

Herodontics: A Multidisciplinary Approach for the Treatment of a Hopeless Tooth - A Case Report.

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Abstract

One of the most challenging problems sustained by the clinician is the endo-perio lesion. It is a impeding problem faced in diagnosing the lesion and a dilemma as to which part of the lesion to be addressed first. The simultaneous involvement of pulpal problems and inflammatory periodontal disease can obscure diagnosis and treatment planning.

The present case report shows the importance of periodontal therapy that includes open debridement of the defect followed by placement of Xenograft {TIO-OSS} along with Platelet Rich Fibrin {PRF} Membrane in

furcation defect. The involved tooth was first treated endodontically that was followed by periodontal treatment. After three months of follow up mesial root recession of the treated tooth was noticed. Root coverage was performed with the help of tunneling technique and placement of Connective tissue Graft {CTG} along with Amnion membrane into the tunnel. There was significant gain in clinical attachment level 6 months post operatively. Radiographically there was a significant amount of bone fill observed using CBCT and RVG.

Keywords: Amnion Membrane, Grade II furcation, Xenograft, PRF, GTR.

Introduction

The pulpo-periodontal interrelationship is a unique one and can consider them as a single continuous system or as one biologic unit in which there are so many paths of communication. The interrelationship of these structures influences each other during function, health and disease. They can get affected combined or individually; when both systems are included they are called true endo-perio lesions. Periodontal- Endodontic problems are responsible for more than 50% of tooth mortality today. They present confrontations to the clinician as far as diagnosis and prognosis of the involved teeth is concerned. It is very imperative to make a correct diagnosis so that the appropriate treatment can be provided. The relationship between the pulp and the periodontium was first discovered by Simring and Goldberg in 1964.⁽¹⁾

Since then, the term 'perio-endo lesion' has been used to specify lesions due to inflammatory products found in varying degrees in both pulpal and periodontal tissues.⁽²⁾

Bacterial infection is the main cause for pulpal and periodontal disease. Cross-infection between the root canal and the periodontal ligament can occur via the following pathways:

1. Anatomical (apical foramen, lateral and accessory canals, dentinal tubules and palato-gingival grooves)
2. Non physiological pathways (iatrogenic root canal perforations and vertical root fractures) (Zehnder M et al, 2002).

Periodontal destruction is the loss of bone from the coronal to apical direction whereas the endodontic infection is from the apical to coronal direction.⁽³⁾

Decision making, treatment and prognosis depends primarily on the diagnosis of the specific disease. To have the best prognosis, clinician must assign the case to various areas of specialization, to perform endodontic,

restorative and periodontal therapy either singly or in combination.⁽²⁾

Classification

The most commonly used classification was given by Simon, Glick and Frank in 1972, which includes:⁽⁴⁾

1. Primary endodontic lesion;
2. Primary periodontal lesion;
3. Primary endodontic lesion with secondary periodontal involvement;
4. Primary periodontal lesion with secondary endodontic involvement;
5. True combined lesion.

Prognosis of Teeth with Endo-Perio Lesions

1. Primary endodontic lesions

Primary endodontic lesions usually heal after root canal therapy. Presence of microorganisms in the root canal influences the outcome of therapy with a proper focus on control of infection; a good prognosis is expected with the treatment.^(2,5)

2. Primary periodontal lesions

Such lesions can solely be treated by periodontal therapy. Prognosis of primary periodontal lesions depends on:⁽²⁾

- ♣ The severity of the periodontal disease
- ♣ Efficacy of periodontal therapy
- ♣ Response of the patient.

However, prognosis of primary periodontal lesions is not as affirmative as primary endodontic lesions. Effective removal of cementum and exposure of dentinal tubules during periodontal surgery may regress the outcome, by causing pulpal inflammation and necrosis of the dental pulp.

Avoiding the use of irritating chemicals, minimizing the use of ultrasonics and rotary scaling instruments may aid in the good outcome of the disease.⁽²⁾

3. Primary endodontic with secondary periodontal lesions: The prognosis of such lesions depends principally on the severity of periodontal involvement.

