

PLATELET- RICH FIBRIN: A NATURE'S BOON TO THE FIELD OF PERIODONTOLOGY

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ABSTRACT

Introduction: The pulpal and the periodontal tissues are intimately related anatomically, functionally and physiologically. It has been suggested that periodontal disease is a direct cause of pulpal atrophy and necrosis and is more deleterious to the pulp than both caries and restorations combined. Treating such lesions is crucial to improve the prognosis of the tooth.

Case Report: An endo-perio lesion in the maxillary left lateral incisor region was initially treated with endodontic therapy. Following the endodontic therapy, the circumferential infrabony defect was treated using platelet- rich fibrin and an alloplastic bone graft.

Results: At the end of 6 months, there was a gain in the clinical attachment levels, reduction in the probing depths. The radiographs showed that there was significant bone fill.

Conclusion: Prognosis of a tooth having an endo-perio lesion and undergoing regenerative therapy, can improve significantly with the use of platelet rich fibrin (PRF) with alloplastic bone graft following successful endodontic treatment.

Key words: Endo-perio lesions, Platelet-Rich Fibrin, Infrabony Defects.

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INTRODUCTION

An intimate embryonic, anatomic and functional interrelationship exists between the pulp of a tooth and its surrounding periodontium and was first described by Simring and Goldberg in 1964[1]. There are three main avenues for the exchange of infectious elements and other irritants between the two compartments, that are (1) dentinal tubules, (2) lateral and accessory canals, and (3) the apical foramen[2]. Root perforations and fractures have also been established as the other pathways[3].

Regeneration is defined as, "the reproduction or reconstitution of a lost or injured part"[4]. During the last 12 years, the field of periodontics has made great strides in developing techniques to regenerate lost tissues[5]. Given the intimate relationship between periodontics and endodontics, such regenerative techniques are appearing more adaptable to endodontic therapy as well. Recent case reports have demonstrated that the use of guided tissue regeneration (GTR) can be successfully applied for the



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surgical treatment of endodontic lesions[6-8].

GTR can promote and guide the proliferation of periodontal ligament cells onto denuded root surfaces, thereby, demonstrating extensive regeneration of the attachment apparatus. In addition, the association of demineralized freeze-dried bone allograft (DFDBA) which is osteoconductive, facilitates the bone regeneration process. Regenerative potential of platelets due to the growth factors was introduced in 1974, by Ross et al[9]. Growth factors released after activation, from the platelet rich fibrin (PRF), have been shown to stimulate the mitogenic response in the periosteum for bone repair during normal wound healing[10].

The purpose of this article is to present a case report with an intrabony osseous defect pertaining to an endo-perio lesion, treated by a combination of PRF, DFDBA and GTR.

CASE REPORT

A 31 year old female patient reported to the department of Periodontology, with a chief complaint of pain, swelling and pus discharge from the maxillary left lateral incisor over a month's duration. The tooth had a history of sensitivity to hot and cold which gradually progressed to a spontaneous throbbing pain that aggravated upon lying down.



Fig.1A:Preoperative Probing Depth

probing revealed a pocket of 8mm on the mesial surface (Fig. 1A), there was no mobility detected. An intra-oral periapical radiograph revealed a widening of the periodontal ligament and an intra- bony defect extending along the mesial aspect of the tooth up to the junction of the middle and the apical third of the root (Fig. 1B). The maxillary lateral incisor was diagnosed with an endodontic- periodontal lesion.



Fig.1B:Preoperative IOPA X-Ray

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10

Following ultrasonic scaling, the tooth underwent root canal therapy. An access opening and thorough biomechanical preparation was done and the canal was abundantly irrigated. The canal was dressed temporarily with calcium hydroxide and the cavity sealed with interim cement. The patient was recalled after a week and was found to present with disappearance of pain, swelling and discharge. The final obturation was then performed. The patient was examined after a month and a stable situation was observed.

However, periodontal pockets persisted for which the patient was appointed for surgery.

On the day of the surgery, a full-thickness mucoperiosteal flap was elevated, thorough debridement and root planning was done (Fig. 2A). The osseous defect observed was a 2-walled defect.

PREPARATION OF PRF

10 ml of the patient's venous blood was collected in a test tube and centrifuged at the speed of 2,700 rpm for 10 minutes. The blood segregated into 3 layers, the bottom layer of red blood corpuscles (RBC's), the middle layer of platelet rich fibrin (PRF)

and the top most layer of platelet poor plasma (PPP). Out of this, the PRF was used.

