Survival of Hybrid Titanium and Porous Tantalum Implants in Low Density (Type IV) Maxillary Bone: 1-Year Interim Results

Shilpa Kottalgi,1 Carlo Maria Soardi,2 Peter van der Schoor,3 Martin Dinkel,1 Hai Bo Wen4

1Zimmer Dental Inc., Carlsbad, CA; 2Brescia, Italy; 3Garderen, Netherlands

# Background

The efficacy of osseointegrated implant therapy in the treatment of fully and partially edentulous patient is well established. Success rates of over 90% in the mandible and over 80% in the maxilla have been historically reported. However, failure rates were much higher in sites which presented with an insufficient quality and/or quantity of bone, i.e., Type IV bone.1,2 The Longitudinal Data Collection Program, an ongoing study in Europe to evaluate the clinical term survival and success of a novel hybrid titanium and porous tantalum dental implant, Trabecular Metal™ (TM) Dental Implant. Among the enrolled subjects, many presented with elevated risks for implant failure, such as, smoking, periodontal disease, parafunctional oral habits, controlled systemic diseases and Type IV bone. This report is focused on the subgroup analysis of TM implant survival in sites which presented with Type IV bone. Each patient was allowed to receive up to 2 TM dental implants as part of the study. Investigators were required to follow the implant’s instructions for use (IFU) and their own professional judgment in patient selection and treatment. Subjects who smoked >20 cigarettes/day and with reported surgical complications were excluded from the study. For this sub group analysis, sites presenting with Type IV bone in the anterior and posterior maxilla were selected. The clinician evaluated the quality of bone using both radiographs and tactile sensation of cutting resistance and force during preparation of the osteotomy and classified the bone type according to the Lekholm and Zarb criteria (Figure 1).3 The importance of correlating tactile feedback with evidence from diagnostic imaging is underscored by Trisi and Rao4 who reported that clinicians could tactfully distinguish between Types I and IV bone, but not Types II and III bone.

## Statistical Analysis

Continuous data were summarized by descriptive statistics of sample size N, average, and range. Categorical data were summarized by descriptive statistics of frequency and percentage.

# Results and Discussion

To date, 64 implants, placed in the maxillary anterior and posterior jaws of 48 subjects (17 men and 31 women) with Type IV bone, have completed 1 year of follow up (Table 1). Of the 64 implants, 47 were placed in the maxillary molar regions (73.5%); 15 in the pre molar region (23.4%) and 2 in the maxillary anterior region (3.1%). 76.5% (n=49) of the implants placed were 4.7mmD; 14.1% (n=9) were 4.1mmD and 9.4% (n=6) were 6.0mmD TM implants. 34 implants were fully microtextured and 30 had machined collars. 96.9% (n=62) of the implants were placed using a soft bone protocol with over 50% of those implants attaining a final insertion torque between 30Ncm to 60Ncm.

Of the 48 subjects in this group, 25% (n=12 subjects) had one or more concomitant health conditions or risk factors in addition to the Type IV bone: Smoking, periodontal disease, osteoporosis, history of heart disease and parafunctional habits like bruxism. At 1 year after placement, 2 implants failed osseointegrate. The cumulative implant survival rate in Type IV bone was 96.88% (n=62/64).

# Conclusion

Within the limitations of this subgroup analysis, TM Dental Implants demonstrated clinical efficacy in Type IV bone at 1 year after implant placement.

# References


Note: Trabecular Metal™ is a trademark of Zimmer, Inc.