If the endodontic treatment is adequate, the prognosis depends on the severity of the marginal periodontal damage and the efficacy of periodontal treatment.⁽⁵⁾

The outcome of these lesions caused due to iatrogenic damage such as root perforations depends on the location, size, time of diagnosis and treatment, degree of periodontal destruction as well as the sealing ability and biocompatibility of the sealer.⁽²⁾

4. Primary periodontal with secondary endodontic lesion and true combined lesions:

Efficacy of periodontal therapy usually regulates the prognosis of combined lesions. A poor or even hopeless prognosis is expected in such cases, especially in patients with chronic and extensive periodontal diseases. A part of the root or tooth structure can be saved through hemisection or bicuspidization, root amputation. However, various factors such as tooth anatomy, function, restorability, root filling, bone support and patient's compliance should be considered before root resection by the operator.⁽²⁾

An improved prognosis can also be achieved by increasing the bone support of the affected tooth by the means of bone grafting and GTR. These regenerative procedures have reported to have a success rate 77.5% in the treatment of combined lesions (Parolia et al. 2013).⁽²⁾

On the contrary, the success rate ranges from 27% to 37% without regenerative procedures. Besides, patient-specific, defect-specific, and healing factors should also be considered at each level while determining the prognosis.⁽⁶⁾

The main factors to take into account for decision-making regarding the treatment are the pulp vitality, type and extent of the periodontal defect.⁽³⁾

The aim of the present study is to diagnose and to manage the endo-perio lesion presented.

Primary periodontal with secondary endodontic lesion:

A 28 year old male patient came to the dental clinic with a chief complaint of food lodgment in his lower right back tooth region since 1 week. Patient was systemically healthy. He gave the history of dull aching pain in 46.

Intra-oral clinical examination

♣ **Visual:** Supragingival calculus and inflammation of marginal gingiva w.r.t 46.

♣ **Periodontal finding:** Deep periodontal pocket in relation to mesial aspect of 46 with Grade III furcation involvement. {figure 2 and figure 3}

♣ **Mobility:** Grade II mobility present.

Investigations:

CBCCT: Radiolucency involving the apical area of the mesial root along with radiolucency in furcation area was present in 46.

Diagnosis: Primary periodontal with secondary endodontic lesion w.r.t. 46. (According to the proposed classification by Simon et.al., 1972)

Decision making and treatment plan

Decision making

Involvement should first be treated with endodontic therapy (Rotstein et al, 2002)⁽⁷⁾ along with first phase one (hygiene phase) of periodontal therapy. After the evaluation of treatment results in 2-3 months, further periodontal therapy should be considered (Parolia et al, 2013)⁽²⁾

Treatment Plan

• **Phase I:**

- ✓ Scaling and root planning.
- ✓ Oral hygiene instructions.

• **Evaluation after Phase 1:** Patient recalled after one week for root canal treatment in 46.

• **Phase II:** Root canal treatment w.r.t 46. (Figure 4, Figure 5 and Figure 6)

Open flap debridement w.r.t 46 (Figure 7) and regeneration was attempted with the help of Xenograft and Platelet Rich Fibrin membrane (Figure 8 and Figure 9)for bone loss in furcation area.

• **Evaluation after phase II: Recall the patient after 3 months.** Mesial root recession of the treated tooth was noticed. Root coverage was performed with the help of tunneling technique and placement of Connective tissue Graft {CTG} along with Amnion membrane into the tunnel.

• **Phase III:** Crown w.r.t 46

• **Phase IV:** Recall appointments to be scheduled based on Merin's classification.

In present case report, root canal treatment was performed irt 46. After 3 months, periodontal pocket was reassessed. Deep periodontal pocket of more than 5mm was present in relation to 46 on the mesial aspect. Periodontal flap surgery was planned in relation to 46 under local anesthesia. A full thickness mucoperiosteal flap was raised w.r.t 46. The area was thoroughly debrided using hand curettes and ultrasonic scalers. Xenograft and Platelet Rich Fibrin {PRF} membrane was placed in relation to 46 in furcal area(Figure 10). Simple interrupted braided 3-0 black silk sutures were placed (Figure 11) and periodontal dressing was applied over the area. Post-operative instructions and medications were given and patient was recalled after 7 days for evaluation.

Evaluation: The patient was recalled after one month and three months of flap surgery for re-evaluation. Bone fill was observed after 3 months of follow up (Figure 12). During the first month of follow up a good oral hygiene of the patient was observed. There was absence of bleeding on probing w.r.t 46. Resolution of the inflammation was observed. During the third month of evaluation mesial

root recession of treated tooth was noticed (Figure 13). Root coverage procedure was planned with the help of tunneling technique and with simultaneous placement of Connective tissue Graft {CTG}(Figure 14 and Figure 15) along with Amnion membrane into the tunnel. Resorbable sutures given (Figure 18). RVG taken 6month postoperatively showed complete bone fill in the furcation area and significant root coverage along with gain in clinical attachment level was observed .

