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PERIODONTAL REGENERATION IN GRADE III MOBILE TOOTH WITH POOR PROGNOSIS: A CASE REPORT

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Abstract: Periodontal therapy aims to regenerate the lost periodontal tissues caused by periodontitis. Periodontal regeneration is a multifactorial process and requires a multi-dependent sequence of biological events, including cell-adhesion, migration, proliferation, and differentiation. Several bone graft materials have been used in the treatment of infrabony defects, but complete and predictable reconstruction of periodontal tissues is still difficult to obtain. The reason is that periodontium, once damaged has a limited capacity for regeneration. Demineralized freeze-dried bone allograft (DFDBA) has been histologically proven to be the material of choice for regeneration. However, platelet-rich fibrin (PRF) has been said to have several properties that aid in healing and regeneration. When mixed with the bone graft, PRF fragments serve as a biological connector between bone particles. Moreover, the gradual release of cytokines plays a significant role in the self-regulation of inflammatory and infectious phenomena within the grafted material. Therefore, a combination of PRF and DFDBA demonstrated better results in probing pocket depth reduction and clinical attachment gain in a various studies. In this case report, an additional clinical outcome of Combination of DFDBA with PRF in the treatment of periodontal intrabony defect was seen.

***IndexTerms*- DFDBA; Intrabony Defect; Periodontal surgery; Periodontitis; PRF; Regeneration.**

I. INTRODUCTION

Regeneration of lost structures has become the primary therapeutic goal in periodontics[1]. Currently the major progress is being made to achieve this end by utilizing various regenerative procedures such as bone grafting, GTR techniques and combination therapy[2]. The most commonly used graft material to treat the infrabony defects remains demineralized freeze-dried bone allograft (DFDBA)[3]. DFDBA contains bone morphogenetic proteins, which aids in mesenchymal cell migration, attachment and bone formation. DFDBA has both osteoinductive and osteoconductive activity and the ability to create and maintain the space[4]. A second-generation platelet concentrate, platelet-rich fibrin (PRF) was introduced in 2001 by Choukroun *et al*. PRF is available in the form of platelet gel and generally used in conjunction with bone grafts. This combination offers several advantages, including promoting bone growth and maturation, wound healing, wound healing, graft stabilization, hemostasis and improving the handling properties of graft materials[5]. In a several studies, in human periodontal infrabony defects, addition of PRF to DFDBA significantly enhanced the regenerative output obtained compared with bone graft alone[6]. Therefore, In this case report intrabony defect with tooth having hopeless prognosis has been treated with the regenerative technique using DFDBA along with PRF.

II. CASE REPORT:

2.1 Case detail:

A 45-year-old Indian female complaining of pain and food lodgement in the lower right back tooth region reported to the Department of Periodontology. Patient did not give any contributory medical history or presence of any systemic condition that could interfere with physiological wound healing. No history of dental trauma or orthodontic treatment was reported. In addition, no injurious habit was reported by the patient during history taking. On clinical examination it was found that the root canal treatment was completed with the tooth (44). Bleeding on probing with pus exudation accompanied with mild swelling on the lingual surface of 44 was noted. The probing pocket depth (PPD) on the same surface was 10 mm(fig 1), and the clinical attachment level (CAL) was 8 mm, Grade III mobility was detected in relation to 44 and fremitus was found to be positive precluding the possibility of trauma from occlusion. A periapical radiograph was taken, which revealed the presence of saucer shaped intrabony defects (IBD) with respect to 44 which was root canal treated (Figs. 2).

A comprehensive treatment plan was formulated based on the clinical examination with the following sequential steps:

1. Proper oral hygiene instructions as well as motivation of the patient so as to perform effective oral hygiene measures.

2. Non-surgical periodontal therapy by scaling and root planning, using curettes and ultrasonic scaler. In addition, coronoplasty to remove trauma from occlusion.
3. Recall after every week and re-examination of the patient after the completion of healing after 4 weeks following non-surgical periodontal therapy. PPD and CAL were measured every week for 4 weeks after the non-surgical periodontal therapy, and they were still found to be 10 mm on lingual surface. The mobility was assessed to be Grade II after Phase I therapy.
4. Surgical periodontal therapy was done one week after the re-examination of the patient after the completion of healing following non-surgical periodontal therapy.

Before planning for the periodontal surgical procedure, patient's Haematological examination including platelet count (3.54 lac/mm3), Haemaglobin (13.3 gm/dl), Bleeding time (2.6 min) and Clotting time (4.4 min) were assessed and found to be within normal limits.

2.2 Surgical Procedure:

Prophylactic antibiotic was provided by administration of 2 g of amoxicillin orally 1 hour prior to surgery. Under local anesthesia (2% Lidocaine with adrenaline), crevicular incision was given around the 44 including one adjacent teeth and flap was reflected on both the buccal and lingual side. After flap elevation, lingual defect was measured using UNC 15 probe (Hu Friedy). There was defect 5 mm in width and 10 mm in length. After thorough flap debridement(fig.3), regenerative procedure was performed using DFDBA (Giestlich Bio-Oss) (fig.4) along with PRF(fig.5) which was compacted in defect area. Flap was closed using interrupted sutures (Mersilk 3-0) (fig.6).

