

Platelet Rich Fibrin in Management of Complex Endoperio Cases

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INTRODUCTION

Pulpal and periodontal problems are responsible for more than 50% of tooth mortality today.¹ The relationship between periodontal and pulpal disease was first described by Simring and Goldberg.² There is general agreement today that a vast majority of pulpal and periodontal lesions are a result of bacterial infection. Lesion involving both periodontal and pulpal tissues can be of primary endodontic, primary periodontal or stem from separate origins.³ Tracing the accurate origin and progression of disease often cannot be done.

A non vital tooth is mostly associated with caries, periodontal pocket, history of trauma or combination of above etiological factors. They are generally diagnosed either during routine dental radiographic examination or following acute pain and/or swelling in relation to the affected tooth

ABSTRACT

Endo-perio lesions have been a dilemma to the dental practitioner. Both tissues share the same anatomical origin. Sometimes exact etiological passage of disease process cannot be traced; nevertheless traditional and newer treatment modalities must be employed to ensure best treatment possibilities. Patient reported with pain and pus exudates in upper left anterior region. Past dental history revealed no history of trauma. Initial examination revealed draining sinus with respect to 22. However, no Caries and pockets could be detected. Tooth was nonresponsive to vitality test. Patient symptoms did not relieve even two months after completion of RCT. Apical surgery was planned. Apicectomy was done and osseous defect was filled with PRF coagulum. Patient was followed up every three months and showed complete resolution of all symptoms. Radiographs showed complete resolution of osseous defect in nine months. PRF can be used to enhance bone augmentation in treatment of periapical defects as a potential treatment alternative for faster healing.

KEY WORDS

Bone graft, periapical cyst, platelet rich plasma

All inflammatory periapical lesions should be initially treated with conventional endodontic therapy.⁴

Recently, approaches such as regenerative procedures that aim to restore lost tissue have been introduced. Platelet rich fibrin (PRF) a second generation platelet rich concentrate is extensively used for regeneration of periodontal defects either alone or in combination with bone replacement graft.⁵

Here, this case report highlights, a case of non vital tooth with draining sinus. No history of trauma, no caries could be traced. Tooth did not have any periodontal pockets. Root canal was planned but in spite of best of endodontic treatment, and antibiotic coverage tooth continued to have pus with draining sinus, thus forcing us to undertake an exploratory surgery, which revealed surprising dehiscence.

CASE REPORTS

A 35-year-old female reported to the Department of periodontology with chief complaint of swelling and pus discharge from upper front tooth region since 1 month (fig. 1a). Past dental history revealed no history of trauma. Initial examination revealed, no caries, no periodontal pockets, however shallow palato-gingival groove was detected. On intraoral examination, there was a draining sinus, in relation to 22. Patient was referred to Department of Conservative dentistry and endodontics for pulp sensibility testing and was found to be non-responsive. Periapical radiograph revealed single bayonet shaped canal and a large diffused periapical radiolucency in relation to 22 measuring 1.4 cm in diameter. Also, Angular bone loss noted on mesial aspect of 22. (fig. 1b.)

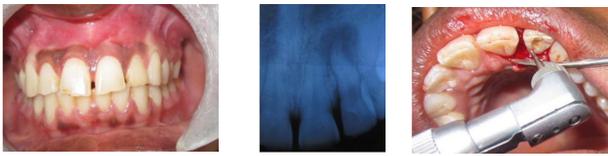


Figure 1a. Shows initial intra-oral draining sinus **Figure 1b.** Shows periapical radiograph showing periapical radiolucency **Figure 1c.** Shallow palatal groove obliterated with slow speed hand piece

Culture and sensitivity test revealed presence of *Pseudomonas aeruginosa*. Accordingly an antibiotic course of cefixime 400 mg twice daily and metronidazole 200 mg thrice daily were advised to the patient for 7 days.

The presence of a bayonet shaped canal complicates non-surgical root canal therapy, with apical curve being extremely susceptible to change in anatomy, causing loss in working length and high chances of instrument separation. So, to successfully manage such canals the instrumentation technique was modified.



Figure 1d. Well defined saucer shaped bone defect was seen in the peri-apex **Figure 1e.** Tissue curetted with slow speed hand piece **Figure 1f.** PRF placed in the bony defect

Initial file was precurved in apical 3 mm. Smaller file sizes were used in apical one third with short amplitude strokes up to 30 K file. Anti-curvature filing was performed in the coronal curve, to prevent stripping. [add Frequent irrigation using Naocl (1%) was done. Saline was used as final rinse. Canal was dried using paper points. Calcium hydroxide intracanal medicament was placed for 15 days. The patient returned to the dental clinics and was apparently asymptomatic, therefore obturation using lateral and vertical condensation was performed. Adhesive post endodontic restoration was placed (Figure 2a).



Figure 1g. Sutures placed **Figure 1h.** One week post-operative shows excellent healing **Figure 1i.** Histopathologic pictures

Patient complained of recurrence of pus discharge after two months of completion of RCT, due to the presence of palatogingival groove an endo-perio lesion was suspected and Patient was referred to department of Periodontology. No pockets were noted with the superficial palatogingival groove and so the patient was posted for an exploratory surgery. Patient consent was taken after careful explanation of the surgical procedure used and the risks and benefits.

Before the surgery, patient’s complete hemogram was done and all the parameters were found to be within normal limits.

