

# Treatment of Intrabony Defect using Xenograft and Collagen membrane-A Case Report with Clinico-radiographic Evidence

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## ABSTRACT

Periodontal regenerative procedures attempt to increase the periodontal attachment, bone level and reduce pocket depth in order to improve the immediate and long-term clinical results of periodontally compromised teeth. Guided Tissue Regeneration (GTR) membrane and bone graft materials or their combination has been used for reconstruction of periodontal apparatus. After reflecting a full-thickness flap, thorough debridement and root planing were accomplished in the present case. A bioabsorbable collagen membrane was placed over the xenograft filled defect to treat an intrabony defect. The one-year-follow up showed improvement in clinical parameters with radiographic evidence of bone fill.

Keywords: Bioabsorbable collagen membrane; bonegraft; intrabony defects; regenerative periodontal therapy.

## INTRODUCTION

Periodontitis is an infectious disease leading to destruction of the tooth-attachment apparatus.<sup>1</sup> Teeth with deep pockets associated with deep intrabony defects represent a frequent sequel of periodontitis and are considered a clinical challenge.<sup>2,3</sup> Guided tissue regeneration(GTR) is a technique where placing a mechanical barrier prevents the apical migration of the gingival epithelium allowing periodontal ligament and bone tissue to selectively repopulate the root surface.<sup>3</sup> The combined use of bone graft and regenerative membrane resulted in greater pocket-depth reduction, clinical attachment level gain compared with the implantation of bone graft alone.<sup>2</sup>

## CASE REPORT

A 37-year-old male reported to the Department of Periodontology and Oral Implantology, BP Koirala Institute of Health Sciences, Dharan with a chief complaint of pain in his upper and lower right and left

back teeth region of the jaw for two years. He had a non-contributory family and medical history. Periodontal examination revealed periodontal pockets ranging from 6 to 10 mm in multiple teeth with generalized deposits present (Figure 1). Orthopantomogram and Intra-oral periapical radiographs (IOPA) revealed generalised horizontal bone loss with vertical bony defects in relation to teeth 26,36,43,46 (according to two-digit tooth numbering system, Figure 2). A provisional diagnosis of generalised periodontitis stage III grade C was made.



Figure 1: Initial clinical presentation.

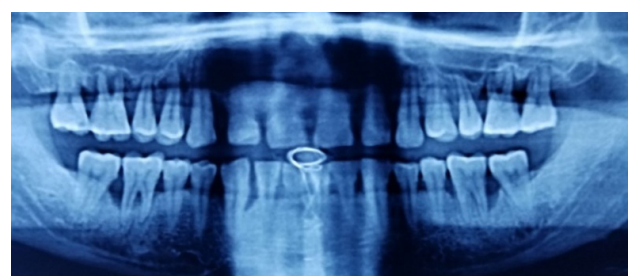


Figure 2: Orthopantomogram showing generalized bone loss.

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**Figure 3: IOPA with respect to 46 (probing depth: 7 mm with UNC-15 probe).**



**Figure 4: After phase I therapy.**



**Figure 5: Distobuccal surface with respect to 46.**



**Figure 6: Lingual view with respect to 46.**

In Phase I therapy, scaling, and root planing (SRP) was done and was re-evaluated after four weeks. On re-evaluation, there was a probing pocket depth of seven millimetre each on the distobuccal surface (Figure 5) and on the lingual surface of tooth 46 (according to two-digit tooth numbering system, Figure 6).

The clinical situation, treatment approach and the type of material to be used were explained to the patient, and consent was obtained for the surgery. Right inferior alveolar nerve block was given with local anaesthesia 2% lidocaine 1:200000 epinephrine and crevicular incision was made using 12D number surgical blade from mesial surface of right mandibular second premolar to mesial surface of second molar region. Full thickness mucoperiosteal flap was raised, to expose the underlying bone

using periosteal elevator. All granulation tissue was removed from the defects and teeth were thoroughly scaled and root planed with Gracey curettes.