2.3 Postoperative care:

The suitable antibiotics and analgesics (amoxicillin 500 mg four times per day for 5 days and ibuprofen 800 mg three times per day) were prescribed, along with chlorhexidine digluconate rinses (0.2%) twice daily for 2 weeks. Sutures were removed one week post-operatively. Surgical wounds were gently cleansed with chlorhexidine digluconate, and the patient was instructed for gentle brushing with a soft toothbrush. Patient was re-instructed to maintain proper oral hygiene measures postoperatively and evaluated weekly up to 1 month after surgical procedure and then 3 and 6 months subsequently. No subgingival instrumentation was attempted at any of these appointments. Re-examination at 6 months after the periodontal surgery revealed reduction in PPD (from 10 mm to 5 mm) (fig.7) and CAL (from 8 mm to 3 mm) with no sign of bleeding on probing and significant radiographic bone formation in the periodontal intrabony defect (Fig. 8).

III. DISCUSSION:

Periodontitis, a primary cause of tooth loss in people, is characterized by the bacterially induced inflammation and breakdown of supporting tissues of periodontium, which generally results in the formation of intrabony defects[7]. A combination of factors related to the patient, defect morphology, and surgical procedure appear to influence the overall predictability and effectiveness of periodontal regenerative approaches. Although some of these factors, such as defect morphology, provide insight into the selection and treatment strategy for optimizing regenerative outcome, a clinical need remains for more accurate predictive models and more robust reconstructive and regenerative strategies[8]. Periodontal regeneration in intrabony defects is possible on previously diseased root surfaces, as evidenced by a reduction of pocket probing depth, gain in clinical attachment levels, gain in radiographic bone height, and overall improvement in periodontal health[9].

Numerous therapeutic modalities for restoring periodontal osseous defects have been investigated[1]. Carroll *et al.* 2005, *in vitro* study demonstrated that the viable platelets released six growth factors like platelet-derived growth factor (PDGF), vascular endothelial growth factor, transforming growth factor (TGF), insulin-like growth factor, epidermal growth factor and basic fibroblast growth factor in about the same concentration for 7 days duration of their study[10].

Commercially prepared DFDBA has been shown to retain active bone matrix proteins such as bone morphogenetic proteins (BMPs) 2, 4, and 7. Part of which, appears to be lost, as a result of tissue processing comported to fresh allograft. There is histological evidence that DFDBA supports the formation of a new attachment apparatus in infrabony defects, whereas OFD results in periodontal repair characterized primarily by the formation of a long junctional epithelial attachment[11].

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[12]. Panda S et al. in his case report observed that the positive clinical impact of additional application of PRF with xenogenic graft material in the treatment of periodontal intrabony defect[13].

In the present case DFDBA along with PRF was used to treat the intrabony defect associated with 44. The clinical attachment gain was found after 6 month follow up. Radiographic examination after 6 month revealed the satisfactory bone gain along with the mobility reduction from Grade III to Grade I. The superior effects of DFDBA and PRF combination have been seen in the present Case.

IV. CONCLUSION :

PRF and DFDBA are most commonly used regenerative treatment modalities to treat the intrabony defects. Superior reduction in pocket depth along with greater bone fill can be observed when both of these regenerative materials are used in combination.

