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Case Report

Regenerative Therapy With Platelet Rich Fibrin In Endodontically Treated Teeth- A Case Report

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ABSTRACT:

Research into regenerative dentistry has added impetus onto the field of molecular biology. It can be documented as a prototype shift in the therapeutic armamentarium for dental disease. Regenerative endodontic procedures are widely being added to the current armamentarium of pulp therapy procedures. The regenerative potential of platelets has been deliberated. A new family of platelet concentrates called the platelet rich fibrin (PRF) has been recently used by several investigators and has shown application in diverse disciplines of dentistry. PRF as an inter-positional biomaterial release growth factor with its own biological scaffold accelerates and enhances the body's natural healing mechanisms. This case report presents the management of large periapical defect induced by trauma using PRF as a regenerative material.

Keywords: Trauma, Regenerative endodontics, Nonvital tooth, Tooth apex.

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INTRODUCTION

The modern exploration of regenerative dentistry has added impetus onto the field of molecular biology. Assuming the present-day situation, it can be categorically documented as an archetype stint in the therapeutic armamentarium for dental disease. Regenerative endodontic procedures are defined as biologically based procedures designed to replace damaged structures, including dentin and root structures, as well as cells of the pulp-dentin complex.¹ The harmonized spurs of biology and mechanical regulators promoting cellular activities have critically enhanced the acceptance of regenerative therapy for dental tissues. The regenerative potential of platelets has been deliberated. The platelets release growth factors that are trapped inside the fibrin matrix following activation. These are considered to be the stimulant for mitogenic response in the periosteum and are

responsible for bone repair during normal wound healing.² The superior understanding of physiologic properties of platelets in wound healing has led to their augmented therapeutic applications.³ Nevertheless, there is still concern linked to the procedures for production of autologous fibrin adhesives.^{4,5} Dental trauma affects the tooth and supporting tissue and is often associated with pulpal necrosis with endodontic infection. Depending on the bacterial load and host immune response, endodontic infection progresses and flares into acute or chronic apical periodontitis. In cases where conventional root canal therapy fails to eliminate the lesion the periapical surgery is the treatment of choice.⁶ Periapical surgeries account for a substantial portion of endodontic practice and is aimed to remove periapical pathology and regeneration of lost bone and periodontium.^{7,8} Platelet rich factor (PRF) as an interpositional biomaterial release growth factor with

its own biological scaffold accelerates and enhances the body's natural healing mechanisms.⁹

CASE REPORT

A 14-year-old female patient reported to the Department of Conservative Dentistry and Endodontics with trauma to the front teeth 11, 21. Radiographic examination revealed a well-defined periapical radiolucency of about 1.2 X 1.0 cm around the apices of maxillary central incisors. Pulp vitality test showed a negative response to temperature for both teeth. The diagnosis was pulpal necrosis with chronic apical abscess with respect to maxillary central incisors. The treatment plan advised was revascularization therapy with PRF in the maxillary central incisors. In the first appointment Following the placement of a rubber dam, a periapical radiograph was obtained to evaluate the working length of the endodontic access aperture under local anaesthetic. After Biomechanical preparation and irrigation with 2.5% Sodium hypochlorite Modified triple antibiotic paste dressing was given. The access cavity was sealed with cotton pellets and Cavit G. In the second appointment The patient no longer had any symptoms

after a two-week course of disinfection. The teeth were assessed, and the Modified triple antibiotic paste dressing was removed using a H file and alternating solutions of 2.5 percent NaOCl and 17 percent liquid EDTA. Next, sterile paper points were used to dry up the root canal. 30 minutes before the clinical procedure, the PRF membrane was prepared in accordance with Dohan et al's protocol for this operation. 8.5 millilitres of whole blood were taken from the patient antecubital vein by venipuncture. Plaquettes lacking in platelets were found to be the most abundant kind of red blood cells, followed closely by PRF clots. The PRF clot was retrieved, and fluids were squeezed out to obtain a PRF membrane. To create an internal matrix at the apex of the PRF membrane, hand pluggers were used to pack the membrane. Biodentine was condensed against the PRF matrix using hand pluggers. A composite restoration was used to close the access cavity. The patient was recalled at 3 and 6 months for reevaluation. Follow-up radiographs at these intervals showed satisfactory bone regeneration and reduced periapical radiolucency with regained pulp vitality.

Figure 1- Pre-operative pictures in relation to 11, 21.



(Traumatic damage irt 11, 21 where the teeth became non-vital with periapical radiolucency's and with an immature open apex observed in an IOPA.)

