

# Management of occlusal trauma-related periodontal abscess: A case report and mini-review of the literature

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**Abstract.** The present study describes a case of a patient with periodontal abscess in a left mandibular permanent first molar (tooth no. 36). The tooth had a fractured cusp which was restored into class II composite restoration and responded normally to pulp vitality tests. There were no signs of periodontal disease or the presence of a deep pocket which, could be probed only by a thin metal instrument. Within a period of 2 months, the patient developed localized periodontal abscess with respect to the left mandibular first molar. The tooth was deemed non-vital, grade II mobility, as it had a deep pocket measuring >5 mm in its distal aspect. Pulp space therapy was performed with periodontal intervention. The curettage of soft tissue was carried out. A 2-year follow-up period of healing was observed. The tooth remained functional and probing of the periodontal sulcus revealed a normal depth of 2 to 3 mm. On the whole, the present study emphasizes the importance of identifying such endodontic-periodontic lesions that require an interdisciplinary approach in their management.

## Introduction

Periodontal abscesses have a high prevalence rate and are thus considered to be the third most prevalent infection which demands emergency treatment (1,2). Clinically, periodontal abscess usually presents as an ovoid swelling in the gingiva along the lateral side of the root (3,4). It is usually associated with a periodontal pocket, the presence of bleeding upon probing and suppuration, and the involved tooth may exhibit increased tooth mobility and tenderness upon percussion (1,5). Periodontal abscesses are treated with oral rinses, mechanical

debridement and drainage; antibiotic therapy is only administered in certain conditions, such as endo-perio lesions, phoenix abscess, etc (2).

Based on the etiology, periodontal abscesses can be either periodontitis-related or non-periodontitis-related. Occlusal trauma has been shown to be linked to periodontal abscesses (4,5). Occlusal trauma is the damage inflicted to teeth when excessive force acts upon the tooth. It is basically the injury resulting in tissue changes within the attachment apparatus as a result of occlusal force. Excessive occlusal forces applied to a tooth with normal periodontal support is termed as primary occlusal trauma, and when the injury results from excessive forces on tooth/teeth with reduced periodontal support, this is considered as secondary occlusal trauma (6).

Occlusal trauma is considered to elicit an inflammatory response in the periodontal apparatus, as well as in the dental pulp, which can lead to pulpal death, and the derangement in periodontal structures and alveolar bone (7).

Both periodontal and endodontic disorders can advance at different rates, depending on a variety of factors, such as injuries, trauma, etc (4,6). These elements may also have an impact on the effectiveness of any given treatment. The additional impact of treating one tissue on the companion tissue should be taken into account when treating teeth with concurrent endodontic and periodontal disorders. The timing of endodontic therapy is a crucial factor to consider when scheduling treatment for concurrent periodontal and endodontic disorders. Furthermore, since cross-seeding through the apical or lateral foramina is a possibility, the result of endodontic therapy may be affected if the root canal filling is inserted, while a periodontal infection that interacts with the root canal system is still present. Fortunately, utilizing an antibacterial medication inside the canals during periodontal therapy helps keep the environment within the root canal system in a state that is unfavorable for bacterial colonization, particularly if the dressing is changed on a frequent basis. Utilizing a biocompatible medication is crucial for encouraging periodontal recuperation and for improving the general outlook of the tooth (7).

The present study describes the inter-disciplinary management involving endodontic and periodontal treatment of the tooth of a patient with periodontal abscess due to occlusal trauma.

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## Case report

A 42-year-old male patient reported to the Department of Conservative Dentistry and Endodontics (Manipal College of Dental Sciences Mangalore, Manipal Academy of Higher Education, Manipal, India) with the chief complaint of a fractured cusp with respect to the lower left back tooth, 1 week prior. The medical history of the patient was non-contributory and the biochemical parameters were not evaluated. No extra-oral changes were noted, and an intraoral examination revealed a bilateral fractured cusp on tooth no. 36, which was found to be due to excessive masticatory load. Pulp sensibility tests revealed that the tooth was vital. No periapical changes were noted on intraoral periapical radiograph. Taking into consideration the clinical and radiographic findings, a composite restoration was performed to build up the fractured cusp after relieving the tooth from occlusion.

