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Introduction

Sinus lift surgery has been a popular surgical tool for the treatment of posterior maxillary atrophy. This procedure, first described in the late 1970s, involves the surgical elevation of the maxillary sinus to facilitate the placement of implants of sufficient length at this critical site in the posterior maxilla, thus enabling the use of a bone grafting material to increase the height of the可用的 sinus cavity. This technique is particularly useful in cases where the bone height is insufficient to accommodate dental implants. The aim of the present case report is to describe the histomorphometric analysis of a sinus lift procedure using synthetic materials and to evaluate the bone regeneration and integration of these materials.

Materials and Methods

The sinus lift procedure was performed using a Bio-Oss® grafting material, which is a fully synthetic, homogenous, and non-resorbable bone substitute made from bovine hydroxyapatite. A collagen membrane was used to separate the sinus contents from the graft material, and the Schneiderian membrane served as the “roof” to the augmented sinus space.

Surgical Technique

The sinus lift procedure was performed as follows: local anesthesia was administered, and a mucoperiosteal flap was elevated, exposing the sinus floor and the area where the graft material would be placed. The Schneiderian membrane was reflected, and a 2 mm drill was used to create a window that was removed, completely exposing the sinus contents. A biodegradable membrane was used to outline the demarcation of the lateral wall of the sinus, and a saline-wet Bio-Oss® graft was placed underneath the reflected Schneiderian membrane.

Results

Histomorphometric Analysis

Histological sections were prepared and stained with Hematoxylin & Eosin (H&E) for morphological examination. The biopsy blocks were cut to 5μm thick sections and stained with hematoxylin & eosin. Bone formation was assessed by counting the number of recordings of each component involved in the area of interest (Fig. 5). The results were analyzed using a computer-aided image analysis program (Bioquant). The percentage of bone, new bone, and residual graft particles was calculated. The graft particles compartment decreased by 60%. This is equal to the volume of bone formed by the newly formed bone. The graft particles compartment decreased by 60%, which is equal to the volume of bone formed by the newly formed bone. The graft particles compartment decreased by 60%, which is equal to the volume of bone formed by the newly formed bone.

Discussion

The present study used Bio-Oss® as a bone substitute in a sinus lift procedure. The graft particles compartment decreased by 60%, which is equal to the volume of bone formed by the newly formed bone. The graft particles compartment decreased by 60%, which is equal to the volume of bone formed by the newly formed bone. The graft particles compartment decreased by 60%, which is equal to the volume of bone formed by the newly formed bone.

Conclusion

The results of the present study provide evidence that Bio-Oss® is an effective bone substitute in sinus lift procedures, with a high percentage of bone formation and minimal graft resorption. Bio-Oss® is a stable, non-resorbable bone substitute that can be used in sinus lift procedures to augment the available bone height and facilitate the placement of endosseous implants.
Clinical Radiographic and Histomorphometrical Analysis of Maxillary Sinus Augmentation Using Synthetic Bone Substitute – 4Bone.
Roncli Koterel, DMD, Haim Tal, DMD, PhD

Introduction
Sinus lift procedures have been performed to increase alveolar bone height prior to or simultaneous with dental implant placement. This technique has been a useful tool in implant surgery, especially in the posterior maxilla. The technique was first presented by Tatum in 1975 and is also known as the Boyne procedure, which was first described in 1980. The technique has been modified and improved upon by many other researchers, leading to the development of various sinus augmentation techniques.

Materials and Methods
The study involved 12 patients who underwent sinus lift procedures using a synthetic bone substitute (4Bone). The procedure was performed using a trephine drill, and the Schneiderian membrane was separated from the housing of the lateral window. A round diamond bur, 2 mm in diameter, was used to enlarge the site into a regular osteotomy. The implant site was then filled with the synthetic bone substitute, and a collagen membrane was placed underneath the reflected Schneiderian membrane.

Surgical Technique
The sinus lift procedure was performed according to the technique described by Tatum and Boyne. Briefly, at the edentulous region, an inner bone window was created, and the Schneiderian membrane was separated from the housing of the lateral window. A round diamond bur, 2 mm in diameter, was used to enlarge the site into a regular osteotomy. The implant site was then filled with the synthetic bone substitute, and a collagen membrane was placed underneath the reflected Schneiderian membrane.

Histomorphometric Analysis
Histomorphometric analysis was performed using micro-CT (micro-computed tomography) scans of the biopsy specimens. The biopsy specimens were scanned using a micro-CT scanner, and the images were analyzed using image analysis software. The mineralized tissue was identified and quantified using the software, and the results were expressed as percentages.

Results
A CT scan performed immediately postoperatively showed stability of the grafted material (Fig. 1). Histological examination of the biopsy specimens showed that the synthetic bone substitute was well integrated with the bone tissue, with minimal resorption of the bone. The new bone formation accounted for 28% of the total surface area. Ample data was reported on the use of different sinus augmentation techniques, and the results of this study are in line with previous studies.

Discussion
New bone formation in the present study averaged 28%. This value is lower than the 40% reported by Cammack et al. who used xenograft and demineralized bone matrix. The results of the present study are similar to those of previous studies, and the synthetic bone substitute used in this study showed promising results.

References
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A CT scan performed 9 months after sinus grafting demonstrates radiographic augmentation. The contact length of the new bone/graft particles relative to the pristine bone was 61% (Fig. 3). The interface between newly formed bone and the mineralized material (new bone formation) are well documented.32,38,39 New bone formation in the present study averaged 28%. This value is lower than the 40% reported by Tatum et al.40 However, this value is comparable to the 34% obtained in the present study. Ample data was reported regarding new bone formation in sinus augmentation procedures. Although our study is based on a single case, the 4Bone procedure has never been investigated. In 99.2% of cases, the graft particles compartment decreased from 39.2% to 27% in the same period. The graft particles compartment measured was 40% in our case (Fig. 5). The difference is 3% (96%). This is equal to the value achieved in the case of Tatum and colleagues.40 However, the graft particles compartment measured was the best reported value. The graft particles compartment increased from 39.2% to 27% in the same period. The graft particles compartment measured was 40% in our case (Fig. 5). The difference is 3% (96%). This is equal to the value achieved in the case of Tatum and colleagues.40 However, the graft particles compartment measured was the best reported value. The graft particles compartment measured was 40% in our case (Fig. 5). The difference is 3% (96%). This is equal to the value achieved in the case of Tatum and colleagues.40 However, the graft particles compartment measured was the best reported value. The graft particles compartment measured was 40% in our case (Fig. 5). The difference is 3% (96%). This is equal to the value achieved in the case of Tatum and colleagues.40 However, the graft particles compartment measured was the best reported value. 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