



## MANAGEMENT OF INTRA-BONY DEFECTS USING PLATELET RICH FIBRIN AND ALLOPLASTIC GRAFT MATERIALS : A CASE SERIES

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**ABSTRACT** Success of periodontal disease management is often predicted by the success of periodontal regeneration including bone regeneration. Combination of regenerative procedures have shown to enhance the success rate of periodontal regeneration. One such modality is use of Alloplastic graft material along with Platelet Rich Fibrin as membrane to manage intra-bony defects. This article depicts two cases of management of intra-bony defects with Platelet Rich Fibrin and alloplast such as Perioglas and Hydroxyapatite and has shown improvement in clinical and radiological parameters

### KEYWORDS :

#### INTRODUCTION

Since the earliest times, Periodontal Disease has crippled the survival of human dentition. Since ages, researchers have been struggling to find a "one for all solution" for the treatment of periodontal disease. The current era of management focuses on customised treatment according to patient's disease presentation. However, one notion common to all treatment modalities including intra-bony defects is Regeneration.<sup>1</sup>

Success of periodontal regeneration in intra-bony defects depends on PASS principle as proposed by Boyapati. These factors include primary wound closure, angiogenesis, space maintenance and wound stability.<sup>2</sup> PRF has gained preference over Platelet rich plasma (PRP) due to increased concentration of growth factors including PDGF, TGF- $\beta$ , and IGF-1 (Platelet derived growth factor, Transforming growth factor  $\beta$ , Insulin like growth factor 1) during wound healing which enhances wound healing including periodontal and bone regeneration.<sup>3</sup> The preparation protocol was developed by Choukroun et al in 2001.<sup>4</sup> Since then numerous variants of PRF has been introduced due to variation in preparation protocol.

Bone grafts have been a boon in field of periodontal regeneration since ages. Numerous types of bone grafts are available including autografts, allografts, xenografts and alloplasts. Although autografts are still gold standard in treatment alloplasts such as Hydroxyapatites (HAs) and Perioglas have reduced risk of immunological reactions and high degree of biocompatibility and osteoconductivity. Authors have shown that alloplasts are gaining popularity in bone regeneration due to improved osseointegrative, osteoconductive properties and bioresorbability.<sup>5,6</sup> Two patients who came to the department of periodontology with intra-bony defects were treated with PRF and alloplasts together and showed increased clinical and radiological success in comparison to baseline parameters.

#### Case Report 1

A 36 year old male patient reported to the Department of Periodontology with a complaint of generalized pain and sensitivity in relation to right lower molars since 6 months. There was no relevant medical history. On clinical examination his oral hygiene status was good. The clinical parameters were measured including probing depth, recession depth and clinical attachment level. The probing depth was 9mm in relation to 45 and 7 mm in relation to 46 respectively (Fig 1). Radiological parameters such as intraoral periapical radiographs (IOPA) was carried out for the patient. Radiographic finding showed angular bony defect in relation to the mesial and distal aspect of 46 and distal aspect of 45 (Fig 1). Treatment plan was formulated for the patient which included scaling and root planning followed by open flap debridement along with placement of Perioglas and PRF in relation to 45 and 46.

Phase I was completed which included Scaling and Root Planing and patient oral health education. Patient was recalled after 4 weeks of oral prophylaxis and gingival and periodontal health was evaluated and the patient was then recalled for surgical procedure.



**Figure 1: Pre operative Parameters**

The surgical site was anaesthetized with buccal and lingual infiltration using local anaesthesia of 2% lignocaine with 1:80,000 adrenaline. Horizontal incision was given bilaterally extending from mesial of 45 to mesial of 47. Debridement of the surgical site was done with curettes (Fig 2). PRF for the patient was prepared just before the surgical procedure. 10 ml of blood was withdrawn from the patient and placed in a centrifuge. PRF was formed after processing it at an rpm of 3400 rpm for 10 mins (Fig 2) At the surgical site Perioglas was placed in the distal bony defect of 45 and mesial and distal angular defect of 46. PRF was then compressed into a membrane and placed as a membrane over 45 and 46. Flap was repositioned and suturing was done (Fig 2). Periodontal pack was placed. Post op instructions were given. Patient was recalled after 7 days for suture removal and after 3 and 6 months for measuring clinical and radiological parameters.



