Journal of

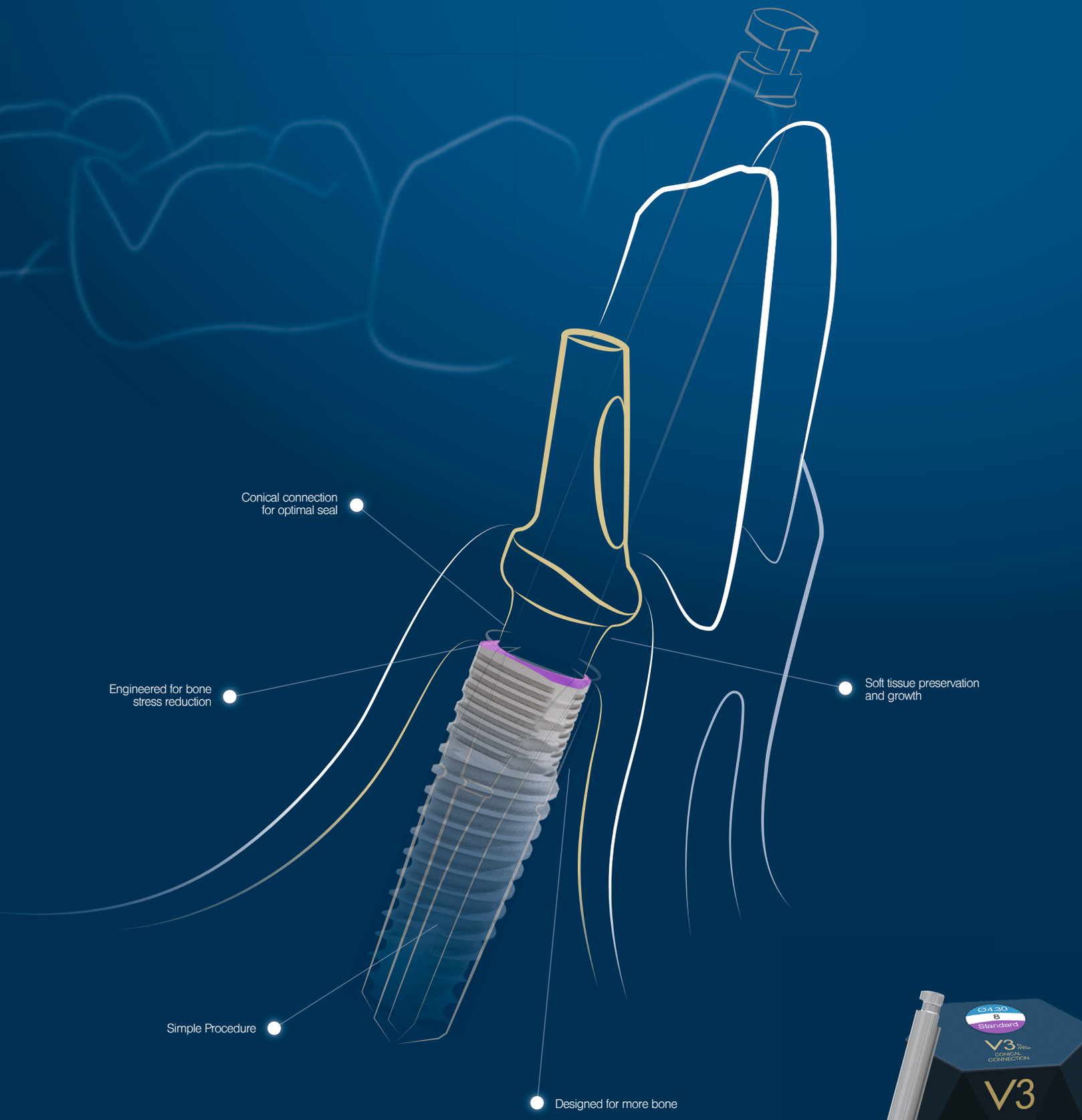
Oral Science & Rehabilitation

Journal for periodontology, implant dentistry, dental prosthodontics and maxillofacial surgery

