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## Original Article

# Platelet rich fibrin and alloplast in treatment of intrabony defect

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## ABSTRACT

**Background:** For complete periodontal regeneration, delivery of growth factors in a local environment holds a great deal in adjunct to bone grafts. Platelet rich fibrin (PRF) is considered as second generation platelet concentrate, consisting of viable platelets, releasing various growth factors like PDGF, VEGF, TGF, IGF, EGF and bFGF. Hence, this case report aims to investigate the clinical and radiological (bone fill) effectiveness of autologous platelet rich fibrin (PRF) along with use of alloplastic bone mineral in the treatment of intrabony defects.

**Methods:** Intrabony defect was treated with autologous platelet rich fibrin (PRF) along with use of alloplastic bone mineral.

**Results:** A decrease in probing pocket depth, gain in clinical attachment level and significant bone fill was observed at end of 6 months.

**Discussion:** The result obtained with the use of Platelet Rich Fibrin may be attributed to the sustained and simultaneous release of various growth factors over a period of 7 days.

**Conclusion:** According to the results obtained in this case report, it could be concluded that the positive clinical impact of additional application of PRF with alloplastic graft material in treatment of periodontal intrabony defect.

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## 1. Introduction

Periodontal regeneration is a multifactorial process and requires a multi-dependant sequence of biological events including cell-adhesion, migration, proliferation, and differentiation.<sup>1</sup> The ultimate goal of periodontal therapy is to

regenerate the lost periodontal tissues caused by periodontitis.<sup>2</sup> Various controlled clinical trials have demonstrated that some of the available grafting procedures may result in periodontal regeneration in intrabony defects, but complete and predictable reconstruction of periodontal tissues is still difficult to obtain.<sup>3</sup> The reason is that periodontium, once

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damaged has a limited capacity for regeneration.<sup>4</sup> The most positive outcome of periodontal regeneration procedures in intrabony defect has been achieved with a combination of bone graft and guided tissue regeneration.<sup>5,6</sup>

The complex series of events associated with periodontal regeneration involves recruitment of locally derived progenitor cells subsequently differentiated into PDL forming cells, cementoblasts or bone forming osteoblasts. Therefore, the key to periodontal regeneration is to stimulate the progenitor cells to re occupy the defects.

Growth factors are the vital mediators during this process which can induce the migration, attachment, proliferation and differentiation of periodontal progenitor cells. Platelet rich fibrin (PRF) may be considered as a second generation platelet concentrate, using simplified protocol, is a recently innovative growth factor delivery medium. Carroll et al 2008, in vitro study demonstrated that the viable platelets released six growth factors like PDGF, VEGF, TGF, IGF, EGF and b FGF in about the same concentration for 7 day duration of their study.<sup>7</sup>

Platelet rich fibrin (PRF) described by Choukran et al<sup>8</sup> allows one to obtain fibrin mesh enriched with platelets and growth factors, from an anti-coagulant free blood harvest without any artificial biochemical modification. The PRF clot forms a strong natural fibrin matrix which concentrates almost all the platelets and growth factors of the blood harvest, and shows a complex architectures as a healing matrix, including mechanical properties which no other platelet concentrate can offer.

It has been recently demonstrated to stimulate cell proliferation of the osteoblasts, gingival fibroblasts, and periodontal ligament cells but suppress oral epithelial cell growth. Lekovic et al in 2011 demonstrated that PRF in combination with bovine porous bone mineral had ability to increase the regenerative effects in intrabony defects.<sup>9</sup>

In this report, we present the clinical and radiographic changes of a patient using PRF along with alloplast as grafting material in treatment of periodontal intrabony defect with endodontic involvement.

## 2. Case report

A 29 year old man was referred to department of periodontics, Saveetha Dental College, India, with a complaint of pain in relation to left lower tooth. On examination, the patient was systemically healthy and had not taken any long term anti-inflammatory medications or antibiotics.

On periodontal examination and radiographic evaluation, the patient presented with an intrabony defect extending up to apical third of the mesial root (Fig. 2) of left mandibular first molar (#36) with a probing depth of 8 mm using William's periodontal probe (Fig. 1). The patient also presented with pain in relation to #36 tooth and had pain on percussion. There was a lingering type of pain when subjected to heat test using a heated gutta-percha point. The diagnosis was made to be primary chronic periodontitis with secondary endodontic involvement in relation to left mandibular first molar (#36).

Initial therapy consisted of oral hygiene instructions, which were repeated until the patient achieved an O'leary



Fig. 1 – Pre-operative measurements.

plaque score of 20% or below.<sup>10</sup> Scaling and root planing of the teeth were performed. Patient was referred to department of conservative dentistry and endodontics for root canal therapy in relation to #35 and #36 teeth (which were symptomatic to the heat test).

Four weeks following phase 1 therapy, a periodontal re-evaluation was performed to confirm the suitability of #36 tooth for this periodontal surgical procedure. Clinical measurements were made using william's periodontal probe with graduation to a precision of 1 mm.

Blood sample was taken on the day of the surgery according to the PRF protocol with a REMI 3000 centrifuge and collection kits. Briefly, 6 ml blood sample was taken from the patient without an anti-coagulant in 10 ml glass test tubes and immediately centrifuged at 3000 rpm for 12 min. A fibrin clot was formed in the middle of the tube, whereas the upper part contained acellular plasma, and the bottom part contained red corpuscles. The fibrin clot was easily separated from the lower part of the centrifuged blood. The PRF clot was gently pressed between two sterile dry gauges to obtain a membrane which was later minced and added to the graft material (OSSIFI™) (Fig. 4).

An intrasulcular incision was made on buccal and lingual aspect of the tooth of left mandibular teeth (# 35, 36, 37) along with a vertical incision, extending to the muco gingival junction in relation to distal aspect of #35. A full thickness

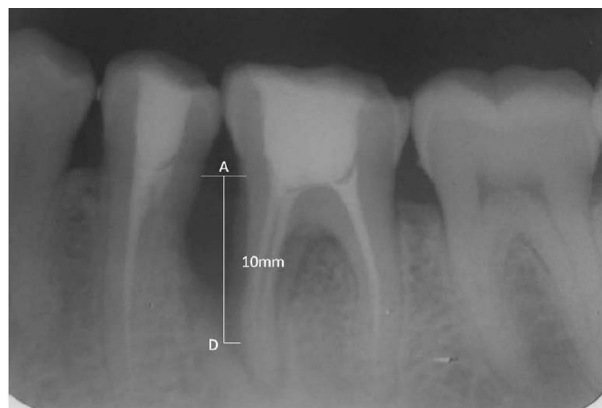


Fig. 2 – Pre-operative radiograph (at baseline).

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