Figure 2- Placement of PRF in the affected teeth

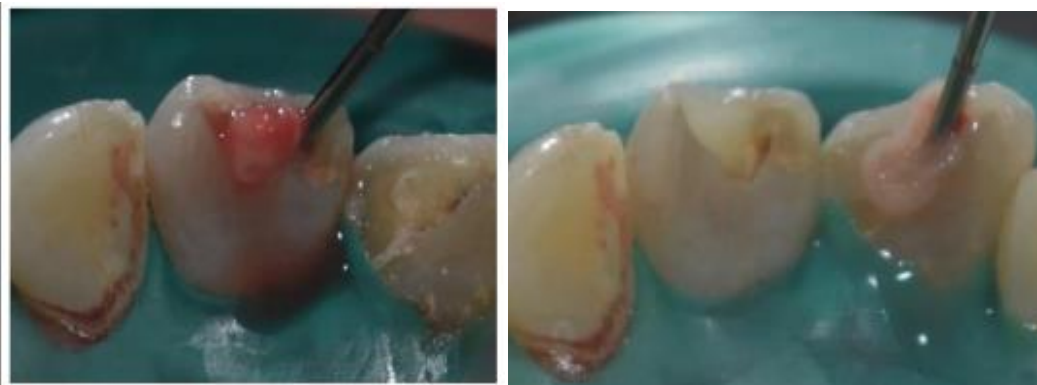
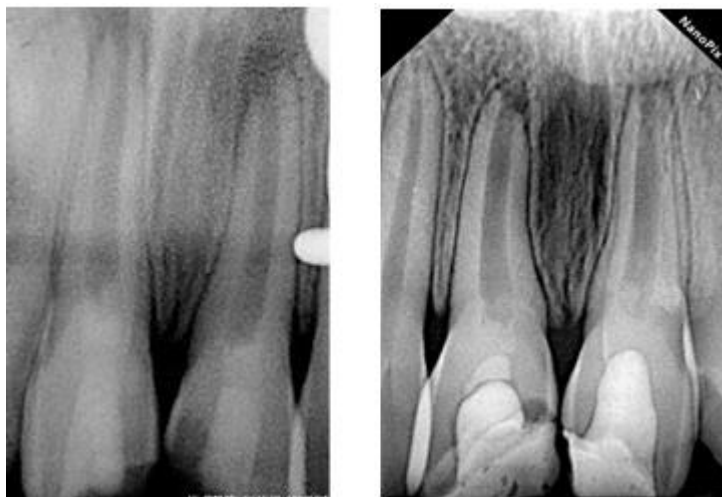


Figure 3- Post-operative IOPA's in relation to the restored teeth

(Immediate post-operative IOPA and follow up IOPA after 6 month showing resolution of peri-apical radiolucency)

DISCUSSION

Endodontic surgery is often a necessary complement when conventional endodontic treatment has not yielded the desired healing outcome. Endodontic surgery is often undertaken due to the loss of bone tissue near the tooth, cortical bone and trabecular bone. After surgical procedure healing usually occurs by repair or regeneration.⁹ The present case report evaluates the clinical efficacy of PRF in the treatment of infrabony defect. PRF is the matrix of autologous fibrin with large quantity of growth factors embedded in it. Fibrin play an important role in wound repair by migration of fibroblast to provide extracellular matrix. Fibrin has also been reported to have a strong association angiogenesis and tissue remodelling.^{10,11} In response to the injury there is platelet activation as well as secretion of active protein for the formation of platelet plug. Growth factors such as Platelet-Derived Growth Factor (PDGF), transforming growth factor β (TGF- β , including β -1 and β -2-isomers), Vascular Endothelial Growth Factor (VEGF), and Epidermal Growth Factor (EGF) can exert chemotactic effects towards the regenerative cells. Active protein secretion through these growth factor binds to trans membrane receptors of the target cells leading to collagen synthesis, wound healing and induction of new bone. It has been reported that PRF clot forms a strong natural fibrin matrix and is an autologous biomaterial. Studies have demonstrated that PRF has shown no cytotoxicity toward many cells including preadipocytes, dermal prekeratinocytes, osteoblasts, oral epithelial cells, dental pulp cells, periodontal ligament cells, and gingival fibroblasts.¹² With the above-mentioned characteristics of platelets and advantages of the PRF in the present case reports, the periapical defects after the surgical procedure were filled with PRF to accelerate the physiologic healing mechanism. The postoperative clinical and radiographic assessments revealed an enhanced healing of the bony lesion at the 6-month follow-up.

CONCLUSION

With the present knowledge, it can be confirmed that PRF can be considered a therapeutic biomaterial. However, despite the evident regenerative benefits of PRF, substantiation of its clinical applications is still limited. Consequently, there is a constraint for the rationalization of its use. Additional randomized, controlled clinical trials are defensible to test the long-term benefits and ultimate outcomes associated with PRF.

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