Figures and Tables

Figure 1: Preoperative probing pocket depth

Figure 2: Preoperative radiograph

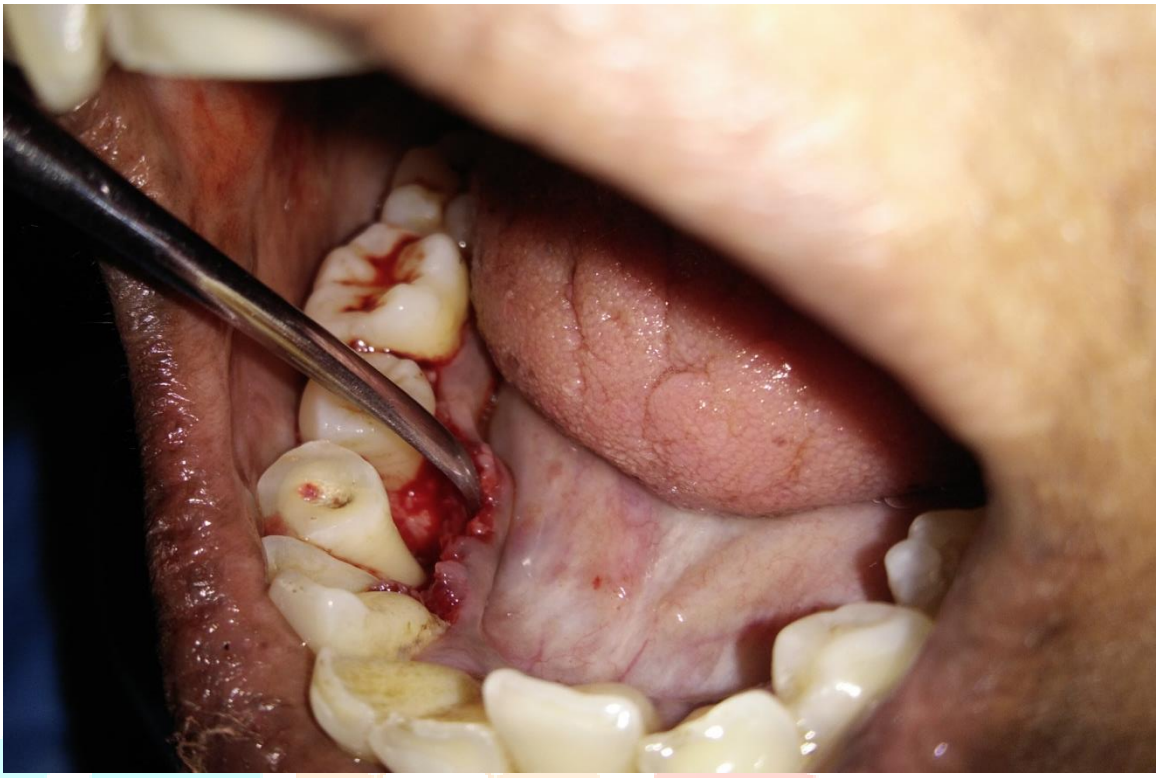

Figure3: Flap reflection and debridement

Figure 4: Demineralized freeze dried bone allograft

Figure 5: Platelet rich fibrin

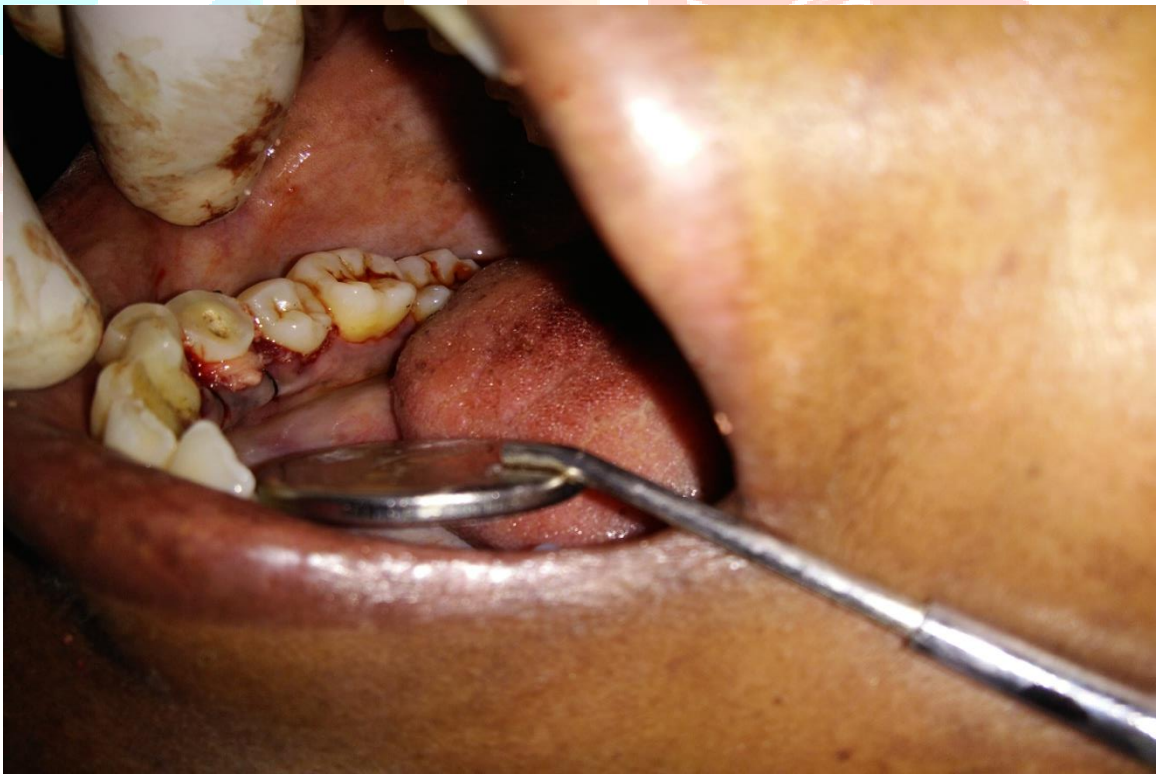

Figure 6: Suturing

Figure 7: Probing pocket depth after 6 months

Figure 8: Postoperative radiograph after 6 months

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