

# Interdisciplinary Management of Endo-Perio Lesion with Regenerative Approach: A Case Series

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Received: 📅 2024 Jan 06

Accepted: 📅 2024 Jan 26

Published: 📅 2024 Feb 05

## Abstract

The understanding of periodontal and endodontic diseases is one of the crucial and controversial topics for the clinicians in terms of clinical evaluation, diagnosis, treatment plan, and prognosis which is encountered when both the lesions are combined. A thorough understanding of the perio-endo lesion is important for accurate diagnosis and to rule out the primary etiological factor for perio-endo lesions. The communication pathway for the spread of infection in between pulpal and periodontal tissue may be through the pathogenic bacteria or through the iatrogenic factors. Even the clinical picture of perio-endo lesion may suggest the multiple sources of pathology and treatment for perio-endo lesion depends on the causative factor and correct diagnosis. The present case series shows the importance of PRF with DFDBA allograft having potential of periodontal regeneration through growth factor and BMP's. this case series presenting a 6 month follow up of primary endodontic lesion with secondary periodontal involvement which are treated by surgical open flap debridement and a combination of PRF and DFDBA allograft and evaluated both clinically and radiographically.

**Keywords:** Periodontal-Endodontic Lesions, Allograft, Platelet Rich Fibrin, Growth Factors, Surgical Periodontal Therapy, Regenerative Therapy, Sticky Bone

## 1. Introduction

The endodontic and periodontal lesions are the two entities which communicate with each other through the anatomical and functional pathways. There are various routes of communication between pulp and periodontium either through apical foramen, lateral canal, dentinal tubules, perforations, fracture or any developmental variation in the root where bacterial colonization may start [1]. The pulp and periodontium both have the same embryonic (Ectomesenchymal) origin and if the problem may persist either in the pulp or periodontium through inflammatory process it may further complicate the diagnosis and treatment plan for the clinicians. It is challenging situation for the clinician to make diagnostic and prognostic value for the involved tooth.

In 1919 Turner and Drew are the first to identify the effects of periodontal tissues on pulpal tissues. Simring and Goldberg first described the interrelationship between periodontal and pulpal tissues in 1694 [2]. The traditional classification given by Simon et al in 1972 based on etiology and progression of the disease. There may be primary periodontal or endodontic lesion or may be true combined lesion involving both the components. Recently Herrera et al in 2017 a new classification system has been formulated based on the root damage either endo-periodontal lesions with root damage

and without root damage [3]. This new concept changes the clinical diagnosis of endo-perio lesion whether to preserve the tooth or remove it.

Both endodontic and periodontal diseases are caused by a mixed anaerobic pathogen includes Streptococcus, Pepto streptococcus, Eubacterium, Bacteroides, Fusobacterium, T. forsythia, P. gingivalis, and A. actinomycetemcomitans [4]. Scientific evidence in the literature have shown that maximum number of bacteria may harbour in the dentinal tubules which acts as a reservoir for the bacterial colonization and form the dental plaque biofilm on the root surface. Endotoxins and inflammatory mediators such as cytokines IL-1 and TNF- $\alpha$  and proteolytic enzymes initiate the host inflammatory response at the apical foramen through periodontal ligament and/or adjacent to openings of accessory canals resulting in localized oedema, increase intra pulpal pressure and cell death. The production of endotoxins produced by plaque bacteria may act as an irritant on the soft tissue around the epithelium and elicit the inflammatory response in the form of mediators. These mediators may cause destruction of the gingival connective tissue, periodontal ligament, resorption of cementum layer around the root surface and destruction of alveolar bone [5].

Clinically there is evidence of caries along with the signs of periodontal or endodontic disease. There may have recession, swelling and localised inflammation of the gingival tissues or a discharging sinus. Radiographic examination reveals areas of radiolucency which seem to originate from the interdental/interradicular area and from a distinct apical area. In the progressed state or where lateral canals are present, the furcation area may also be involved [6]. Tenderness on percussion, Pulp vitality test, pocket probing, fistula tracking, and cracked tooth testing are the primary diagnostic tools for diagnosis of perio-endo lesions. In view of above facts, we present a case series of perio-endo lesion which was treated successfully by endodontic treatment followed by regenerative periodontal therapy.

