

MAXILLARY SINUS FLOOR AUGMENTATION WITH ENZYME PROCESSED DFDBA AND ENZYME PROCESSED LYOPHILIZED DURA MATTER WITH IMMEDIATE IMPLANT PLACEMENT. CLINICAL AND RADIOLOGICAL FINDINGS

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Abstract.

Context: Sinus floor augmentation expanded the options for edentulous patients to receive dental implants.

Objective: to evaluate guided tissue regeneration for sinus augmentation with simultaneous implant placement.

Methods: Five sinus lifts with 16 simultaneous dental implants were performed in 4 patients. Freeze-dried dura mater served as collagen barrier and freeze-dried bone allografts were used as bone substitute.

Results: Functional loading with was applied 9 - 12 months after surgery. Clinical and radiological evaluation showed stable bone environment after 2 years of loading.

Conclusions: It can be concluded that guided bone regeneration is reliable for sinus floor augmentation and simultaneous implant placement.

Key words: sinus floor augmentation, simultaneous implant placement, freeze-dried dura mater, demineralized freeze-dried bone allograft, enzyme-processing.

INTRODUCTION

The edentulous or partially edentulous resorbed and pneumatized maxilla is recognized as the most difficult area for rehabilitation in dental implantology. [1-3] Reduced alveolar bony volume does not allow for accommodation of dental implants of adequate length and diameter. Additionally, primary implant stability is often compromised by the poor bone quality in this region. [2, 9 10] Many different techniques have been proposed to address the problem [2, 7, 9, 10, 17] Lateral maxillary sinus augmentation (LMSA) was first suggested in 1974 by Dr. Hilt Tatum and then published by Boyne and James in 1980. [5] They described a 2-stage bone grafting procedure with a healing phase of 4 to 6 months. The method was used by other workers and in 1996 The Sinus Consensus Conference raised by the Academy of Osseointegration came to the conclusion that the sinus lift is highly predictable and effective treatment modality. [9]

PURPOSE

The aim of this study was to evaluate a method for lateral maxillary sinus augmentation with simultaneous implant placement utilizing enzyme-processed allografts.

MATERIALS AND METHODS

Patients. Seven adults (5 females and 2 males) requested dental implants for missing maxillary molars. In all cases the natural teeth had been lost many years earlier resulting in extensive alveolar ridge resorption. Benefits and complications of the proposed method were meticulously explained and signed informed consent was obtained before treatment. Patient and defect distribution is shown on Table 1. Three patients were tobacco users; all had developed some masticatory parafunctions. Root-form dental implants. A total of 11 Taper-Lock (Paragon Implant Company, Encino, Ca; consequently Centerpulse Dental) and 7 Anthogyr (Anthogyr, Salanches. France) screw implants were simultaneously mounted during the LMSA procedure. Two of them were mounted in fresh extraction sockets. Surgical technique. The patients were operated on under local or general anesthesia. A bony window was outlined and fractured inwards. Schneiderian membrane was elevated (Fig. 1) and implant osteotomies were prepared. The space between the sinus floor and the elevated membrane was packed with partially or fully demineralized freeze-dried bone allografts (1)1 DBA). The implants were mounted and freeze-dried dura mater allografts (FDDMA) were applied as collagen barriers.

Patient Nr	Gender	Age	Number of implants	Implants		Tobacco usage (cigarettes per day)	Parafunctions			
				Paragon	Anthogyr		Bruxism	Bruxomania	Chewing hard things	Food consistency
1	f	42	2	2		40	yes	yes	no	Hard mainly
2	m	40	4	4		0	no	yes	yes	Soft mainly
3	m	44	2	2		30	yes	yes	no	General
4	f	50	4	3	1	12	yes	yes	no	Hard mainly
5	f	72	2		2	0	no	yes	no	General
6	f	42	2		2	0	yes	yes	yes	Hard mainly
7	f	63	2		2	0	yes	yes	no	General
		50	18	11	7		5	7	2	

Table 1. Patient and im plant distribution.

Membranes were positioned over the w indow and fixed. Allografts were prepared at the Institute of Food Technology and Lyophilization, Sofia with enzyme-processing as a substantial part of graft transformation. Postoperative follow-up. Patients were examined clinically and radiographically on a pre-designed for all patients schedule. The variables followed were clinical - implant mobility (IM), probing depth (PD), and clinical attachment level (CAL); and radiological - radiolucency changes in augmented area. (Table 2).

RESULTS

All patients experienced uneventful healing. Seventeen implants were uncovered after 10 months and 1 (the patient with additional implant) after 4 months of healing. At re-entry operation bone apposition around and over the implants was found in all cases and the e-FDDMA membrane was still distinguishable. Gingival healing screws were placed for 3-4 weeks, replaced by fixtures and the final bridgework was cemented. Soft tissue changes within the 2 year period as verified by clinical measurements were minimal with no implant dehiscence and periimplantitis. Radiographic examinations revealed extensive bone resorption of the bone regenerate during the first year which then slowed down in the next year. All implants serve successfully as supports for cemented bridges (Fig. 3).

