The role of growth factors in autologous platelet concentrate for treatment of periodontal bone defect with platelet rich fibrin: a case report

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ABSTRACT

The ultimate goal of periodontal therapy is regeneration of tissues which are destroyed as a result of periodontal disease. Periodontal regeneration is regarded as a difficult and challenging concept as it requires a complex process of coordination of various cellular activities. Dental surgeons are constantly looking for an edge that jump starts the healing process to maximize predictability as well as volume of regenerated bone. PRF is a new step in the platelet gel therapeutic concept with simplified processing minus artificial biochemical modification which accelerates healing at surgical sites, serving as a beneficial ingredient for regeneration.

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by stabilizing the fibrin clot and PRF fragments serve as biological connectors between osteoblasts. Second, the integration of this fibrin network into the regenerative site facilitates cellular migration, particularly for endothelial cells necessary for the neo-angiogenesis, revascularisation and survival of the graft. Third, the platelet cytokines (PDGF, TGF-β, IGF-1) are gradually released as the fibrin matrix is resorbed, thus supplying a continuous source of growth factors for wound healing to occur. Lastly, the presence of leukocytes and cytokines in the fibrin network can play a significant role in the self-regulation of inflammation within the grafted material.[11]

CASE DESCRIPTION

A 32 year old male patient complaining of food lodgement and pain in the lower right mandibular premolar region reported to the Department of Periodontics and Implantology. Patient did not give any relevant medical history and there was no systemic condition that could interfere with physiologic wound healing. On intraoral examination there was generalized inflammation within the grafted material.[11]

DEFECT WITH PLATELET RICH FIBRIN: A CASE REPORT

Periodontal dressings and sutures were removed. Surgical wounds were gently cleansed with 0.2% of chlorhexidine digluconate and patient was instructed for gentle brushing with a soft toothbrush. Patient was reinforced and motivated for proper oral hygiene measures postoperatively and follow up was done weekly up to 1 month after surgery then at 3 months.

RESULTS

Re-examination at 3 months after the periodontal surgery revealed that PPD was reduced from 9 mm to 4 mm and improvement of CAL from 8 mm to 3 mm with no sign of bleeding on probing and significant radiographic bone formation in the periodontal intrabony defect (Figure 9). The defect size was reduced from 4 mm to 3 mm and alveolar crest resorption was 0.5 mm.

The radiographic defect resolution was calculated as:

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\text{Defect resolution} = \text{Bone fill\-Alveolar bone crest change}.
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The defect resolution in percentage = Defect resolution/defect of intrabony defect x 100.

Bone fill was 75% in this case.

DISCUSSION

The present case report demonstrates the clinical efficacy of PRF in the treatment of intrabony defect and significant improvement radiographically. PRF acts as a healing and interposition biomaterial. The fibrin matrix itself shows mechanical adhesive properties and act as fibrin glue to maintain the flap in a stable position enhancing neoangiogenesis, reducing necrosis and shrinkage of the flap. This environment guarantees maximal periodontal regeneration by remodelling and stabilization of the surgical site for wound.[10]

Polypeptide growth factors are biological mediators that have the ability to regulate cell proliferation, chemotaxis and differentiation. Platelet derived growth factor amongst all growth factors have proliferative, chemotactic and differentiative properties. Platelet rich fibrin is a new step in the platelet gel therapeutic concept with simplified processing minus artificial biochemical modification. This technique requires neither anticoagulant nor bovine thrombin. Its advantages over platelet rich plasma include ease of preparation, minimal expense and lack of biochemical modification. Platelet rich fibrin is a matrix of autologous fibrin where a large quantity of platelets and leukocyte cytokines are embedded during centrifugation. The intrinsic incorporation of cytokines within the fibrin mesh allows for their progressive release over time (7-11 days). The easily applied PRF membrane acts much like a fibrin...
bandage, serving as a matrix to accelerate the healing of wound edges. It also provides a significant postoperative protection to surgical site. The platelets and leukocyte cytokines play an important role in biology of biomaterial. PRF is a biomimetic material. It helps in better healing procedures, easy, fast and cost effective preparation without use of any anti-coagulant, along with functional intact platelets in fibrin matrix and substantial growth factors. PRF is considered the leader in fibrin technology. PRF along with bone grafts have shown to be an effective regenerative modality for the treatment of osseous defects in periodontal diseases.

CONCLUSION
The present case report demonstrated the clinical efficacy of PRF in the treatment of intrabony defect and showed significant improvement in clinical as well as radiographic parameters with 90% bone fill.

CLINICAL SIGNIFICANCE
Importance of autologous material prepared at very low cost chairside for periodontal regeneration

REFERENCES