Following this episode, the patient returned to the aforementioned department after 2 months, with the complaint of a swelling in the lower back tooth. Upon an intraoral examination, a localized swelling (1 cm in diameter) was found on tooth no. 36. A periodontal pocket measuring 5 mm was found on the distal aspect of tooth no. 36. The tooth developed grade II mobility and was rendered non-vital due to the lack of a response on the pulp vitality test. An intra oral periapical radiograph with respect to tooth no. 36 revealed diffuse radiolucency involving the distal root, the loss of lamina dura in that area and radiolucency in the furcation area, suggestive of furcation involvement. Horizontal bone loss was also noted. Noting the aforementioned results, the treatment strategy was planned accordingly.

*Treatment of the periodontal abscess.* For the treatment of the periodontal abscess, the patient was referred to the Department of Periodontology in the same institution. As there was a periodontal pocket and drainage was feasible via the sulcus, surgical drainage and incision did not constitute the recommended course of treatment. After administering local anesthesia, gracey curettes 11-12 and 13-14 were used to drain the abscess through the sulcus. Following the drainage, antibiotics (C. Amox LB, 500 mg, 1-1-1 for 5 days) were prescribed over the course of 5 days. Additionally, urgent endodontic therapy was initiated. Rubber dam isolation was difficult, since the tooth was grade II mobile (Fig. 1).

By the next visit, the resolution of the swelling was noted and the mobility had reduced from grade II to grade I. A reduction in the depth of the periodontal pocket was observed. The endodontic treatment was then completed using Protaper files (Dentsply Inc., Maillefer, Dentsply India) with the crown down technique till F2 file size. Copious irrigation was performed using normal saline 0.9 and 5% sodium hypochlorite (Vishal Dentocare Pvt. Ltd.). In addition, three rounds of calcium hydroxide were administered as an intracanal medicament in the form of Calciur (Voco) at every 15-day intervals. After 45 days, tooth no. 36 was obturated with an F2 protaper gutta percha cone (Dentsply Inc., Maillefer, Dentsply India) along with AH Plus sealer (Dentsply Inc., Sirona, Dentsply India).

To receive the core build up, the existing restoration was removed. Limited access to the tooth surface was noted on the lingual side, and hence, an access flap was planned. After

administering local anesthesia, sulcular incisions was placed around tooth no. 36, the flap was reflected using periosteal elevator and access was achieved for the restoration. Lingually, the access flap was reflected below the gingival margin, and the tooth surface was smoothed using polishing bur and the entire cavity was sealed using glass ionomer (GC Glass Ionomer Universal Restorative) restoration (Fig. 2A). Simple interrupted sutures were placed and post-operative instructions were provided. The patient was recalled after 1 week, and suture removal followed by the reduction of glass ionomer restoration and the composite core build up (Filtek Z 350 XT, 3M ESPE) were performed. The patient was recalled after 1 month and porcelain fused to metal crown was administered as the post-endodontic restoration (Fig. 2B and C).

Follow-up visits were scheduled for clinical and radiographic examinations. During the follow-up clinical examinations, healthy gingival and periodontal health was noted with the reduced mobility of tooth no. 36. Upon a radiographic examination, the dissolution of periapical changes and bone fill were noted. The patient was followed-up for 3 months, 6 months, 1 year and 2 years post-treatment (Fig. 3).

## Discussion

The present study highlights the need of an interdisciplinary approach in the management of endodontic and periodontal lesions. The endo-periodontal conditions require the assistance of experts from the fields of endodontic and periodontics, as the need for periodontal therapy and endodontic treatment cannot be accomplished by general dentists.

There are several potential causes of dental infections, including gingival infections, trauma, surgery, pericoronitis and pulp necrosis. Depending on the etiology of the infection, odontogenic or dental abscesses are classified as endodontic or periapical, periodontal, or pericoronal (3). In emergency dentistry clinics, the frequency of periodontal abscesses has been investigated (8,9). Periodontal abscesses are frequently linked to areas where there was no previous periodontal pocket or directly to periodontitis. While such occurrences can sometimes occur in the absence of an abscess, a periodontal abscess in periodontitis indicates an interval of ongoing bone deterioration (exacerbation). Abscesses can emerge more easily in convoluted areas with cul-de-sacs that ultimately become sequestered. Through the course of illness, a periodontal abscess can arise at numerous stages: As an acute aggravation of unresolved periodontitis during periodontal therapy, in cases of resistant periodontitis, or while performing periodontal management. In the absence of periodontitis, periodontal abscesses may originate from the following causes: i) Effects of foreign bodies; ii) an endodontic tool creating a hole in the tooth wall; iii) the involvement of the lateral cysts; and iv) local elements influencing the shape of the root may make a periodontal abscess more likely to develop (3,9).