After debridement a combined defect was present with three wall defects apically and one wall defect coronally on distal surface of tooth 46 (according to two-digit tooth numbering system, Figure 7) The graft material (Bio-Oss® size 0.25 to 1 mm) was moistened in sterile saline before placement into the defect. Following grafting, a bioabsorbable collagen membrane, Bio-Gide ® was cut according to the morphology of the defect using a template. The membrane was carried to the defect site and adapted over the entire defect to cover two to three millimetres of the surrounding alveolar bone and to ensure the stability of the graft material (Figure 8).



Neither sutures nor pins were used for membrane stabilization. Finally, the mucoperiosteal flaps were repositioned coronally (to prevent membrane exposure) and were approximated from buccal to lingual surface using interrupted sutures (3-0 silk suture) (Figure 9). Post-operative care consisted of rinsing with 0.2% chlorhexidine digluconate solution twice a day for two weeks. Further he was instructed not to smoke and to apply ice intermittently during

the first day on the face over the operated area and was summoned back after one week for suture removal. Post-operative examination and cleaning of surgical site with chlorhexidine was done at two weeks, followed by supragingival scaling every month for upto six months. Neither probing nor subgingival instrumentation was performed during the first 6 months after the surgery.



**Figure 7: Measurement of intrabony defect buccal and lingual view after debridement.**



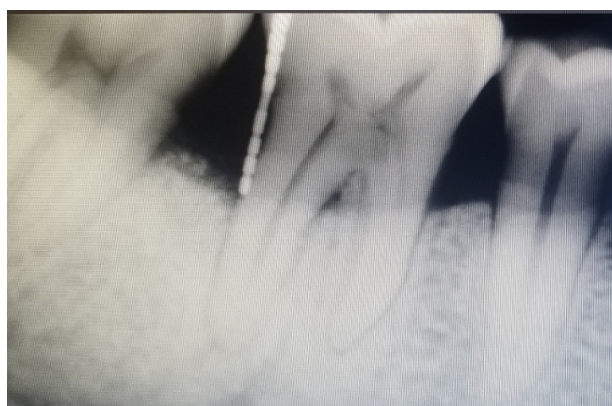
**Figure 8: Placement of graft and membrane in the defect.**



**Figure 9: 3-0 silk sutures placed.**



**Figure 10: Buccal and lingual view after one-year-followup (Reduction in pocket depth).**



**Figure 11: Post treatment radiograph after one year.**

The post-operative healing was good. Surgical site examination revealed the tissues were firm and pink with no any clinical signs of inflammation. A favorable response was observed with the reduction in probing pocket depth of four millimetres, gain in clinical attachment level of four millimetres (Figure 10), and radiologic observation revealed a decreased radiolucency within the intrabony component of the bone defects, after one year of healing (Figure 11).

#### **DISCUSSION:**

A periodontal defect within the bone that is encircled by one, two, or three bony walls is known as an intrabony defect.<sup>4</sup> Angular defects with at least two bony walls on either side provide lateral sources for periodontal ligament cell growth and may thus heal more predictably than intrabony lesions with only one wall, we also anticipated in the present case.<sup>4</sup>

Bio-Oss® is a deproteinized bovine-derived xenograft that is prepared by protein extraction of bovine bone and resembles human cancellous bone with osteoconductive properties. A porcine-derived bilayer collagen membrane (Bio-Gide®) has been proven to be a promising option in Guided Tissue Regeneration because of its slow absorbable property and its ability to enhance periodontal tissue regeneration.<sup>9</sup>

