

Management of localized advance loss of periodontal support associated Grade II furcation and intrabony defect in chronic periodontitis patient through amalgamation of platelet-rich fibrin and hydroxyapatite bioactive glass composite granules

SANJEEV KUMAR SALARIA, SIMRAT KAUR GHUMAN, SAURABH KUMAR, GARIMA SHARMA

Abstract

Periodontal disease is infectious, complex, multifactorial, chronic inflammatory disease of supporting periodontal tissues that not only alters the bone morphology but also leads to the reduction in bone height. Different types of bony deformities such as horizontal, vertical, craters, and furcation result from periodontal disease, but vertical and Grade II furcation defects are more amenable to regenerative periodontal therapy. The present case report describes the current concept of periodontal diagnosis and the clinical radiographical efficiency of platelet-rich fibrin and hydroxyapatite bioactive glass composite granules graft combination in the management of localized advance osseous defects with respect to tooth number 36 in chronic periodontitis patient at 1 year postoperatively.

Keywords: Furcation defect, hydroxyapatite bioactive glass composite granules, intrabony defect, platelet-rich fibrin, regeneration

Introduction

Regeneration of lost periodontal structures, especially the lost alveolar bone, is a matter of prime concern in the clinical management of periodontal disease as bone destruction is primarily responsible for tooth loss. Different therapeutic modalities such as autogenous bone graft and allograft etc. have been recommended for restoring periodontal osseous defects with their own set of advantages and inherent disadvantages such as sense of procurement of the same, patients discomfort; antigenic reactivity, danger of transmission of diseases such as HIV etc.^[1] Recently, Choukroun's platelet-rich fibrin (PRF)^[2] and a unique alloplastic graft material hydroxyapatite (HAP)-bioactive glass (BG) composite granules (BioGraft® HABG active) because


of promising regenerative potential^[1,2] attracted lot of attention of various researchers. The purpose of this case report is to describe the current concept of periodontal diagnosis and to evaluate clinically as well as radiographically the efficacy of Choukroun's PRF and BioGraft® HABG active combination in the treatment of localized advance intrabony and Grade II furcation defect in #36.

Case Report

A 25-year-old female patient reported to the Department of Periodontics with chief complaint of teeth discoloration, mild and intermittent pain in left lower back tooth region, and bleeding gums while brushing since childhood, 12 and 2 months, respectively. On examination, dental fluorosis, local factors, and gingival inflammation were observed [Figure 1]; bleeding on probing, vertical probing depth (VPD) of 4–5 mm with clinical attachment loss (CAL) of 1–2 mm was present in more than 30% teeth, but distobuccal, distolingual, and mid-lingual aspect of vital tooth #36 Showed VPD 11, 4 and 10 mm [Figure 2] with advance CAL of 9, 2, and 8 mm, respectively, along with horizontal probing depth (HPD) of 6 mm with lingual

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Grade II furcation involvement. The patient was otherwise systemically healthy. The orthopantomogram [Figure 3] and intraoral periapical radiograph [Figure 4] revealed generalized mild bone loss with advance bone loss in furcation and on the distal surface of #36. Generalized mild chronic periodontitis with localized advance loss of periodontal support in #36 was diagnosed.

After Phase I therapy, plaque control was re-evaluated every 2nd week and maintenance therapy was reinforced as per need. By the end of 8 weeks, gingiva was found healthy with normal sulcus depth, but no change was observed in #36. The management of existing isolated intrabony and Grade II furcation defect in #36 utilizing different periodontal regenerative treatment modalities such as bone grafts and guided tissue regeneration was discussed in detail with the patient. Choukroun's PRF and BioGraft® HABG active was selected, and duly signed consent from the patient was taken. The patient was advised routine blood, urine investigations which were within the normal limits and HIV, hepatitis C virus, and hepatitis viral markers were reported to be negative.

PRF prepared just before the surgery as per protocol developed by Choukroun's *et al.*^[3] Ten milliliters of blood sample was taken from antecubital vein of the patient in

sterile glass tube without an anticoagulant and centrifuged at 2400–2800 rpm for 12 min. A fibrin clot was formed in the middle part of the tube whereas the upper and bottom part contained acellular plasma and red corpuscles, respectively.

Under aseptic condition, after local anesthesia administration both the buccal and lingual full-thickness flaps were reflected after crevicular incision with respect to #35–#37 followed by thorough subgingival scaling and root planing of both furcation and intrabony defects associated with #36. A fibrin clot formed in the middle part of the tube was obtained and amalgamated with BioGraft® HABG active and filled in both furcation and intrabony defects of #36 followed by direct loop sutures and periodontal dressing application. The patient was instructed oral rinse twice daily with 0.2% chlorhexidine for 2 weeks and amoxicillin 500 mg and ibuprofen 400 mg was advised thrice a day for 5 days.

Surgical wound healed uneventfully, and sutures were removed 2 weeks postoperatively. Reduction in VPD [Figure 5], HPD [Figure 6], and CAL was observed at 3, 9, 12 months as shown in. Postoperative radiographic evaluation of #36 at 3 months showed mild changes [Figure 7a] whereas complete healing of Grade II furcation and intrabony defect up to the adjacent mesial alveolar bone margin of #37 observed at 9 and 12 months [Figure 7b and c].