ISSN 2365-6123 (Print)
ISSN 2365-6891 (Online)

Volume 4 — Issue 1/2018

dti Dental Tribune International



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Editorial

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Flap detachment and retraction in periapical surgery

In many cases, periapical surgery is required instead of tooth extraction and implant placement. In this regard, flap detachment and retraction, affording adequate access to the periapical lesion with good visualization of the surgical field, is crucial in order to ensure meticulous, rapid and correct periapical surgery and treatment success. This in turn avoids damage to the surrounding soft tissue and neurovascular elements, allowing adequate ostectomy, with the sutures resting on hard tissue.

The raising of the flap and traction must be carried out firmly but gently in order to minimize trauma. The sulcus technique, described in apicoectomy of the mandibular premolars, allows safe stabilization of the retractor supported on the bone without harming the surrounding tissue. Adequate soft-tissue management not only results in a better postoperative course, with less pain and inflammation, but also guarantees optimum wound healing. Furthermore, an adequate flap design will increase the efficiency of surgery, resulting in a shorter operating time.

Flap detachment and retraction is fundamental in periapical surgery, but in the past has not been well addressed from the teaching perspective in the books and articles published on this subject. It is important for dental surgeons to learn, use and trust these techniques in order to adequately decide when and when not to indicate dental implant placement.

Dr. Miguel Peñarrocha Diago
Editor-in-Chief

Content

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Sinus lift surgery in severely resorbed maxillae: One-year follow-up

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How to cite this article:

Canullo L. Sinus lift surgery in severely resorbed maxillae: one-year follow-up. J Oral Science Rehabilitation. 2018 Mar;4(1):08–14.

Abstract

Objective

The aim of this prospective study was to clinically analyze the behavior of implants inserted into severely resorbed maxillae after sinus grafting.

Materials and methods

Twenty-six wide-diameter implants with a rough surface over their entire length were inserted during 13 consecutive sinus lifts. Radiographic analysis was preoperatively requested for each patient. After Schneiderian membrane elevation, a magnesium-enriched hydroxyapatite (Mg-e HA) and collagen-based scaffold with a porous 3-D structure was used to prevent perforation during implant placement. Sinus grafting was performed using a biomimetic Mg-e HA. No membrane was used to cover the buccal window. The preoperative residual bone height ranged between 1 and 4 mm (mean value: 2.5 mm; SD: 1.0 mm).

After 6 months of healing, uncovering was carried out and the definitive restoration was seated after 2 weeks. In order to monitor the stability changes, resonance frequency analysis was performed and ISQ (Implant Stability Quotient) values were collected at the first surgery (baseline, T_0), at the abutment connection (T_1) and at the 1-year follow-up (T_2).

In order to measure bone changes, the patients underwent panoramic radiographs after 2-year follow-up. Image analysis software calculated the grafted bone height changes at the level of the implant site, comparing preoperative and follow-up panoramic radiographs.

Results

No postoperative complications were observed. The mean ISQ value was 42.5 (SD: 2.7) at T_0, 75.3 (SD: 8.2) at T_1 and 81.5 (SD: 2.6) at T_2. Statistically significant differences ($P \leq 0.005$) regarding mean ISQ values were found between T_1 and T_0, as well as between T_1 and T_2. After 12 months of functional loading, only 1 implant was lost (cumulative survival rate: 96.15%). During the same observation period, the mean radiographic vertical height of the grafted sinus floor was 11.05 mm (SD: 2.10 mm), with a mean gain of 8.50 mm.

Conclusion

Within the limitations of this study, despite preoperative critical residual bone height, maxillary sinus lift restoration using a biomimetic Mg-e HA and an Mg-e HA/collagen-based scaffold with a porous 3-D structure seems to be a reliable procedure.

Keywords

Sinus lift, magnesium enriched hydroxyapatite, x-ray analysis, ISQ.

