



Trabecular Metal™ Implants — from Orthopedics to Dental Implantology

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1 Background

Trabecular Metal Material* (TM) is an 80% porous, tantalum-based biomaterial with a trabecular structure designed for bone ongrowth and bone ingrowth (osseoincorporation). Its extensive clinical use in orthopedics¹⁻² led to the development of a new, tapered, threaded, titanium dental implant with a TM midsection. Evaluations in both animal³ and human⁴ models have suggested that the combination of conventional implant threads and TM's interface with the bone⁵ may provide adequate primary anchorage to support immediate loading in selected patients. The present study was conducted to evaluate that concept.

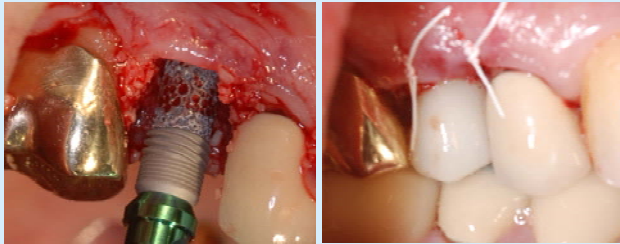


Figure 1: TM implant immediately placed into a grafted sinus using a crestal approach through a fresh extraction socket (left). After placement, the implant was immediately provisionalized out of occlusion (right).

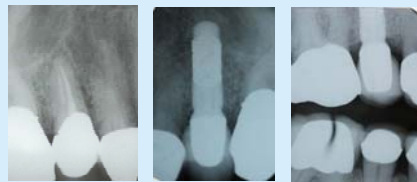


Figure 2: Preoperative (left) and 10-months after loading (middle and right).

2 Materials and Methods

Eighteen (18) implants were placed with or without simultaneous bone augmentation in 14 patients with healed or fresh extraction sockets (Figures 1-4). Impressions for the final prosthesis were taken at implant placement. Within 48 hours of placement, implants were immediately provisionalized out of occlusion. Implants were definitively loaded in occlusion within 2 weeks postoperative. Clinical and radiographic evaluations of bone levels were conducted at the time of abutment connection, and at 6 and 12 months.

3 Results

One patient received 3 implants, 2 patients received 2 implants each, and 11 patients received 1 implant. At 12 months, all 18 implants in the 14 participating patients were clinically osseointegrated and functioning according to their prosthodontic intent. Bone and soft tissue levels remained stable and asymptomatic, and there were no prosthetic complications.



Figure 3. One-year follow-up

Diameter	Length	Number Placed
4.1 mm	10 mm	2
	11.5 mm	3
	13 mm	3
4.7 mm	10 mm	1
	11.5 mm	2
6.0 mm	13 mm	3
	10 mm	1
	11.5 mm	1
	13 mm	2

Table 1. Distribution of Implants Placed

4 Discussion

Immediate implant loading of inadequately stabilized dental implants can result in deleterious micromovements capable of damaging or preventing osseointegration.⁶ In the present study, TM implants achieved stability for immediate loading in all 14 patients.

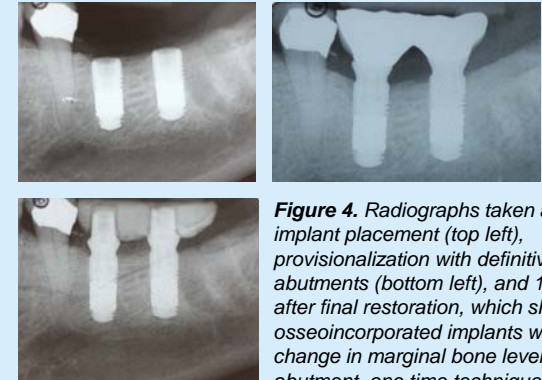


Figure 4. Radiographs taken after implant placement (top left), provisionalization with definitive abutments (bottom left), and 10 months after final restoration, which shows osseoincorporated implants with no change in marginal bone levels (one abutment, one time technique) (top right).

5 Conclusion

Within the limitations of this study, TM implants exhibited adequate primary stability to enable immediate loading in selected patients.

6 References

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*Trabecular Metal™ Implant is a trademark of Zimmer, Inc.