The periodontal abscess may have commenced as a result of germs entering the soft tissue pocket wall. Chemotactic proteins secreted by the bacteria subsequently draw in pro-inflammatory cells, and the ensuing inflammatory response causes the connective tissues to be destroyed, the bacterial encapsulation and pus generation. Histologically, a

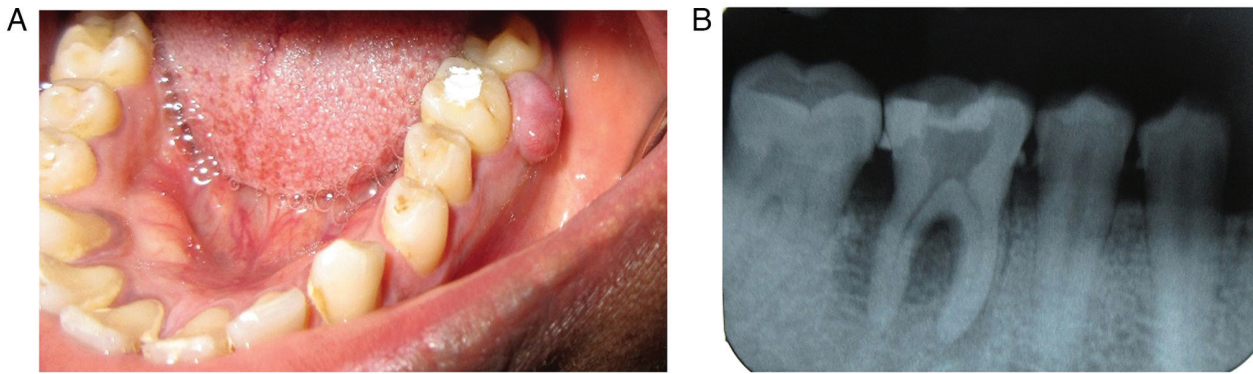


Figure 1. Pre-operative clinical and radiographic assessment of tooth no. 36. (A) Pre-operative clinical image with respect to tooth no. 36. (B) Pre-operative intraoral periapical radiograph with respect to tooth no. 36.

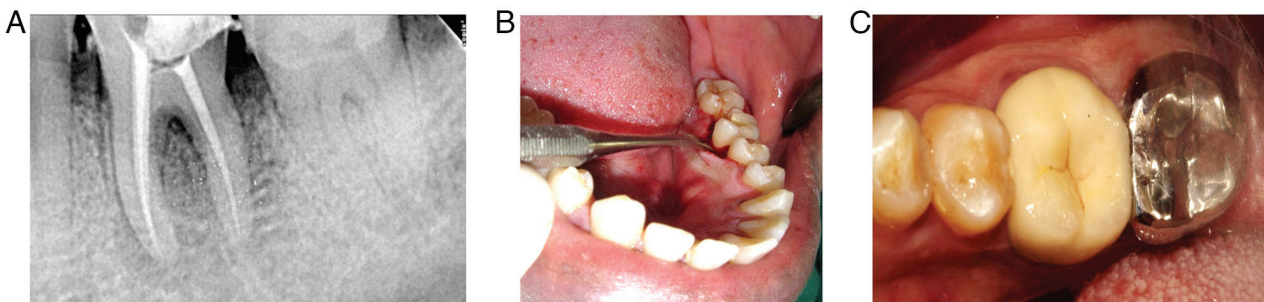


Figure 2. Clinical treatment protocol with respect to tooth no. 36. (A) Endodontic treatment with respect to tooth no. 36. (B) Periodontal treatment (access flap) with respect to tooth no. 36. (C) Prosthodontic treatment with respect to tooth no. 36.

