The Use of a Thin Bodied Diameter Implant as a Tent Pole for Vertical Ridge Augmentation: A Case Report

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INTRODUCTION

Treatment of vertical bone defects is often necessary to allow implant placement in ideal position for prosthetic restoration. Successful bone augmentation of large vertical resorptions and mandibular alveolar ridge defects is difficult to achieve. Various techniques have been described for the reconstruction of these large vertical defects prior to implant placement. These techniques have included autogenous only block grafts (1,4), autogenous particulate grafts (5,6), guided bone regeneration with membranes or titanium mesh (10,11), distraction osteogenesis (12) and a combination of these (13-15). However, these techniques have disadvantages which include: requirement of secondary surgical procedure, limited access and exposure of the titanium mesh (1-15).

Man et al reported on a novel surgical approach using dental implants as "tent poles" in combination with a bone grafting material. A successful treatment of edentulous atrophic mandibles, resulted in a mean gain in bone height of 10.2 mm (16). The novelty of this strategy was to allow bone grafts to consolidate and maintain their volume around dental implants that provided a tenting effect. This concept can be performed using thin-bodied diameter implants (TBI). The latter were originally introduced as transitional implants (7,8) to support immediately loaded provisional restorations in a single-stage surgery (17-21). These TIBs were designed to be removed at the end of the provisionalization period and replaced with definitive implants (22, 23). Otherwise, TIBs were used clinically, not only for fixed provisionalization, but also as a guide for proper angulation and position of final implants.

The purpose of this case report was to present and describe the step by step technique for the use of a TBI as a tent pole in a guided bone regeneration procedure.

MATERIALS & METHODS

Clinical data in this study was obtained from Implant Database (ID). This data set was extracted as de-identified information from the routine treatment of patients at the Ashman Department of Periodontology and Implant Dentistry (NYUCD) Kriser Dental Center. ID was certified by the Office of Quality Assurance, NYUCD, NYU College of Dentistry (NYUCD). Clinical data in this study is in compliance of the Health Insurance Portability and Accountability Act (HIPAA) requirements and approved by the University Committee on Activities Involving Human Subjects.

Clinical Case

A 57-year-old male presented to Ashman Department of Periodontology and Implant Dentistry New York University College of Dentistry (NYUCD). His chief request was to have an implant placed in the maxillary central incisor area (99) (Fig. 1). His dental history revealed that root canal treatment had been performed on both 98 & 99. Radiographically evaluation, vertical bone loss was observed on both 98 & 99 (Fig. 2). A guided bone regeneration (GBR) procedure was performed under local anesthesia using 2% lidocaine with 1:100,000 epinephrine. A midcrestal incision was made slightly palatal to the previous incision, followed by intrabony incision to the midbuccal of teeth 98 & 99 and a full thickness mucoperiosteal flap was reflected only in the labial area, in order to avoid exposure of the buccal plate. The titanium reinforced membrane was cut with a 15-C blade and a surgical scissors, to create a mnd 4 mm diameter hole to accommodate the implant placement. Bone formation was observed just apical to the implant. The TBI was removed and a healing abutment connected to the corticotomy site (Fig. 7). The complete oral rehabilitation was performed on 98 & 99 with transitional implants. A 4.1 mm platform diameter and 14 mm length, (SLActive, Straumann AG, Basel, Switzerland) was placed, followed by the manufacturer’s protocol in an ideal 3D position (Fig. 9). Implant stability (30 Ncm) was established with a torque wrench. Simple interrupted resorbable sutures were placed using 4.0 chromic gut to close the incision (Fig. 12). The patient was prescribed 0.2% chlorhexidine as an oral rinse, to be used twice a day for two weeks. The patient was monitored with routine surgical follow-up for two months after final implant placement. No post-operative complications were reported.

Bone remodeling after extraction results in vertical and horizontal bone loss (25, 26). Depending on the anatomic position, different surgical techniques can be performed to improve the bone dimensions of the implant site. Many authors have reported on the use of autogenous bone grafts to restore bony defects and allow for the correct positioning of implants (1, 2, 4, 5, 6, 14, 16, 27, 28). However, when treating a severely atrophic alveolar ridge, it is common to encounter large volume defects that must be fully reconstructed to create an esthetic and a functional result. With these large volume material for the grafting procedure (31). Furthermore, in addition to restoring the hard tissue defect, the particulate bone preserves and augments the soft tissue architecture. This allows an option for implant placement and creates a better esthetic result.

The primary advantage of using the procedure described in this case report is the diminished treatment time. Buerg et al reported bone formation using a nonresorbable membrane after a period of healing of 7 to 13 months, prior implant placement (32). Implants placed into a grafted area have been shown to require a healing period of 8.5 months with implant and GBR simultaneously using a non-resorbable membrane.

Fig. 1. Pre-op occlusal view - labial defect
Fig. 2. 4-6mm natural bone can be used for stability
Fig. 3. Fractured view - no vertical defect in soft tissue
Fig. 4. Intraoral design - conservative flap opening
Fig. 5. TBI can be used for "tent-poling"
Fig. 6. TR-PTFE membrane trial
Fig. 7. TBI + ABM + TR-PTFE + Tissue + Submucosa
Fig. 8. TR + ABM + TR-PTFE + Tissue + Submucosa
Fig. 9. Implant with TR-PTFE
Fig. 10. Occlusal opening of PTFE = 14mm BL implant
Fig. 11. Tension-free primary closure

REFERENCES