John Ley, DDS, Editor

Reviews

"Clinical Study on the Primary Stability of Two Dental Implant Systems with Resonance Frequency Analysis," by A. Rabel, S. G. Kohler, A. M. Schmidt-Westhausen. Clin Oral Invest, 11:257–265, 2007.

This article examined the correlation of resonance frequency analysis (RFA) and insertion torque of self-tapping and non–self-tapping implant systems on their primary implant stability. Two implant systems were studied: Ankylos non–self-tapping implants (Friadent, Mannheim, Germany) and Camlog self-tapping implants (Camlog, Wimsheim, Germany). A total of 602 implants were placed in 263 patients. At insertion, the insertion torque was recorded by the surgical drilling unit. A RFA was performed on 85 implants immediately after insertion and on 63 implants at uncovery. The results indicated that the non–self-tapping implants had significantly higher insertion torque values. No difference was found between the systems with respect to RFA. These results led the authors to conclude that RFA on its own is not a good indicator of implant stability and that RFA values are not comparable between implant systems.

"Bone Engineering of the Rabbit Ulna" by A. El-Ghannam, L. Cunningham, D. Pienkowski, A. Hart. J Oral Maxillofac Surg, 65:1495–1502, 2007.

This study examined the ability of a bioactive implant, silica-calcium phosphate nanocomposite (SCPC), to act as a medium for bone engineering. Three-dimensional (3D) implants of rabbit ulna were fabricated using data obtained from computed tomography (CT), stereolithography, and computer-aided design (CAD) software sent to a Z-Corp machine (Z Corporation, Burlington, MA). Ulna implants were fabricated from SCPC and coated in bone morphogenetic protein (rhBMP-2). The implants were placed into rabbits that had had similar-sized portions of ulna removed at the time of surgery. The implants were then stabilized using a titanium bone-plating system. At 4, 8, and 12 weeks after surgery, CT scans were performed on the rabbits. After the rabbits were killed, the ulnae (control and grafted sides) were subjected to torsional testing and histologic analysis. In a separate in vitro test, the release profile of the rhBMP-2 from the SCPC was assessed and compared with a control material. The results indicated that the grafts had been replaced by mature bone that was similar in strength to the control ungrafted ulnae. The in vitro study demonstrated that the SCPC released rhBMP-2 in a sustained manner for 14 days. These results suggest that the SCPC/rhBMP-2 construct was a suitable 3D graft and that it was incorporated and replaced by bone. The authors stated that this process would be well suited to reconstructing maxillofacial defects.

"Boosting Effect of Bisphosphonates on Osteoconductive Materials: A Histologic in vivo Evaluation" by B. Houshmand, H. Rahimi, F. Ghanavati, et al. J Periodont Res, 42:119–123, 2007.

This study evaluated the effect of adding a bisphosphonate drug to a xenograft placed into bone defects in sheep jaws. Eight sheep had 24, 6-mm deep defects created in their mandibles using a 6-mm trephine bur. These defects were grafted with nothing (negative control), a bovine-derived hydroxyapatite (HA) alone (positive control), or the HA mixed with a bisphosphonate (pamidronate disodium)(case group). After 6 weeks the animals were killed and subjected to microscopic analysis. The results indicated a significant increase in bone formation in the case group. In addition, significantly fewer osteoclasts were observed in the case group. Results indicated that locally adding a bisphosphonate into a graft material may enhance bone formation.

"Osteoconductive Effects of Vinyl Styrene Microbeads in Rat Calvarial Defects" by K. M. Marzouk, A. Gamal, A. Al-Awady, M. Sharawy. J Oral Maxillofac Surg, 65:1508–1516, 2007.

This paper examined the efficacy of a new bone alloplast material, vinyl polystyrene microbeads (VSM), as a delivery vehicle for platelet-derived growth factor (PDGF). In the study, 73 rats were separated into 4 groups of at least 15 animals. In each rat defects 8 mm in diameter were created in the calvaria. The defects were treated in 1 of 4 ways: no graft (group 1), VSM only (group 2), PDGF only (group 3), VSM and PDGF (group 4). The defects were covered above and below with membrane (Millipore, Billerica, MA). At least 5 animals from each group were killed at 2, 4, and 16 weeks after surgery. The calvaria were analyzed radiographically for new bone formation using an image analysis system. The grafted areas were then subjected to microscopic analysis. Results indicated that the VSM-only group demonstrated higher defect fill than the non-VSM groups at all kill times. The VSM-

PDGF group demonstrated bone fill that was less consistent than the VSM-only group. The radiographic bone-volume analysis revealed that at 16 weeks the PDGF-only and VSM-only groups had significantly greater bone volume than the VSM-PDGF group. There was no difference between the VSM and PDGF groups at 16 weeks. These results suggest that the VSM is a suitable osteoconductive material. Adding PDGF to the VSM negatively affected bone formation in this animal model.

"Effect of Microthread on the Maintenance of Marginal Bone Level: A 3-year Prospective Study" by D. W. Lee, Y. S. Choi, K. H. Park, et al. Clin Oral Implant Res, 18:465–470, 2007.

This study examined the effect of a microthread at the coronal level of an implant on alveolar bone levels. Seventeen patients received 34 implants. The implants installed were either the Astra Tech single tooth implant, which has a coronal microthread or the Astra Tech TiOblast implant, which does not have a microthread. Both implants have the same blasted surface treatment. In each edentulous area, one fixture of each implant was installed in a randomized fashion. The bone around the implants was allowed to heal for standardized periods in the maxilla and mandible, and the patients were followed up at set intervals before and up to 3 years after loading. Results indicated that the microthreaded implants suffered significantly less bone loss during their first year of loading. After 2 years of loading, the rate of bone loss was similar for the 2 implant types. These results suggest that a coronal microthread may help maintain crestal bone levels around implants.

"Crown-to-Implant Ratios of Single Tooth Implant-Supported Restorations" by J. Schulte, A. Flores, M. Weed. J Prosthet Dent, 98:1–5, 2007.

The purpose of this study was to examine the effect of crown-to-implant ratios on the success rates of implants. A total of 294 patients in a private practice had 1 or more single-tooth implants placed over a 2-year period. A retrospective study was conducted in which the charts were reviewed and radiographs were evaluated for crown-to-implant ratios. Implant failure was defined as implant removal. Results indicated that 889 implants were placed, and the patients were followed up for an average of 2.3 years (range = 0.1 to 7.4 years). Sixteen implants failed (98.2% success). The crown-to-implant ratio was 1.3:1 for those that were functional and 1.4:1 for those that failed. The authors concluded that the crown-to-implant ratio guidelines for teeth should not be applied to implants and that the crown-to-implant ratio of the failed implants was similar to the ratio for those that were successful.