Successful Management of Three-Wall Periodontal Intrabony Defect Using Novabone Dental Putty®

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Abstract

Chronic periodontitis can result in destructive changes in the soft and hard tissues of the periodontium, culminating in loss of periodontal attachment, formation of periodontal pocket, and loss of supporting alveolar bone. Suprabony pockets are typically associated with a horizontal pattern of alveolar bone loss that is not amenable to periodontal regeneration with available regenerative therapies, while intrabony pockets are associated with vertical or angular bony defects that are often responsive to periodontal regeneration. The purpose of this case report is to describe the regenerative potential of Novabone Dental Putty® in the human periodontal three-wall intrabony defect. The case has been evaluated clinically and radiographically at baseline and 6 months after the completion of osseous regenerative surgery. The successful healing of intrabony defect was found to be achieved after 6 months of follow up.

Keywords: Bone graft, intrabony defect, osteoconductive, osteogenic, osteostimulatory

INTRODUCTION

Periodontal diseases are one of the most prevalent oral diseases which is affecting 95% of the Indian population.[1] An intrabony defects with periodontal pockets are common in periodontitis which represent the anatomic sequelae of the apical spread of plaque in the course of periodontitis.[2] When periodontal disease results in a loss of the attachment apparatus, regeneration of periodontal attachment will become primary aim of the regenerative therapy.[3]

The regenerative therapy for intrabony defects >3 mm is decided by the geometry of the lesion. The three-wall defect is most favorable for the regeneration.[4] Bone grafting is considered as the most common form of regenerative therapy and usually essential for restoring all types of periodontal-supporting tissues.[5] Novabone Dental Putty® (NDP) is a synthetic, fully resorbable, bone graft and has a hemostatic effect. It is composed of calcium phosphosilicate with polyethylene glycol as an additive and glycerin as the binder. It belongs to the class of bioactive glass which has an osteoconductive and osteostimulatory effect.[6] NDP has mean particle size of 750 µ and pore size ranges from 50 to 100 µ with a pore volume of about 60%. It is designed as continuous porous structure comparable to cancellous bone which allows rapid vascularization, mineralization, and permits the formation of new bone.[7]

Being the alloplast, it also offers the advantages of unlimited quantity, no additional surgical site, and no potential for disease transmission. The clinical reports on the effect of NDP in human periodontal applications have been limited. Hence, we decided to treat three-wall intrabony defect with NDP to assess its regenerative potential.

CASE REPORT

A 43-year-old female patient reported regarding her complaint of bleeding from gums since 4–5 months. Patient was systemically healthy, but intraoral examination revealed deep periodontal pocket of 7 mm on mesial aspect with 36. Radiographically, wedge-shaped radiolucency was observed at the mesial aspect of 36 (i.e., angular bone loss) and defect

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depth of 7 mm was recorded with the help of radiographic grid [Figure 1].

After 4 weeks of Phase I therapy, the patient underwent planned surgical procedure. Complete hemogram and random blood glucose test results were within the normal limits. The written consent was obtained from the patient before surgery. The custom-made occlusal acrylic stent with longitudinal groove was prepared to guide the pressure-sensitive UNC-15 periodontal probe and to standardize the probing measurements at baseline and 6 months after surgery. At baseline, the probing pocket depth was 7 mm and relative clinical attachment level was 10 mm mesial to 36 [Figure 2].

After maintaining all the aseptic conditions and using local anesthesia of 2% xylocaine hydrochloride with adrenaline (1:80,000), crevicular incision was made which extends to the two teeth anteriorly and one tooth distally to the tooth being treated, on both buccal and lingual sides of operated teeth [Figure 3]. Full-thickness mucoperiosteal flap elevated with periosteal elevator from the bone until the desired reflection is achieved. Following flap reflection, all accretions (subgingival plaque, calculus, and inflammatory granulation tissue) were debrided from the root and from the intrabony defect with curettes (Hu-Frider®) [Figure 4].

The defects were irrigated with saline. The NDP was used to fill the intrabony defect to the most coronal level of the osseous walls [Figures 5 and 6]. Flaps were repositioned and sutured with interrupted sutures using 4-0 silk and periodontal dressing was placed (Coe pak®, USA) [Figures 7 and 8].

Patient was advised to take systemic amoxicillin 500 mg three times a day for 5 days and ibuprofen 400 mg three times a day for 3 days postsurgery. The patient was instructed to rinse with 0.2% chlorhexidine gluconate twice daily. The patient recalled after 7 days of surgery for the removal of periodontal dressing and suture. Recall appointments were scheduled, and oral hygiene status of the patients was checked and reinforced.

After 6 months of surgery, probing pocket depth was reduced from 7 to 2 mm, and the relative clinical attachment level was reduced from 10 to 5 mm mesial to 36 [Figure 9]. The bone fill of 4.5 mm was observed in the intrabony defect with 36 [Figure 10].
due to the periodontal disease, therapy aims at regeneration of periodontal attachment.[3] In this case report, NDP showed significant improvement in the clinical and radiological parameters of three-wall intrabony defect. This alloplastic graft

**Discussion**

The maintenance of healthy and comfortable function of natural dentition is the primary goal of periodontal regenerative therapy. Whenever loss of attachment apparatus of tooth occurs

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**Figure 5:** Novabone Dental Putty®

**Figure 6:** Placement of Novabone Dental Putty® after thorough scaling, root planning, and debridement of defect area

**Figure 7:** Interrupted direct loop suture placed after approximation of flap

**Figure 8:** Periodontal dressing given

**Figure 9:** Probing pocket depth reduced to 2 mm (6 months after surgery)

**Figure 10:** IOPA RVG showing bone fill mesial to 36 (6 months after surgery)
material does not found to adhere to the gloves and instruments during a surgical procedure. The present case does not show any sign of antigenic response or immunologic reaction.

Bioactive glass is widely used alloplast in periodontal regeneration. They are granular in nature and not reliable as a scaffold. To overcome this limitation, in the present case report, we used NDP as a regenerative material. Due to its putty consistency, graft was easy to place and well stabilized at the defect which assured contact of graft for sufficient period of time at the defect site which is required for regeneration.

The NDP radiographically appears as a sufficiently radiopaque mass at the defect area. It lacks normal trabecular pattern of bone and well differentiated from the surrounding bone. The grafted site appears similar to natural bone in the region after period of time required for the bone remodeling. There will be activation of autocrine mechanism in osteoblasts which is mediated by the induction of secretion of transforming growth factor-b. The particles from NDP release a substantial concentration of soluble silica as well as Ca and P during the first few days in contact with fluids on the implanted site. This may be responsible for the osteogenic effects observed in this case.

Some histological studies have proved that it can prevent an apical migration of the junctional epithelium as well as induces a significant increase in newly formed cementum and periodontal attachment. Information about the effectiveness and benefits of NDP, which is a newer material, in periodontal indications is limited in the literature. The findings of the present case report were in accordance with the study done by Grover et al. and Slezák and Paulusová which showed that NDP is an efficacious treatment option for the management of periodontal intraosseous defects. It led to significant improvements in the probing pocket depth reduction, clinical attachment level gain, and bone fill.

To assess periodontal regeneration, the most reliable outcome is human histological analysis. We avoided performing human histological analysis and re-entry procedure due to the practical as well as ethical constraints and nonacceptance of procedure by the patient. Hence, further long-term clinical studies with large samples along with histological examination are required to evaluate the regenerative potential of NDP.

**Declaration of patient consent**

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that name and initial will not be published, and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

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**Conflicts of interest**

There are no conflicts of interest.

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