### 1.1. Case 1

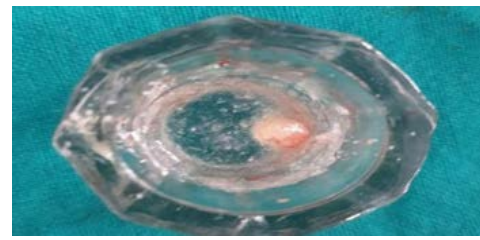
A 42 years old male patient reported to the outpatient department with chief complaint of pain and food lodgement in the right lower back region for 1 month. Patient had history of pain which was sharp, shooting pain which gets aggravated on hot and cold stimuli and on mastication and it gets relieved on taking medications. Patient also had history of vertical food lodgement in the right posterior second molar region. Medical and dental history was non-contributory. On thorough intra oral examination, there was deep carious lesion wrt 46. Periodontal examination revealed 6mm periodontal pocket measured with UNC 15 probe. Furcation measurement was done with Naber's probe which revealed Glickman's Grade III furcation involvement. On intra oral periapical radiographic examination, radiolucent area reveals vertical bony defect and Grade III furcation defect wrt 46 region. Based on clinical and radiographic examination, Primary endodontic lesion with secondary periodontal involvement was diagnosed with fair prognosis. Phase I non-surgical periodontal therapy i.e scaling and root planning followed by an endodontic treatment was performed and patient was recalled after 10 days for surgical periodontal therapy. Periodontal pocket was reassessed, and periodontal regenerative surgery was planned for the treatment of furcation defect. Open flap debridement



**Figure 1:** Pre-operative radiograph at baseline



**Figure 2:** Bone defect wrt 46



**Figure 3:** Sticky bone (PRF+DFDBA)



**Figure 4:** Sticky bone placement wrt 46



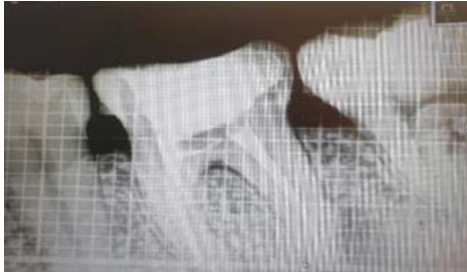
**Figure 5:** Post operative radiograph at 6 months

with full thickness flap reflection was done followed by thorough removal of granulation tissue in the furcation defect area. After thorough debridement of the defect, Sticky bone i.e Platelet rich fibrin and Allograft (DFDBA) was placed over the vertical defect as well as in the furcation and defect. PRF was prepared by drawing 5 ml of blood from anti-cubital vein and was transferred in the test tube and centrifuge at 2700 rpm for 13 minutes. 5-0 vicryl resorbable sutures were given to approximate the flap margins followed by the periodontal dressing (Coe-Pak). Post-operative instructions were given, and antibiotics were prescribed Tab Amoxiclav 625mg BD and tab Ketorol DT 10mg BD for 5 days. The patient was recalled after 7 days for periodontal pack removal. The patient was asked to follow the regular visit and clinical examination revealed the periodontal pocket depth reduction. Sequential radiographs were taken at 6 months post operatively showed considerable bone fill in the 46 regions.

### 1.2. Case 2

A 30 years old female patient reported to the outpatient department with chief complaint pain and sensitivity in the left lower back region for 15 days. Patient had history of pain which was dull, intermittent which gets aggravated on mastication and it gets relieved on taking medications No significant medical and dental history was reported by the patient. On thorough intra oral examination, there was deep carious lesion wrt 36 region. Periodontal examination revealed 5 mm periodontal pocket measured with UNC 15 probe. Furcation measurement was done with Naber's probe which revealed Glickman's Grade III furcation involvement. On periapical intra oral radiographic examination, radiolucent area

reveals vertical bony defect and Grade III furcation defect wrt 36 region. Based on clinical and radiographic examination. Primary endodontic lesion with secondary periodontal involvement was diagnosed with fair prognosis. Phase I non-surgical periodontal therapy i.e scaling and root planning followed by an endodontic treatment was performed and patient was recalled after 10 days for surgical periodontal therapy. Periodontal pocket was reassessed and periodontal regenerative surgery



