

Placement of Porous Tantalum Trabecular Metal Implants in Sinuses Augmented with Mineralized Allografts: Interim Results from a Single Center

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1 Introduction

Dental implant placement in the posterior maxilla can often be complicated by pneumatization of the sinus, alveolar ridge resorption and the presence of low-density of bone.¹ The resulting lack of available bone for implant placement can be overcome by subantral augmentation (sinus lift) procedures.¹

A tapered, multi-threaded implant with a modified midsection of highly porous tantalum material (Trabecular Metal Dental Implants, Zimmer Dental Inc., Carlsbad, CA) has been developed to augment anchorage through osseointegration, a combination of conventional osseointegration and bone ingrowth and neovascularization inside its network of interconnected pores.²

To evaluate the long-term clinical performance of TM implants, a 5-year, multicenter, Longitudinal Data Collection Program (LDCP) is currently being conducted in Europe. The study is ongoing in 5 countries across 22 sites including university settings and private practices. The study complies with the Declaration of Helsinki and the ICH-GCP and is being conducted under the auspices of the local institutional review boards and ethics committees. Investigators were required to follow the implant's instructions for use (IFU) and their own professional judgment in patient selection and treatment. The study enrolled patients with concomitant health conditions and elevated risks for implant failure and/or bone loss.

Implant placement in sinus grafts has been reported in the dental literature as a potential risk factor for implant failure; a single study center in Italy placed TM implants in grafted sinuses of extremely atrophic maxillae. This poster reports on the current status of these cases.

2 Methods

Sixteen patients with extremely atrophic maxillae were enrolled in the study. The maxillary ridges were augmented with a composite graft of 80% cortical and 20% allogenic bone chips (Puros®, Zimmer Dental Inc.) and left to heal for 6 months.

On presenting with healed ridges, TM dental implants were placed in 21 sinuses of the 16 patients. Three months after implant placement, the sites were uncovered and the implants counter torqued at 25Ncm to evaluate stability. The implants were restored if clinically stable.

Implant success and survival will be evaluated clinically and radiographically at annual follow-up for 5 years.