Introduction

Sinus floor augmentation has recently become a widely accepted surgical procedure to improve the amount of bone volume before implant placement. Although the use of autogenous bone appears to be the gold standard,[1, 2] much attention has been paid to the use of bone substitutes. After the harvesting procedure, donor site morbidity has to be taken into consideration.[3] Additional disadvantages for autografts are the limited availability and the tendency to resorb.[4] In order to overcome these limitations, several biomaterials have been evaluated in experimental and clinical studies, such as demineralized freeze-dried bone allograft,[5] bovine bone matrix,[4] composite bone graft including platelet-rich plasma,[6] resorbable and nonresorbable hydroxyapatite[7, 8] and beta-tricalcium phosphate.[9] In particular, bioceramics based on calcium phosphate are widely used owing to their biocompatibility, absence of immunogenic factors and osteoconductivity; although, the high temperature during the sintering process could negatively influence osteoconductivity and resorption time.[10] New hydroxyapatites enriched with magnesium (Mg-e HAs) have recently been introduced on the market. Mg-e HA has been demonstrated to allow complete healing of the tissue around a graft and undergoes almost complete resorption already after 1 year.[11] Despite its high predictability, the more recent literature has highlighted possible complications after this procedure.[12] The main complication is membrane perforation, mostly during implant insertion. Mg-e HA/collagen-based scaffolds have been successfully used for sinus augmentation procedures, demonstrating bone formation after 6 months already.[13] Owing to its properties, this material might be suitable to protect the sinus membrane from eventual perforation during implant insertion.

The present preliminary prospective study was designed to evaluate clinically and radiologically implant restorations 12 months after prosthetic loading in severely resorbed maxillae requiring 1-stage sinus lift surgery. The graft used was an Mg-e HA and Mg-e HA/collagen-based scaffold with a porous 3-D structure and was used to prevent Schneiderian membrane perforation.

Materials and methods

Study design and patient selection

One dental center consecutively recruited 13 patients scheduled for implant-supported restoration in the posterior maxilla with a sinus augmentation procedure. A total of 26 wide-diameter implants with a rough surface over their entire length were inserted in extremely resorbed posterior maxillae. The present study was performed following the principles outlined in the Declaration of Helsinki of 1975, as revised in 2013, on experimentation involving human subjects. All of the patients were in general good health. They were informed about the procedure and required to sign a consent form. They were followed for a period of 12 months after prosthetic rehabilitation. The principal inclusion criterion was a residual bone crest (distance between the sinus floor and bone crest) ranging between 1 and 3 mm in height and allowing wide-diameter implant insertion. Additional inclusion and exclusion criteria are summarized below:

Subject inclusion criteria:
- Need for fixed implant-supported prosthesis in the posterior maxilla.
- Aged > 18 years.
- No relevant medical conditions.
- Nonsmoker or smoked ≤ 10 cigarettes/day (pipe or cigar smokers were excluded).
- Full-mouth plaque score and full-mouth bleeding score of ≤ 25%.

Study site inclusion criteria:
- Native bone height of 1–3 mm in the sinus zone.

Subject and site exclusion criteria:
- Acute infection of the Schneiderian membrane or chronic sinusitis.
- Allergies involving the respiratory system.
- A history of bisphosphonate therapy.
- Uncontrolled diabetes (glycated hemoglobin A_{1c} > 6%, glycemic level > 110 mg/dL).

Preoperative and postoperative medication

The patients underwent a preoperative digital panoramic radiograph, subsequently used as baseline. A cone beam computed tomography scan was also required to investigate antral anatomy **(Fig. 1)**. One week before the surgical procedure, full-mouth professional prophylaxis was performed. The patients were instructed to use 1 g of penicillin clavulanate 1 day prior to surgery and continue with 2 g per day for 6 days. Just before surgery, the patients underwent a 5-min mouth rinse with 0.2% chlorhexidine gluconate.