**Figure 6:** Pre operative radiograph at baseline



**Figure 7:** Bone defect wrt 36



**Figure 8:** Sticky bone (PRF+DFDBA)



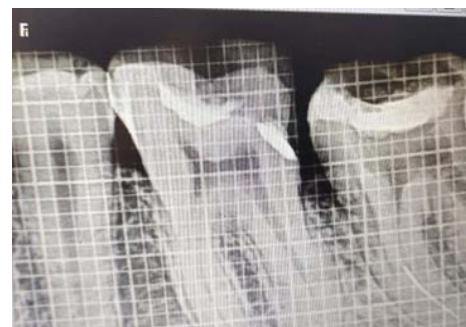
**Figure 9:** Post operative radiograph at 6 months

was planned for the treatment of furcation defect. Open flap debridement with full thickness flap reflection was done followed by thorough removal of granulation tissue in the furcation defect area. After thorough debridement of the defect,

Sticky bone i.e Platelet rich fibrin and Allograft (DFDBA) was placed over the vertical defect as well as in the furcation and defect. PRF was prepared by drawing 5 ml of blood from anti-cubital vein and was transferred in the test tube and centrifuge was done at 2700 rpm for 13 minutes. 5-0 vicryl resorbable sutures were given to approximate the flap margins followed by periodontal dressing (Coe- Pak). Post-operative instructions were given, and antibiotics were prescribed Tab Amoxiclav 625mg BD and tab Ketorol DT 10mg BD for 5 days. The patient was recalled after 7 days for periodontal pack removal. The patient was asked to follow the regular visit and clinical examination revealed the periodontal pocket depth reduction. Sequential radiographs were taken at 6 months post operatively showed considerable bone fill in the 36 regions.

### 1.3. Case 3

A 29 years old male patient reported to the outpatient department with chief complaint of pain and sensitivity to hot and cold in left lower back region. Patient had history of pain which was sharp, radiating pain which gets aggravated on mastication and it gets relieved on taking medications. Medical and dental history was non-contributory. On thorough intra oral examination, there was deep carious lesion wrt 36,37. Periodontal examination revealed 5mm periodontal pocket measured with UNC 15 probe. On intra oral periapical radiographic examination, radiolucent area revealed vertical bony defect in 46 regions. Based on clinical and radiographic examination, Primary endodontic lesion with secondary periodontal involvement was diagnosed with fair prognosis. Phase I nonsurgical periodontal therapy i.e scaling and root planning followed by an endodontic treatment was performed and patient was recalled after 10 days for surgical periodontal therapy. Periodontal pocket was reassessed, and periodontal regenerative surgery was planned for the treatment of furcation defect. Open flap debridement



**Figure 10:** Pre operative radiograph at baseline



**Figure 11:** Bone defect wrt 36



**Figure 12:** Post operative radiograph at 6 months

with full thickness flap reflection was done followed by thorough removal of granulation tissue in the furcation defect area. After thorough debridement of the defect, Sticky bone i.e Platelet rich fibrin and Allograft (DFDBA) was placed over the vertical defect as well as in the furcation and defect. PRF was prepared by drawing 5 ml of blood from anti-cubital vein and was transferred in the test tube and centrifuge was done at 2700 rpm for 13 minutes. 5-0 vicryl resorbable sutures were given to approximate the flap margins followed by periodontal dressing (Coe- Pak). Given. Post-operative instructions were given, and antibiotics were prescribed Tab Amoxiclav 625mg BD and tab Ketorol DT 10mg BD for 5 days. The patient was recalled after 7 days for periodontal pack removal. The patient was asked to follow the regular visit and clinical examination revealed the periodontal pocket depth reduction. Sequential radiographs were taken at 6 months post operatively showed considerable bone fill in the 36,37 regions.

