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## Case Report

### DEMINERALIZED BONE MATRIX (DBBM) AND TYPE 1 COLLAGEN MEMBRANE IN THE TREATMENT OF A 10MM PALATAL INFRABONY DEFECT-A CASE REPORT

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#### ABSTRACT

Periodontal disease is characterized by numerous clinical and radiographic features. Infrabony defects are a common finding in progressive periodontal disease. Numerous regenerative procedures with promising results have been developed for the purpose of treating such defects. Since there are several techniques, a combination of these have been tried to enhance the outcome of the treatment. Guided tissue regeneration is a procedure that involves placement of a barrier membrane to help repopulate regenerative cells in an attempt to re-grow lost cementum, periodontal ligament and alveolar bone. Bone grafts have been used to fill infrabony defects caused due to periodontal destruction. These grafts mineralize to form normal bone over a period of time. Guided tissue regeneration in combination with the use of demineralized bone grafts have been used in a regular basis to achieve increased success in treating periodontal defects. The following case report shows a case of a 10mm infrabony defect treated successfully with a combination of guided tissue regeneration and demineralized bone graft.

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#### INTRODUCTION

Infrabony defects are a common clinical finding in Periodontal disease. Multiple treatment options are available for treating infrabony defects<sup>[1]</sup> - (i) Conventional flap surgery (ii) Resective osseous surgery (iii) Regenerative osseous surgery (iv) Bone grafts (v) Guided Tissue Regeneration (GTR) (vi) Platelet rich plasma (PRP). GTR in combination with demineralized bone graft have shown promising effect in improving clinical and radiographic parameters.

The main objective of Guided Tissue Regeneration is to regenerate the periodontal tissues lost due to advanced stages of disease.<sup>[2]</sup> The Principle of GTR is allowing selective repopulation of periodontal cells, especially fibroblasts, which help in formation of new periodontal tissues.<sup>[3]</sup> In addition, the membrane provides space for optimal wound stability that is necessary for periodontal regeneration.<sup>[4]</sup>

Xenografts used in the treatment of infrabony defects can be derived from bovine bone and natural coral. These are also referred to as anorganic bone, since proprietary processes are suggested to remove all cells and proteinaceous material, leaving behind an inert absorbable bone scaffolding upon

which revascularization, osteoblast migration, and woven bone formation occurs.<sup>[5]</sup>

Demineralized bone matrix (DBBM) is a sterile bio-resorbable bovine derived xenograft composed of type I collagen which has demonstrated positive results in management of intrabony defects.<sup>[6]</sup> The positive clinical effects of GTR in treatment of infrabony defects have been well documented. A combination of both xenografts and GTR has been attempted in this case to treat an infrabony defect of 10mm.

#### Case Report

A 38 year old female patient reported to the Department of Periodontics, Karpaga Vinayaga Institute of Dental Sciences, with a chief complaint of pain, swelling and bleeding gums in upper right back tooth region for 2 weeks. She gave a history of dull pain which was intermittent in nature and aggravated on mastication. Bleeding from the gingiva was occasionally seen and the patient had a well noticeable swelling that interfered with occlusion.

#### Clinical Examination

On clinical examination, there was bulbous interdental gingiva in palatal aspect of 14 and 15. The probing depth (PD) in the

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palatal aspect was 10mm and buccal aspect was 3mm [Fig1]. There was no mobility in either of the teeth. Intra Oral Periapical Radiograph was taken to assess the amount of bone loss. It revealed vertical bone loss in between the roots of 14 and 15[Fig 2]. We arrived at a diagnosis of Chronic gingivitis with localized periodontitis with an infra bony defect in relation to 14 and 15.



**Fig 1** Pre operative view showing 10mm palatal defect in 15

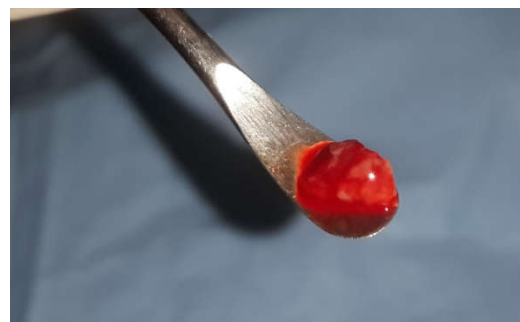


**Fig 2** Pre operative radiograph showing vertical defect

### **Procedure**

A thorough Phase I therapy was done to reduce the inflammation. The patient was given antibiotics and analgesics for 3 days. (Amoxicillin 500mg thrice daily, Flagyl 400mg thrice daily, and Combiflam 500mg t.i.d) and asked to report after 1 week for surgery.<sup>[7]</sup> Prior to surgery again the probing depth was measured. Due to reduction in inflammation PD was 9 mm on the day of surgery. Local anesthesia was achieved by buccal infiltration and a greater palatine nerve block. 1:2,00,000 Lignocaine Hydrochloride with adrenaline was used.<sup>[8]</sup>

Full thickness mucoperiosteal flap was elevated both buccally as well as palatally Loose granulation tissue along the root surface as well as the floor of the defect was removed simultaneously using a curette[Fig 3]. Ultrasonic scaling was done on the root surface to remove calculus deposits. The flap was trimmed using Castro Viejo scissors to remove the inflamed inner wall. Demineralized bone matrix (Osseograft<sup>®</sup>) was incorporated into a sterile dappen dish. It was mixed with saline to a packable consistency. Bone graft was packed into the site in increments using a condenser and wet gauze [Fig 4]. Bone graft was filled adequately and condensed tightly. Care was taken to avoid over filling the defect.



