samona J, Yoon JI, Kinaia BM (2025) Management of Retrograde Peri-Implantitis Using Guided Bone Regeneration. *Compend Contin Educ Dent* 46(7): 322-325.