## 2. Discussion

The treatment modality only depends upon the definitive diagnosis of the lesion. The simultaneous destruction of periodontal attachment apparatus and affecting the pulp may further complicate the diagnosis and prognosis of the involved tooth. The treatment of endo- perio lesion require endodontic as well as regenerative therapy to fulfil the goal of removal of necrosed pulp and also facilitate the regeneration of lost periodontal attachment apparatus [7]. In all the three cases, diagnosis was Primary endodontic lesion with secondary periodontal involvement. Therefore, endodontic treatment followed by surgical regenerative periodontal therapy. The clinical/ radiographic features of these endo-perio lesions were quite similar i.e., presence of deep periodontal pocket, tooth decay/caries, periapical radiolucency in the periapical region or in the furcation defect area. Traditional treatment of endo-perio lesion was the non-surgical debridement through phase I therapy and root canal treatment alone of the involved tooth [8].

Bone loss in endo-perio lesion is caused by either pulpal or periodontal disease which is reversible or irreversible depending upon the etiological causative factor. Periodontal disease causes advanced bone loss in terms of intrabony defect, vertical defect, furcation involvement or any kind of contained defect and is resolved only through the Phase II sur-

gical periodontal therapy. Recently these defects are treated with a regenerative therapy either through bone graft, GTR membrane, enamel matrix derivative, or growth factor delivery in the form of PRF and sticky bone [9]. Varughese et al. in 2015 proposed a surgical approach for the treatment of the perio-endo lesion involving root resection and regenerative therapy [10]. In this case series, PRF (autologous) along with sticky bone (allograft) was used as a regenerative therapy and placed in the vertical and furcation defect. Platelet-rich substitute enriched with  $\alpha$ -granules of platelets and growth factors can regulate the proliferation, chemotaxis, and differentiation of the locally derived progenitor cells in the defect site. It also offers several advantages such as better tissue handling, release of growth factors, faster healing, and stabilization of graft if such is used [11]. therefore, in this case series, DFDBA allograft was used in conjunction with PRF to fill the vertical and furcation defect. The objective of using bone graft is to induce the new bone formation and attachment gain. DFDBA used as an allograft is associated with the presence of bone morphogenetic protein that contain BMP 2, 4 and 7 for the stimulation of osteo-induction. It has the potential to degrade more rapidly and enable the new bone formation.

Similarly, in scientific evidence, a case series published by Hacer Aksel in 2014 where one case with primary endodontic and secondary periodontal lesions was reported. Treatment of the case was endodontic treatment followed by periodontal surgery after 3 months. Follow up of one year revealed that there was a resolution of the symptoms and improved clinical and radiographic findings [12]. Navanoti et al. in 2013 present a clinical case with combined regenerative approach by using decalcified freeze-dried bone allograft and barrier membrane (DFDBA along with guided tissue regeneration) and demonstrated a significant amount of bonefill and reduction of horizontal probing depth [13]. Regenerative procedure in endo-perio lesion fulfil the objective of bone fill and reduction in the probing depth. The clinical outcome is predictable in terms of arresting the mild to moderate periodontal defect and might be the success is not much predictable in advanced cases. The combination PRF with DFDBA bone graft as a sticky bone accelerate the periodontal healing and booster for the biological properties of the graft material. The fragments of sticky bone act as a biological link when placed in the defect and arrest the bleeding and improved the clinical outcome of the defect.

## 3. Conclusion

Endodontium and Periodontium are closely related and diseases of one tissue may lead to secondary diseases in the other tissue or vice versa. The diagnosis and prognosis of the tooth with endo-perio lesions present as treatment dilemma to the clinicians. The simultaneous involvement of pulpal and periodontal lesions can complicate diagnosis and treatment planning. The interdisciplinary management of endo-perio lesion along with regenerative approach is most important for the long- term success of clinical outcome. Regenerative therapy is highly predictable in endo-perio lesions which may contribute to accelerate the process of tissue regeneration.

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