

Zimmer Dental Research

Summary of an abstract presented at Annual Meeting of the American Association for Dental Research, March 5, 2010, Washington, D.C

Trabecular Metal™ Dental Implants in an Animal Model

Kim D-G¹, HUJA SS¹, LARSEN PE¹, KREUTER KS¹, CHIEN H-H1, JOO W2, and WEN HB2

¹The Ohio State University, Columbus, OH

²Zimmer Dental Inc, Carlsbad, CA

Abstract 1511, presented at the Annual Meeting of the American Association for Dental Research, March 5, 2010, Washington, D.C.

Trabecular Metal material is a highly porous tantalum biomaterial that mimics the structure and stiffness of trabecular bone, and has been used in orthopedic reconstructions for more than a decade. A *Trabecular Metal* dental implant has been recently developed, and the goal of this study was to evaluate tissue response to the new device in the canine model. Three *Trabecular Metal* implants were placed in the partially edentulated jawbones of 8 dogs (3 implants per jaw quadrant / 6 implants per dog) (Fig. 1). Prior to sacrifice, calcein was injected to label newly mineralizing bone tissue. After 2, 8 and 12 weeks of submerged healing, 2 dogs were sacrificed for histological evaluations. Implants were retrieved in block sections and 2 histological samples were prepared from each implant: one section was stained by Goldner's Trichrome to evaluate the presence of osteoid and matured bone inside the pores of the *Trabecular Metal* material, and the other section was analyzed to evaluate the calcein-labeled tissue. Statistical analysis consisted of Student's t-tests to compare bone-to-implant contact (BIC) and histological measures between time intervals. At week 2, the highest percentage of newly mineralizing tissue (36.08%) was observed (Fig. 2). This finding decreased over time: at 8 weeks it was 22.40% and at 12 weeks it was 19.95% ($p < 0.05$). The presence of osteoid was also highest at 2 weeks (63.53%) and significantly decreased over time (35.97% at 8 weeks, 42.94% at 12 weeks; $p < 0.05$) as it was increasingly replaced by matured bone at each time interval of 2, 8 and 12 weeks: 3.32%, 9.01% and 18.69%, respectively. This study found active bone formation inside the pores of the *Trabecular Metal* material, and the rapid mineralization of tissue during the early healing stage and high BIC levels. The researchers concluded that the *Trabecular Metal* implant design could be effectively used for dental implant applications. Zimmer Dental Inc. sponsored this study.



Fig. 1 Fluoroscopic image of *Trabecular Metal* implants immediately after placement and soft tissue closure.

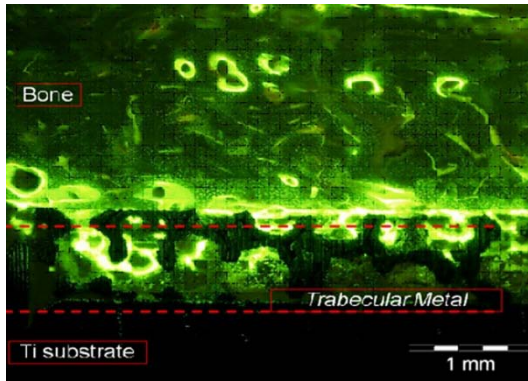


Fig. 2 New bone formation inside the pores of *Trabecular Metal* implants 2 weeks post-implantation (40x, calcein labeling).

Images courtesy of Dr. Do-Gyoon Kim and The Ohio State University

2400, Rev 11/10