**Fig 3** Granulation tissue removed from the defect



**Fig 4** Defect filled with Demineralized bone matrix Osseograft<sup>®</sup>

Healiguide<sup>®</sup> GTR membrane was cut according to the size of the defect. It was hydrated using saline. The membrane was then inserted into the defect [Fig 5]. Pre suturing was done before complete placement of the membrane. The membrane was inserted totally into the defect and the final knot was placed [Fig 6].



**Fig 5** Healiguide<sup>®</sup> collagen membrane being inserted into the defect



**Fig 6** Sutures placed

Coronoplasty was done in the treated teeth to avoid occlusal load. Periodontal pack was placed for wound protection and to

hold the graft and membrane in place [Fig 7]. Antibiotics and analgesics (Cap. Amoxicillin 500mg thrice daily for 3 days, Tab. Xerodol 500mg thrice daily for three days) were given to augment healing.

Periodontal pack and Suture removal was done after one week. Patient did not develop any post operative complications. The wound healing was satisfactory after one week of surgery. Saline irrigation was done to remove soft deposits. The Patient was again recalled after 6 months.

After 6 months the clinical parameters were assessed clinically as well as radiographically. The probing depth was not assessed in order to avoid any injury to the healing tissues [Fig 7]. IOPA showed an appreciable increase in bone level and an excellent bone fill [Fig 8].



Fig 7 6 months Post operative view showing healing of tissues



Fig 8 6 months post operative radiograph showing bone fill

## DISCUSSION

A prominent clinical finding in advanced periodontal disease cases is Infrabony defects. Numerous regenerative techniques have been developed to treat such defects with varying clinical results. Guided tissue regeneration (GTR) in combination with bone graft stands as a successful treatment modality in periodontal regenerative surgeries.<sup>[9]</sup> GTR is found to be more effective when compared with conventional surgery in the gain of clinical attachment, reduction in probing depth and in the treatment of intrabony and furcation defects.<sup>[10]</sup>

Numerous studies support the use of the bone graft material and the collagen membrane used in this case. The bone graft material used is Osseograft<sup>®</sup>. It occupies the infrabony defect as a filler material<sup>[11]</sup> It helps in supporting the GTR membrane which is placed over it. It also prevents the collapse of the GTR membrane. It acts as a substitute for the lost bone and facilitates native bone formation. This process of formation of native bone is done by osteoconductive/osteoinductive activity<sup>[12]</sup>. It enhances the process of healing following surgery. It serves as a framework to the bone forming cells and

blood vessels thereby encouraging formation of healthy new bone and also helps in the repair of the osseous defect.

DMBM being radiolucent material was not apparent on the radiographs at all times. So, the bone fill in the defects was not easy to notice after 6 months interval. Bone grafts have been used to treat the osseous defects caused due to periodontal disease for a very long time. This procedure has been proven to be successful by assessing the clinical parameters before and after treatment. This procedure must be followed up with effective plaque control by the patient on an everyday basis and must be monitored by a professional on a regular basis for proper maintenance.<sup>[13]</sup>

Healiguide<sup>®</sup>, used in this case, is a Type I collagen membrane collagen. Selection of this membrane was also based on supporting scientific evidence major constituent of gingival connective tissue is Type I collagen. So in order to regenerate the lost connective tissue elements, Type I collagen membrane will prove to be the best choice.

Healiguide<sup>®</sup> is a bio-absorbable membrane. It undergoes resorption by getting incorporated into the connective tissues or by undergoing degradation by macrophages. This process takes about 6–8 weeks to complete. Even though they undergo resorption, their function in acting as a barrier is as effective as a non resorbable membrane.

The collagen membrane acts as a scaffold upon which the fibroblasts migrate and undergo proliferation to form the periodontal ligament fiber cells.

The Type I collagen contained in Healiguide<sup>®</sup> membrane also has hemostatic property. This property enables the membrane to accelerates the wound healing in the surgical site, thereby yielding faster results.

In conclusion, the finding of this study indicated that the use of GTR technique (collagen membrane) in combination with xenogenic bone graft material was beneficial for the treatment periodontal intrabony defects. This combination technique provided improved outcomes in terms of clinical, radiographic, and intrasurgical parameters. Further studies are required with larger sample size and longer follow-ups.

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