Discussion

The endo-perio lesions are a challenging factor to clinicians as far as diagnosis and prognosis of the involved teeth are concerned.⁽³⁾ Correct diagnosis is important to determine the treatment and long term prognosis. However, treating a complex periodontal endodontic lesion is still one of the most common challenges in today's clinical practice. The simultaneous existence of Periodontium and endodontium tissue destruction can complicate the diagnosis and subsequently affect the prognosis of the involved teeth.⁽⁸⁾ This highlights the importance of following a critical diagnostic strategy to establish a correct treatment plan. It also requires thorough understanding of wound healing process involving both complex tissues.⁽⁹⁾

Treatment of perio–endo lesion requires both endodontic treatment and periodontal regenerative therapy. The treatment strategy is to first target on debridement and disinfection of the root canal system followed by an observation period. The Objective of periodontal surgery is to remove all necrotic tissues from the surgical site and facilitate the regeneration of hard and soft tissue along with the formation of new attachment apparatus.⁽¹⁰⁾

In the reported case the established diagnosis was of primary periodontal with secondary endodontic involvement. Root canal therapy was done irt 46 followed by periodontal surgery. Since buccal furcation was

involved, an attempted regeneration was done with the help of bone graft along with membrane. Bone graft used was Xenograft {TIO-OSS} which is a Bovine Porous Bone Mineral (BPBM) produced by removal of organic compounds from bovine bone, that results in a trabecular structure equivalent to human cancellous bone and can enhance bone formation. The graft material is anorganic derived osteoconductive hydroxyapatite bone mineral ⁽¹¹⁾ along with graft, Platelet Rich Fibrin membrane was used which is harvested from a simple blood sample drawn from the patient at the time of the surgical procedure. It is then treated with a single centrifugation. At the end of the centrifugation procedure 3 distinct layers are formed of which the intermediate layer is that of dense platelet rich fibrin clot. This dense platelet rich fibrin clot is used as a membrane.

Platelet-rich fibrin is a fraction of plasma that provides a rich source of growth factors and may enhance the stabilization and revascularization of the flaps and grafts.⁽¹²⁾

After three months of follow up recession was noticed, root coverage was performed with the help of tunneling technique using connective tissue graft along with amnion membrane.

Connective tissue graft has been regarded as a reliable and predictable procedure that provides a satisfactory esthetic outcome, inexpensive, versatile, and easily available; it provides successful outcomes; it is less invasive than other autogenously grafting techniques; and also has a shorter healing period.⁽¹³⁾

Placental-based amnion membrane, which have inherent biologic properties that actively promote wound healing in lieu of simply providing an occlusive barrier for selective cell repopulation.⁽¹⁴⁾

Significant gain in clinical attachment level 6 months post operatively and also a significant amount of bone fill observed using CBCT and RVG.

Conclusion

Endo perio lesion has a complex pathogenesis and requires great dexterity to identify and treat it. Hence; Cooperation between different disciplines that includes periodontology, prosthodontic and endodontics is required to adequately treat the lesion. A Preferred treatment plan leads to a better result as seen in this case report.

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Legend Figures

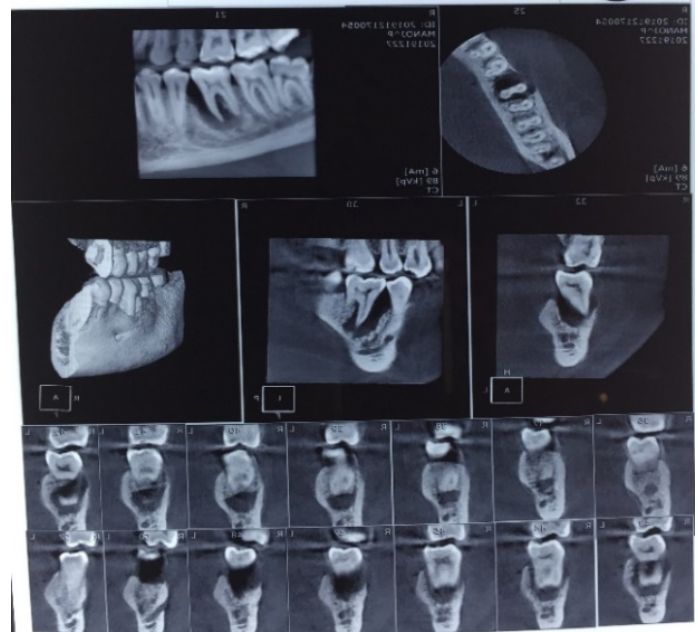


Figure 1: Pre-op CBCT.



Figure 2: Pre-op horizontal attachment level.