**Figure 2: Intra Operative in relation to 45 and 46**

#### Case Report 2

A 43 year old male patient reported to the Department of Periodontology with a complaint of generalized pain and mobility in relation to upper front teeth since 9 months. There was no relevant medical history. On clinical examination his oral hygiene status was good. The clinical parameters were measured including probing depth, recession depth and clinical attachment level. The probing depth was 7mm and clinical attachment level was 9 mm in relation to 11 (Fig 1). Radiological parameter such as intraoral periapical radiographs (IOPA) was carried out for the patient. Radiographic finding showed angular bony defect in relation to the mesial and distal aspect of 11 (Fig 1). Treatment plan was formulated for the patient which included scaling and root planning followed by open flap debridement along with HA and PRF in relation to 11.

Patient was recalled after 4 weeks of oral prophylaxis and gingival and periodontal health was evaluated and the patient was then recalled for surgical procedure.

The surgical site was anaesthetized with buccal and palatal infiltration using local anaesthesia of 2% lignocaine with 1:80,000 adrenaline. Horizontal incision was given bilaterally extending from mesial of 21 to distal of 12. Debridement of the surgical site was done with curettes (Fig 3). PRF for the patient was prepared before the surgical procedure.



**Figure 3: Intra Operative in relation to 11**

At the surgical site Hydroxyapatite was placed in the mesial and distal aspect of 11. PRF was then compressed into a membrane and placed as a membrane over 11 (Fig 3). Flap was repositioned and suturing was done (Fig 3). Periodontal pack was placed. Post op instructions were given. Patient was recalled after 7 days for suture removal and after 3 and 6 months for measuring clinical and radiological parameters.

#### Post Surgical Evaluation

Following surgery the patients were recalled once in a month for 6 months. For case 1, Post operative intraoral periapical radiograph after 6 months showed increased bone fill in relation to 45 and 46 (Fig 4). For case 2 periapical radiograph taken after 6 months showed increased bone fill in relation to 11 which was measured using a standardized method (Fig 4). Periodontal parameters showed reduction in the probing depth and gain in the clinical attachment level by 3-4 mm.



**Figure 4: Post operative Parameters**

#### DISCUSSION

Recent years have shown advancement in field of periodontal regeneration including use of PRF as a membrane.

Guided tissue regeneration promotes selective repopulation of periodontal ligament cells that is primary criteria for periodontal regeneration. PRF differs from PRP such that it doesn't require clotting agent, is faster and has higher concentration of platelets.<sup>7</sup> Authors have shown reduction in probing depth, gain in clinical attachment level and increased bone fill with PRF.<sup>8,9</sup>

Hydroxyapatite is an absorbable alloplast that doesn't comprise of any organic material and thus are highly biocompatible. HA has shown to increase success of regeneration due to its increased conductivity and osteointegrative property.<sup>10,11</sup> Perioglas is a synthetic absorbable bone graft made of calcium phosphosilicate bioactive glass. It has also shown to be osteopromotive in nature along with its ability to upregulate osteoblastic differentiation which has shown to promote bone regeneration.

In our study PRF is placed as a membrane along with alloplastic bone grafts in intra-bony defect site to obtain similar results. Nikhil D Chandradas et al assessed the efficacy of PRF in the treatment of intra-bony defects with and without bone grafts.<sup>12</sup> They concluded that PRF improves treatment success as compared to open flap debridement alone. In our current treatment modality also there were improvements in clinical and radiological parameters. PRF aids in enhanced wound healing and quicker regeneration because of the property of biomodulation. Alloplasts such as Perioglas and HA leads to surge in protein adsorption and osteoblastic adhesion. Hence, our treatments of both the patients have shown improved success due to enhanced bone and periodontal regeneration.

#### CONCLUSION

Management of intra-bony defects with placement of PRF in combination with alloplastic graft material has shown decreased probing depth, gain in attachment level and radiographic bone fill as compared with the baseline. Hence, combination of PRF and alloplasts can be an effective approach towards management of intra-bony defects. However, studies with larger population needs to be conducted to prove statistically significant results.

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