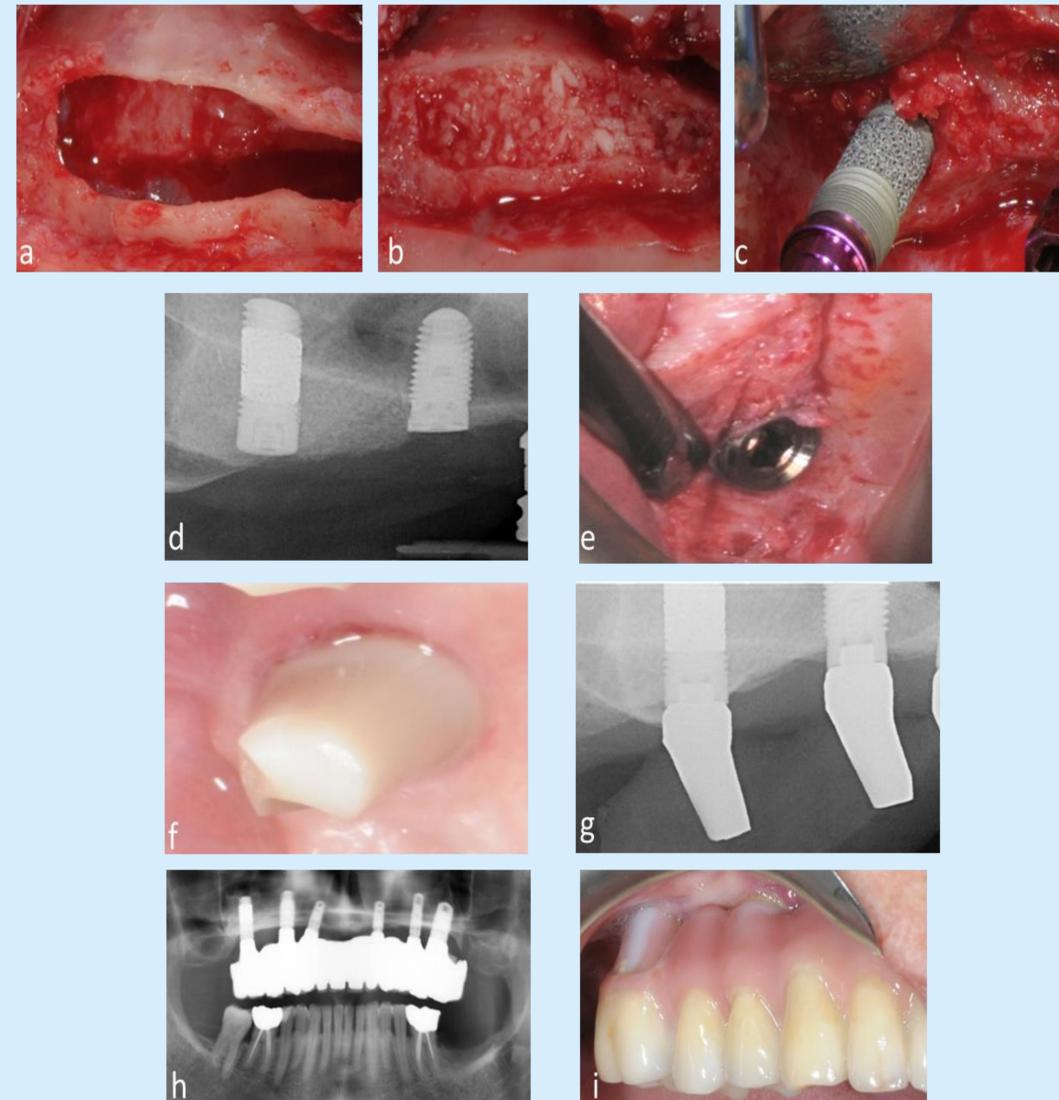


Figure 13: A 70-year old, female patient presented to the clinic with an extremely atrophic maxilla and was treatment planned to receive 6 implants (1 TM implant in relation to the maxillary right first molar and 5 non study implants (Zimmer, Tapered Screw-Vent). (a, b) A crestal window technique was used to perform the sinus lift procedure. The sinus was augmented with a composite graft of 80% cortical and 20% allogenic bone chips (Puros®, Zimmer Dental Inc.). (c) Six months following the augmentation procedure, the TM implant was placed. (d) Radiographic view post implant placement. (e) The TM implant was uncovered after 3 months of healing and subjected to 25Ncm of counter torque to evaluate stability. A healing collar was placed over the implants and allowed to heal for an additional 3 months. (f) A zirconia abutment was then placed for provisional restoration. (g) Radiographic view at the 1-year annual follow-up. (h, i) Radiographic and clinical views of the implant at 2-year annual follow-up; implants were stable and without complications at this visit. The patient received a definitive full arch restoration at this visit.

3 Results and Discussion

Sixteen patients (6 males and 10 females) were treated with 21 implants after maxillary sinus augmentation. The average age of the patients in the study was 57.11 (range 38-71) years.

31.2% (n=5) patients had one or more concomitant risk factors that could affect the implant survival and/or bone maintenance around the implant (smokers=3; history of systemic disease=2; periodontal disease=1). All sites presented with a low density Type 4 bone (n=21). All implants tolerated the counter torque of 25Ncm applied at implant uncovering at 3 months of implant healing. One patient with one implant was lost to follow up at 15 months. Two patients with single implants reported resolved systemic disease (cancer) unrelated to the study at 1-year follow-up. To date, the implants have been followed up between 21 to 33 months with no failures or peri-implant pathologies reported. Hence, the implant survival is 100% (n=20/20). The average bone level change from implant placement to 1 year follow up is 0.65±0.56 mm.

Table 1. Demographics and Implant Design Summary

Patient Age (years)	Average	57.11
	Minimum	38
	Maximum	71
Implant Design	Diameter (mm)	4.1 (n=4); 4.7 (n=17)
	Length (mm)	10 (n=2); 11.5 (n=19)
	Collar Surface Finish	Machined (n=1) Textured (n=20)

4 Conclusions

Within the limitations of this case series,

- Placing TM implants into grafted sinuses resulted in a high level of predictability.
- There appears to be no difference in implant survival between healthy and elevated risk patients within this sub group.

5 References

1. Altintas NY, et al. Comparative radiological analyses of newly formed bone after maxillary sinus augmentation with and without bone grafting. J Oral Maxillofac Surg 2013; 71:1520-1530
2. Schlee M, van der Schoor WP, van der Schoor ARM. Immediate loading of Trabecular Metal-enhanced titanium dental implants: interim results from an international proof-of-principle study. Clin Implant Dent Relat Res 2013; Jul 30. doi: 10.1111/cid.12127. [Epub ahead of print].
3. Images courtesy of Dr. Carlo Maria Soardi, Brescia, Italy