The PRF was mixed with demineralized freeze dried bone allograft (DFDBA, Bone Graft from Tata Memorial Tissue



Fig. 2B:DFDBA Bone Mixed with PRF

Bank, Mumbai.) (Fig. 2B) and was placed into the defect (Fig 2C). The graft was covered with a guided tissue regeneration (GTR) membrane, the flap was repositioned and was sutured into place with a 3-0 black braided silk (BBS) suture using the simple interrupted technique, and surgical COE-Pak was given.

The patient was put on antibiotics and analgesics for a 5 day (Capsule Amoxicillin 500 mg TID and Tablet Ibuprofen 400 mg TID) and the use of 0.2% Chlorhexidine mouthwash with a 1:1 dilution for 7 days. The patient was dismissed with post operative and oral hygiene



Fig. 2C:Graft Placed in Situ

instructions and was recalled for re-evaluation after a week.

On the day of recall, the surgical pack and the sutures were removed. The site was irrigated with normal saline and was checked for healing. The healing was satisfactory. At the 6 month follow up visit, the patient showed a considerable reduction in the probing depth to 3 mm on the mesial aspect. Radiographic evidence showed a significant amount of bone fill (Fig. 3).

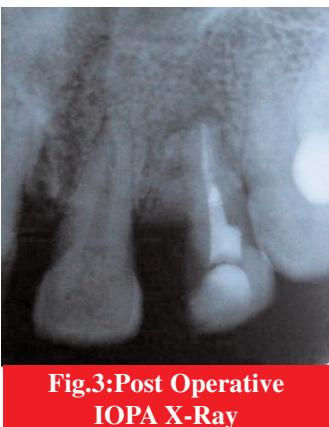


Fig.3:Post Operative IOPA X-Ray

DISCUSSION

Endo-perio lesions are commonly occurring challenges to the dentist. The essence of which lies in the correct diagnosis and thorough elimination of the infection by the help of a precise treatment plan, failing of which, may hamper the prognosis of the tooth. Proper diagnosis is made by the combined result of a careful history, precise clinical examination, special tests and good radiographs. This helps in detecting whether the lesion is a primary endodontic, primary periodontic or a true-combined lesion.

Primary endodontic lesions resolve considerably with endodontic treatment only whereas primary periodontal and true-combined lesions require a periodontal intervention before and after endodontic therapy, respectively. The intrabony defects associated with deep periodontal pockets act as ecological niches for periodontopathogens and may complicate the outcome of any therapy if left untreated. In these cases, even if the clinical symptoms subside after successful endodontic therapy, it is necessary to correct the periodontal defect simultaneously to avoid recurrence and to improve the functional status of the tooth.

Demineralized freeze-dried bone allografts (DFDBA) have been used in periodontal therapy for decades[11]. It is known to have an osteogenic potential that is manifest by exposing bone morphogenic protein (BMPs) which presumably have the ability to induce host cells to differentiate into osteoblasts[12]. They have been successfully used to reconstruct intraosseous periodontal defects[13]. Anderegg CR in 1991, have demonstrated that a combination of guided tissue regeneration (GTR) and DFDBA yields enhanced results when compared to the barrier technique alone[14].

PRF is yet another miraculous discovery that has proved a bonus to the field of periodontics and elsewhere. It is an accepted and most extensively worked upon current biological material with immense regenerative potential. Choukroun's platelet rich fibrin (PRF) is a fibrin matrix in which platelets and growth factors are aggregated and these growth factors are released over a period of 7 days[15]. The released growth factors like PDGF, TGF and VEGF are involved in wound healing and are postulated as promoters of tissue regeneration.

There is a wide range of regenerative and reattachment procedures that have been developed over the years. It is important to recognize and harness the benefits of each process and use

them aptly in the correct sites. The benefit of which, may manifest as maximum regeneration approaching the physiologic contours.

CONCLUSION

The prognosis of a tooth with an endo- perio lesion can be improved by successful endodontic treatment and subsequent periodontal regeneration achieved by the use of platelet- rich fibrin along with alloplastic bone graft and the guided tissue regeneration membrane. The patient has been further appointed for prosthetic rehabilitation.

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