



# Human Histologic Evaluations of Implants with a Unique Triangular Neck Design

Myron Nevins, DDS<sup>1</sup>/ Stefano Parma Benfenati, DDS<sup>2</sup>/ Primo Galletti, MD, DDS<sup>3</sup>/  
Cosmin Sava, DDS<sup>4</sup>/ Catalin Sava, DDS<sup>4</sup>/ Mihaela Trifan, MD, DDS<sup>4</sup>/ Fernando  
Muñoz, DVM, PhD<sup>5</sup>/ Chia-Yu Chen, DDS, DMSc<sup>1</sup>/ David M. Kim, DDS, DMSc<sup>1</sup>

## Abstract

**Objective:** The goal of the present study was to evaluate human histologic healing of dental implants with a unique triangular neck design that is narrower than the implant body.

**Materials and methods:** Four patients in need of full-mouth reconstruction were recruited and received several implants to support a full-arch prosthesis (C1, MIS).

In each patient, two additional customized reduced-diameter implants were placed, designated to be harvested after 6 months of submerged healing. The 8 harvested implants were all placed in healed edentulous maxillary or mandibular ridges. These implants were  $\text{Ø } 3.5 \times 8 \text{ mm}$  in size; the final osteotomy drill allowed for the creation of a gap up to 0.2 mm in size between the coronal aspect of the triangular implant neck and the surrounding bone (V3 implants, MIS). At the end of the healing period, the implants were retrieved with the surrounding bone. Microcomputed tomography ( $\mu\text{CT}$ ) was performed before processing the biopsy samples for undecalcified histologic examination. Bone-to-implant contact (BIC)

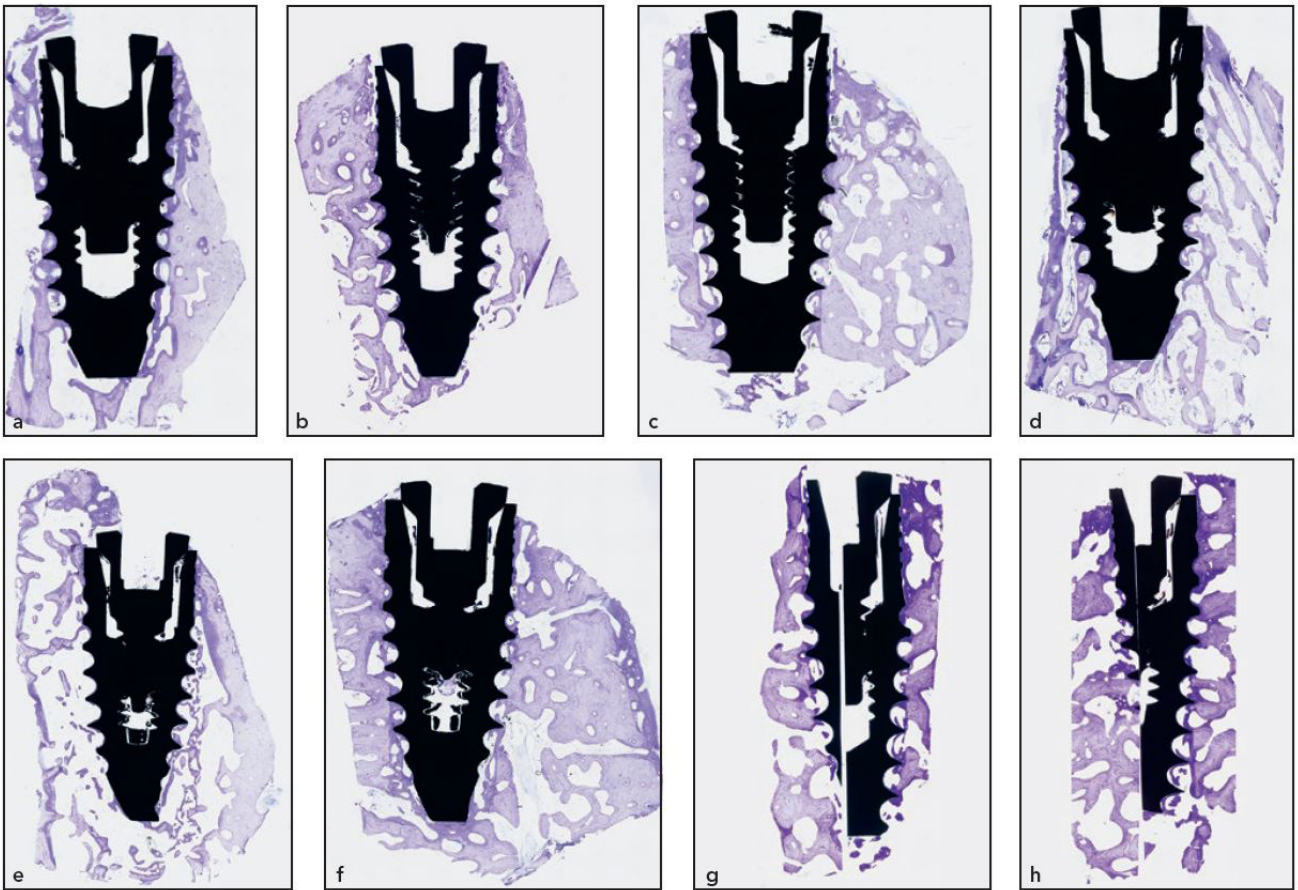
was measured from the  $\mu\text{CT}$  data and from buccolingual/buccopalatal and mesiodistal central histologic sections.

**Results:** All implant gaps were filled by mature remodeled bone. The mean BICs of the BL/BP and MD sections were  $64.45\% \pm 6.86\%$  and  $65.39\% \pm 10.44\%$ , respectively, with no statistically significant difference.

The mean 360-degree 3D BIC measured all over the implant surface was  $68.58\% \pm 3.76\%$ . The difference between the BIC measured on the  $\mu\text{CT}$  and on the histologic sections was not statistically significant.

**Conclusions:** Specimens of this human histologic investigation in the mandible and maxilla demonstrated robust BIC. The positive histologic results of the study confirm the efficacy of this uniquely designed dental implant.





**Fig. 6** Examples of (a to f) buccolingual/buccopalatal and (g and h) mesiodistal histologic sections from the biopsy sample implants. All specimens demonstrated significant BIC. Newly formed bone was found in contact with the implant surfaces, with normal bone marrow spaces and blood vessels. The crestal bone level exceeded the first thread on most specimens.

### Authors' affiliations

<sup>1</sup> Division of Periodontology, Department of Oral Medicine, Infection and Immunity, Harvard School of Dental Medicine, Boston, Massachusetts, USA.

<sup>2</sup> Master's program in Periodontology, Dental School, University of Turin, Turin, Italy; Master Degree in Surgery and Oral Pathology, University of Parma, Parma, Italy.

<sup>3</sup> Private Practice, Ferrara, Italy.

<sup>4</sup> Private Practice, Bistrita, Romania.

<sup>5</sup> iBoneLab, Lugo, Spain; Department of Veterinary Clinical Science, University of Santiago de Compostela, Lugo, Spain.