Figure 3: Pre-op distal probing depth.



Figure 6: RCT (Post-op).



Figure 4: RCT (Working length).



Figure 7: Open Flap Debridement.



Figure 5: RCT (Obturation).

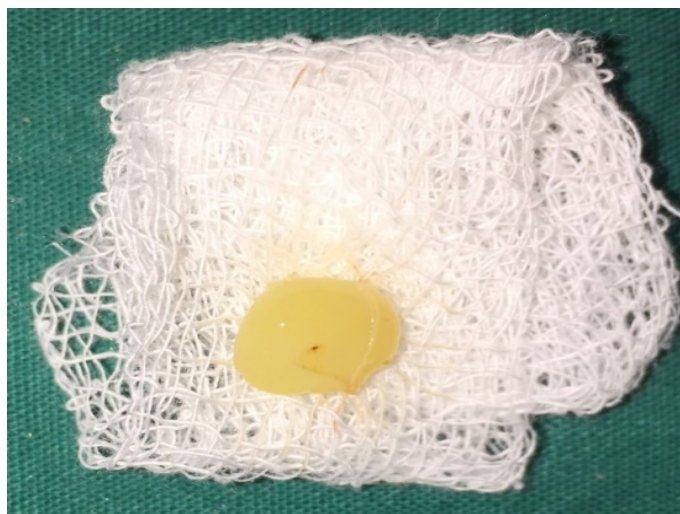


Figure 8: Platelet Rich Fibrin.

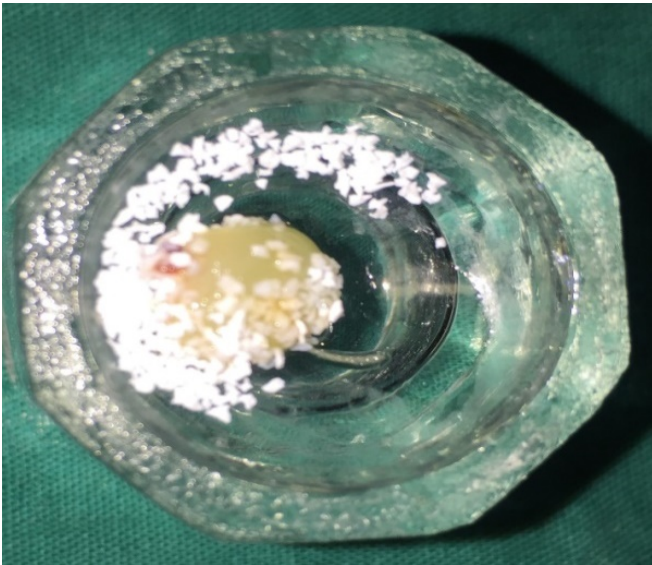


Figure 9: Xenograft and Platelet Rich Fibrin.



Figure 10: Placement of Xenograft and Platelet Rich Fibrin in the defect area.



Figure 11: Suturing done.



Figure 12: After 3 months of follow up.



Figure 13: After 3 months of follow up, mesial root recession was noticed.

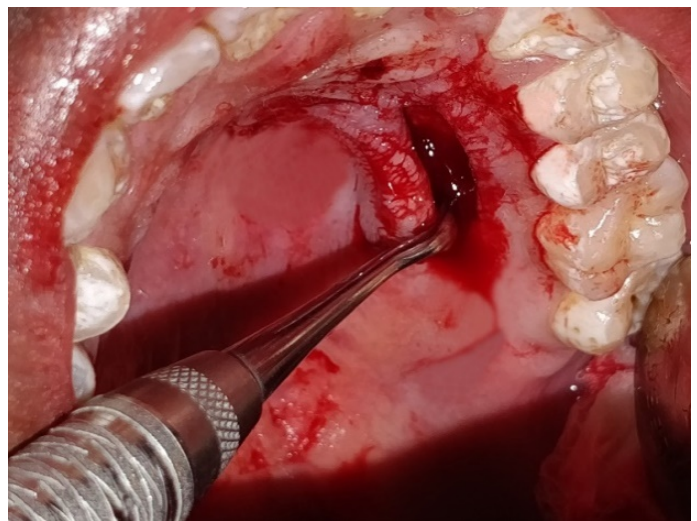


Figure 14: Connective Tissue Graft Procured.



Figure 15: Connective Tissue Graft.



Figure 18: Resorbable suture given.



Figure 16: Connective Tissue Graft placed into the tunnel.



Figure 19: Six months follow up



Figure 17: Placement of AMNION MEMBRANE into the tunnel.



Figure 20: After 6 months of follow up.