Using GTR membrane and graft material to treat deep intrabony defects is one of the most reliable strategies that could result in considerable clinical advantages in terms of clinical attachment and bone growth, as well as a reduction in pocket depth.<sup>6</sup> In the present case, a biocompatible barrier membrane was surgically placed over the graft filled defect to prevent migration of the epithelial periodontal tissues into the defects allowing time for bone and

other attachment tissues to heal.<sup>5</sup> Additionally, bone grafts with GTR were placed in the defect to support and stabilize the membrane, preventing membrane collapse and promoting bone repair. Reduction in pocket depth of four millimetres and gain in clinical attachment level was observed in this case with use of collagen membrane and bio oss® which is consistent with the result of the study done by Camelo et al.<sup>7</sup> and Gorkhali et al.<sup>8</sup>

Clinical measures as periodontal probing, radiographs, and re-entry evaluations are used to evaluate the outcome of regenerative periodontal treatments. The histologic demonstration is required for the evaluation of the formation of a completely new attachment apparatus, and is the evidence for the periodontal regeneration which could not be examined in the present case. The improvement in clinico-radiographic parameters in the present case was most likely due to the type of treatment, biomaterials used, patients' participation in recall program and the absence of bacterial plaque and bleeding during probing, in the treated sites that

were all necessary for the stability of sites treated with GTR.

## SUMMARY

In the present case report we evaluated the clinical and radiographic response to Bio-Oss graft in combination with Bio-Gide collagen membrane for the treatment of intra-bony defects. Teeth presenting with deep pockets associated with deep intra-bony defects can be successfully treated with regenerative flap surgery and can be maintained with a regular supportive periodontal treatment.

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**Conflict of Interest:** None.

## REFERENCES

1. Bosshardt DD, Sculean A. Does periodontal tissue regeneration really work? *Periodontol* 2000. 2009;51(1):208-19.
2. Cortellini P, Tonetti MS. Clinical concepts for regenerative therapy in intra-bony defects. *Periodontol* 2000. 2015;68(1):282-307.
3. Stoecklin-Wasmer C, Rutjes AWS, Da Costa BR, Salvi GE, Jüni P, Sculean A. Absorbable collagen membranes for periodontal regeneration: A systematic review. *J Dent Res*. 2013;92(9):773-81.
4. Lang NP. Focus on intra-bony defects - Conservative therapy. *Periodontol* 2000. 2000;22(1):51-8.
5. Needleman I, Worthington H V, Giedrys-Leeper E, Tucker R. Guided tissue regeneration for periodontal infra-bony defects. *Cochrane Database Syst Rev*. 2006;(2).
6. Cortellini P, Tonetti MS. Focus on intra-bony defects: Guided tissue regeneration. *Periodontol* 2000. 2000;22(1):104-32.
7. Camelo M, Nevins ML, Schenk RK, Simion M, Rasperini G, Lynch SE NM. Clinical, radiographic, and histologic evaluation of human periodontal defects treated with Bio-Oss and Bio-Gide. *Int J Periodontics Restor Dent*. 1998;1(18):4.
8. Gorkhali RS, Pradhan S, Shrestha R, Agrawal S, Lamicchane K, Koirala PK, et al. Evaluation of bovine derived xenograft combined with bioresorbable collagen membrane in treatment of intra-bony defects. *J Nepal Soc Periodontol Oral Implantol*. 2020;4(2):61-7.
9. Palachur D, Rao KVP, Murthy KR V., Kishore DT, Reddy MN, Bhupathi A. A comparative evaluation of bovine-derived xenograft (Bio-Oss Collagen) and type I collagen membrane (Bio-Gide) with bovine-derived xenograft (Bio-Oss Collagen) and fibrin fibronectin sealing system (TISSEEL) in the treatment of intra-bony defects: A clinical study. *J Indian Soc Periodontol*. 2014;18(3):336.
10. Cortellini P, Buti J, Pini Prato G, Tonetti MS. Periodontal regeneration compared with access flap surgery in human intra-bony defects 20-year follow-up of a randomized clinical trial: tooth retention, periodontitis recurrence and costs. *J Clin Periodontol*. 2017;44(1):58-66.