Intraoral and extraoral antisepsis was performed using 0.2% chlorhexidine digluconate rinse and povidone iodine solution, respectively. Following administration of local anaesthesia, palatal flap revealed a shallow catch on palatal cusp, which was obliterated using slow speed hand piece (figure 1c). On labial aspect sulcular incision was given and mucoperiosteal flap was reflected. On flap reflection surprising dehiscence was seen which was not associated with any pockets. Well defined saucer shaped bone defect was seen in the periapex. (figure 1d) Meticulous defect debridement was done with respect to 22. Tissue was curetted and sent for histopathological examination. Apicoectomy was performed with slow speed handpiece. (figure 1e.) Burnishing of gutta percha was done Root conditioning was done using tetracycline.⁶

In order to achieve optimal healing and regeneration of bone, it was planned to use PRF in combination with bone graft. Intravenous blood (by venipuncturing of the antecubital vein) was collected in a 10 mL sterile tube without anticoagulant and immediately centrifuged at 3,000 rpm for 10 minutes.^{5,7} PRF was easily separated from red corpuscles base (preserving a small RBC layer) using sterile tweezers just after removal of PPP (platelet-poor plasma) and then transferred into a sterile dappen dish. PRF was squeezed between two gauze pieces to remove excess of plasma. PRF was placed in the bony defect, and compressed to fill the defect (figure 1f). The mucoperiosteal flap was repositioned and simple interrupted sutures were given using 3–0 nonabsorbable black silk suture. (figure 1g).

Post-operative care was explained to the patient, with instructions to report back after a week for suture removal (figure 1h). Recall examinations after 1, 3, 6 and 9 months interval were done to evaluate the healing kinetics of the periapical defect.

Histopathology section showed connective tissue stroma and arcading pattern of stratified squamous epithelium in few areas. Connective tissue stroma shows numerous extravasted RBC's, inflammatory cells and areas of necrosis. These features were suggestive of "PERIAPICAL CYST". (figure 1i)



Figure 2a. Completion of Root canal treatment
Figure 2b. 3 months post-operative showing obliteration of radio opacity
Figure 2c. 6 months post-operative showing complete obliteration of radiolucency

DISCUSSION

This case report highlights the intimate relationship between pulp and periodontal ligament and its subsequent manifestation. The presence of dehiscence was surprising, as it was not associated with any pocket, labial placement of tooth or gingival recession. A periapical cyst was discovered upon histopathologic examination of the denuded tissue. The cause of periapical cyst could be one of the following.⁸

- I. Unreported history of trauma-leading to tooth becoming non vital
- II. Presence of long standing dehiscence which could act as conduit for microbes from gingival sulcus into the dentin. This process continuing over a long time could have caused non vitality of pulp and subsequent peripaical lesion
- III. Activation of Hertwigs' epithelial root sheath (HERS) due to passage of irritants from the gingival sulcus/oral cavity via the dehiscence causing blockage of vascular supply to the pulp leading it to become non-vital.

For optimal healing of bony defect successful regeneration of osseous tissue was aimed for. Regeneration is defined as reproduction or reconstitution of a lost or injured part which fully restores the architecture or function of the part.

To promote periapical tissue regeneration and healing, local application of growth factors and host modulating agents are being used.

However, harvesting these growth factors have been a challenge and posed different technical difficulties. To overcome this, concept of autologous platelet rich concentrate came into picture. Platelet rich fibrin (PRF) is considered as second generation platelet growth factor.^{5,7}

PRF leads to more efficient cell migration and proliferation.⁹ This unique structure may act as a vehicle for carrying cells that are essential for tissue regeneration. Many growth factors, such as platelet-derived growth factor (PDGF) and TGF- β , are released from PRF,^{10,11,12} PRF consists of a fibrin matrix polymerized in a tetra molecular structure, with the incorporation of platelets, leukocyte, and cytokines, and circulating stem cells.¹⁰ Organized dense fibrin scaffold of PRF with a high number of leukocytes is concentrated in one part of the clot,¹³ with a specific slow release of growth factors (such as TGF- β , PDGF-AB, and vascular endothelial growth factor) and glycoproteins (such as thrombospondin-1) during ≥ 7 days.¹²

Earlier studies with PRF have demonstrated faster healing and bone fill when used in the treatment of bone defects, 10 sinus lift procedures, 14 socket preservation, 10 and mandibular grade II furcation defects.¹⁵ Few studies have used it for management of periapical defects, an infected area which is harder to debride and heals slowly on its own.⁴ Studies have questioned whether the amount of growth factors released was adequate for healing of defects of varying sizes. Currently no other major disadvantage of the use of PRF has been reported.⁵ Hence, decision was made to use PRF alone as a filling material.

One week post-operative recall showed excellent soft tissue healing with resolution of sinus tract (fig. 1h). Three months post-operative IOPAR, showed increased radiopacity in perapical area, suggestive of repair/regeneration. (fig. 2b.) At the six month post-operative visit, radiograph showed a definitive trabecular appearance. (fig. 2c.) Nine months post-operative, Trans gingival probing was done under local anesthetic, and a bony hard mass was felt. As no bone grafts (radiopaque/dense) was used, it can be safely assumed that felt bony mass clinically and appearance of trabecular radiopacity on IOPAR to be a regenerated bone.

While the possible etiology was a source of speculation, the authors chose to use modern technology to aid in faster healing of the periapical lesion by placement of Choukrouns' PRF in the osseous defect. Hence, PRF can be considered as treatment modality to enhance healing pattern in periapical osseous defect.

Pulp and periodontium have a close interrelationship. Disease in one has effect on the other and similarity of symptoms makes determination of etiology challenging. An amalgamation of traditional techniques and modern materials would allow clinicians to successfully manage such lesions.

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