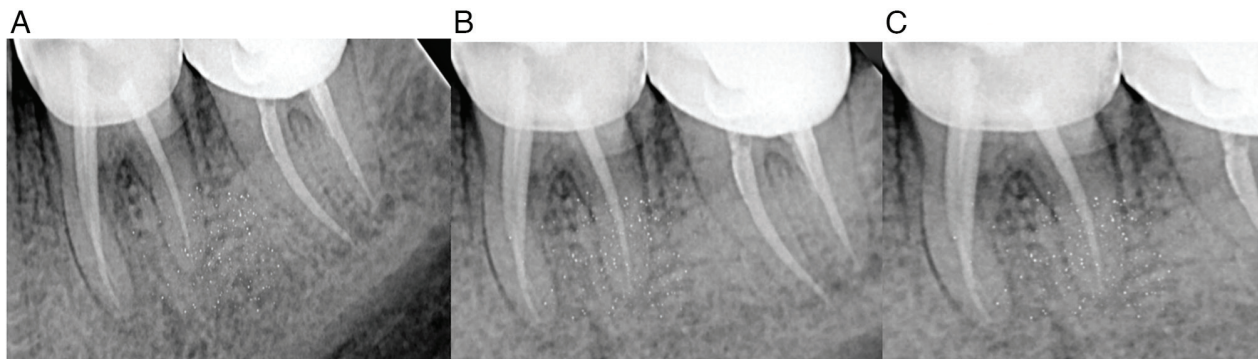


Figure 3. Radiographic follow up of tooth no. 36. (A) Follow-up IOPAR with respect to tooth no. 36 at 6 months. (B) Follow-up IOPAR with respect to tooth no. 36 at 12 months. (C) Follow-up IOPAR with respect to tooth no. 36 at 2 years. IOPAR, intraoral periapical radiograph.

core region of damaged leukocytes and soft tissue debris is surrounded by intact neutrophils (9).

At a later stage, neutrophils and macrophages assemble to form a pyogenic membrane. Since a highly acidic atmosphere will encourage the action of lysosomal enzymes, the degree of breakdown in the abscess will be dependent on the pathogenicity and development of the bacteria inside the foci as well as the local pH (3).

In the case in the present study, the initial representation was of a fractured cusp, which was found to be the result of occlusal trauma. Occlusal trauma has long been known to cause damage to the underlying periodontium. The injury that thus results in the periodontium is known as trauma

from occlusion. This trauma from occlusion, when it occurs on a healthy periodontium due to excessive occlusal forces, is known as primary trauma from occlusion. This is known to occur when a person bites onto a hard food substance or as a result of a faulty restoration. Secondary trauma from occlusion on the other hand occurs in situations where the periodontium is weak and unable to bear the normal forces of occlusion (10). In the present case, the periodontium was healthy and hence, the fractured cusp may have been due to primary trauma from occlusion. Thus, occlusal correction followed by the restoration of the cusp was performed.

Persistent trauma has been known to cause changes in the periapical region, causing pulp necrosis and leading to acute

periapical abscess or phoenix abscess. In the case presented herein, the tooth was found to be mobile and an isolated deep periodontal pocket was found to be associated with the tooth (7,11). The pulpal infection could have spread via the lateral canals into the periodontal pocket and lead to a periodontal abscess (12). Taking the clinical course and manifestations into consideration, the case was diagnosed as an endodontic periodontal lesion. Periodontal abscess drainage followed by endodontic treatment and the restoration of the involved tooth were carried out.

Therefore, it is critical for a dentist to recognize, evaluate and treat endodontic periodontal diseases in this manner. A periodontal abscess is diagnosed according to the symptoms experienced by the individual, as well as the signs discovered during the oral examination. In order to improve the prognosis of patients, the management of periodontal abscess requires the use of therapeutic modalities carried out under expert supervision. In the case this condition is left untreated, bacteria will then accumulate due to the periodontal pocket closure preventing the gingival crevicular fluid from being cleared. However, the expulsion of the lysosomal enzymes from hosts neutrophils is mostly responsible for tissue destruction in periodontal abscesses. Long standing untreated cases of periodontal abscess affects the prognosis of the condition, resulting in damage to the periodontal architecture and osseous framework, resulting in the exfoliation of teeth.

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#### Authors' contributions

RM and SP conceptualized the study. SH substantially contributed to data interpretation, and RM, SP wrote and prepared the draft of the manuscript. RM, SP and SH confirm the authenticity of the raw data. All authors have read and approved the final manuscript.

#### Ethics approval and consent to participate

The present study was approved by the Institutional Ethics Committee Manipal College of Dental Sciences (18115), Mangalore, India. The patient provided consent for his participation in the study.

#### Patient consent for publication

The patient provided consent for the publication of the present case report and any accompanying images.

#### Competing interests

The authors declare that they have no competing interests.

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