DISCUSSION

Three major surgical procedures are considered to be the most effective in dealing with dental implants and excessive bone loss of posterior maxilla: [2, 3, 9, 11, 16, 17, 20] 1) alveolar ridge augmentation with sandwich onlay bone grafts; [2, 3, 5, 6, 17] 2) Le Fort 1 osteotomy with interpositional bone grafting; [2, 3, 5, 6, 17, 19] and 3) sinus floor lift with inlay grafts [1-3, 5, 7, 9, 10-13]. Grafting to the alveolar ridge may reduce posterior interocclusal space causing prosthetic restorative problems. [12, 13] Le Fort I osteotomies with simultaneous bone grafting must be performed under general anesthesia

and there is potential for relapse of the maxillary segment. [12, 13, 17, 19, 20] Only with the sinus lift approach alveolar augmentation is achieved preserving the existing maxillo-mandibular occlusal relationship. [6, 7, 12, 13]

In all grafting procedures the most important hazards are infection and resorption. Soft tissue changes we found during the 2 year period are within accepted ranges and do not show signs of inflammation (Fig 3). Variations in regenerate resorption activity as visualized by radiographic examinations revealed extensive resorption during the first year which gradually slowed down in the next months to clinically insignificant levels (Figs. 2 and 3).

Membrane material has a crucial role for final outcome of GTR therapy. Fontana, Trisi and Piattelli [8] implanted 85 FDDMA around dental implants and reported full defect substitution with bone and excellent osseointegration with partial dehiscence of only 4%. Histological examination showed formation of both cancellous and cortical bone. Remagen and Prezmeky [16] used dura mater membranes for alveolar ridge augmentation in more than 600 cases and demonstrated microscopically new bone formation in all cases. Piattelli, Scarano and Piattelli [14, 15] also found new lamellar bone after alveolar ridge augmentation with FDDMA and demineralized bone in all cases. Piattelli, Scarano and Piattelli [14] and Peleg et al [13] published histological results after GTR with dura mater for treatment of peri-implant dehiscencies and fenestrations proving its effectiveness.

Shah and Jathal [18] and Borissov et al [4] proved clinically and histologically the biocompatibility of FDDMA in experimental studies, pointing out that human FDDMA [4] is a xenogenous material to the experimental animals. We could not achieve the permission of taking biopsies at re-entry because of patients' fear of jeopardizing the bone regeneration and implant osseointegration process.

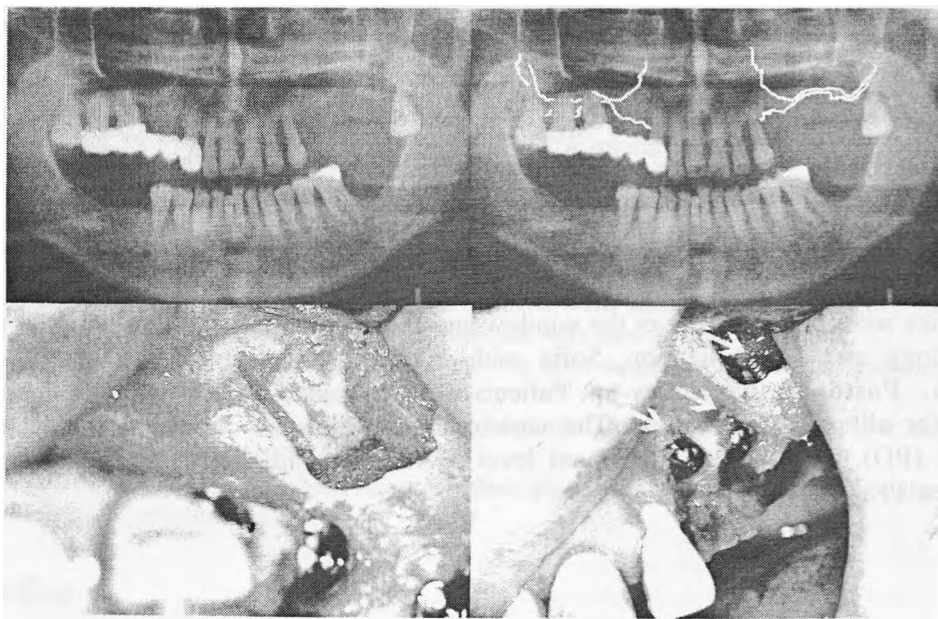


Figure 2. Technique of LMSA. A and B: Shows maxillary atrophy and planned extraction of tooth 28; C: The bony window is fractured, and pushed into the sinus. The space between the sinus membrane and floor is packed with ep-DFDBA; D: Three implants mounted. With the exception of their cervical parts implant bodies freely penetrate into the sinus cavities. Insufficient alveolar width and exposed threads of implants in positions 24 and 25 (arrows).

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