Figure 1: Clinical frontal aspect depicts dental fluorosis and local factors associated gingival inflammation



Figure 3: Orthopantomogram reveals generalized mild bone loss with advance bone loss in furcation and on the distal surface of #36

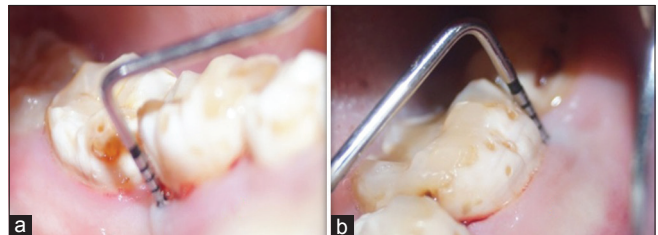


Figure 2: (a) Vertical probing depth of 10 mm at mid-lingual and (b) distobuccal aspect of #36, respectively

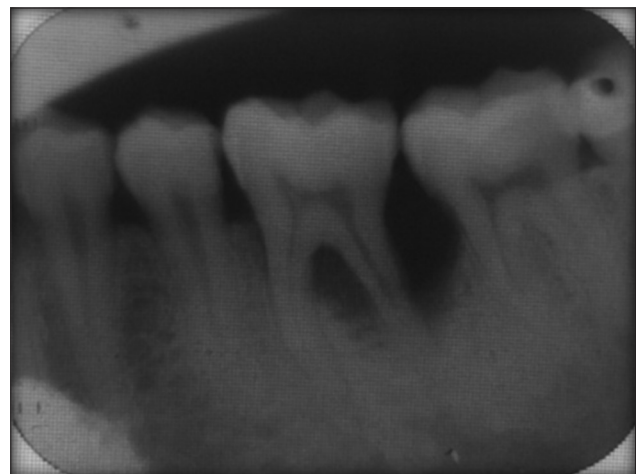


Figure 4: Intraoral periapical radiograph showing interradicular bone loss and severe osseous defect at distal aspect of #36



Figure 5: (a) Vertical probing depth distobuccal aspect reduced to 6 mm (b) reduced to 4 mm (c) reduced to 3 mm at 3, 9 and 12 months postoperative respectively



Figure 6: (a) Horizontal probing depth 4 mm (b) 3 mm (c) 0 mm at 3, 9 and 12 months postoperatively



Figure 7: Postoperative healing of hard structures at (a) at 3 months (b) 9 months (c) 12 months respectively

Discussion

Chronic periodontitis is characterized by loss of attachment due to destruction of periodontal ligament, loss of adjacent supporting bone; usually slow to moderate rate of progression but may have the period of rapid destruction localized, involving one area of the tooth's attachment or more generalized. The area of rapid destruction characterized by probing depth >6 mm with attachment loss >4 mm, furcation involvement if present will exceed Class I (incipient) with radiographic evidence of same.^[4] The severity and distribution/extent of chronic periodontitis was diagnosed on the basis of 1999 international workshop for classification of periodontal diseases and condition; and American Academy of Periodontology task force report 2014, respectively (the task force preferred to use the percentage of affected teeth rather than the percentage of affected sites as an extent descriptor for chronic periodontitis that is generalized chronic periodontitis may be defined as periodontitis without a clear pattern of disease distribution of affected teeth or $>30\%$ of affected teeth).^[5] Similarly, in the present case, the generalized chronic mild periodontitis was observed in $>30\%$ of the teeth along with localized severe loss of periodontal

support with respect to #36, therefore, diagnosed as generalized chronic mild periodontitis associated with localized advance loss of periodontal support in #36.

As regeneration in furcation and deep intrabony defect is difficult to attain because anatomy that impedes the accessibility for individual oral hygiene in molars, professional root debridement and due to slow and difficult integration of the grafted material into the physiological architecture as cited in reports of Sharma and Pradeep^[6] and Rastogi *et al.*,^[7] respectively. In spite of different periodontal regenerative approaches, as currently, not a single regenerative material is considered gold standard in the treatment of osseous defects; therefore, amalgamation of BioGraft[®] HABG active and Choukroun's PRF was utilized because of their promising properties^[8-10] in the present report to obtain maximum outcome.

Dohan *et al.*^[8] reported that the interleukin (IL) 1 β , IL 6, tumor necrosis factor- α , IL 4, vascular endothelial growth factor (VEGF) in the PRF clot play a crucial role in balancing the tissue homeostasis, whereas the healing cytokines IL 4 and VEGF inhibit inflammatory signal pathways thereby support

and coordinate the neovascularization which may be the reason for uneventful healing in present case.

The present case report showed reduction in PDs, CAL clinically and complete healing of furcation as well as intrabony defect radiographically; may be due to the property of BioGraft® HABG that bonds with host bone faster than HAP ceramics and resorbs slowly but completely than BG, which is replaced and remodeled by the new bone. PRF when used as a membrane or as a grafting material creates an improved space making effect, which facilitates cell events that are favorable for periodontal regeneration leading to mineralized tissue formation,^[9] and it also induces the cell proliferation of osteoblasts, periodontal ligament cells, growth factors, but suppress the oral epithelial cell growth.^[10] The combined effect PRF and BioGraft® HABG because of their distinct properties along with thorough debridement may result in excellent outcome in the present case report, which is in accordance with the reports of Rastogi *et al.*^[7] utilized HAP particles with PRF membrane in the intrabony defect, whereas Salaria *et al.*^[11] PRF with BioGraft® HABG active in Grade II furcation defect in molar, respectively.

Conclusion

Amalgamation of PRF and BioGraft® HABG active was effective for the management of adjoin localized advance intrabony and Grade II furcation defect in the same tooth, but long-term randomized clinical trials should be undertaken before reaching final conclusion.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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