John Ley, DDS, Editor

Endosseous Implants

"In Vitro Evaluation of the Biocompatibility of Contaminated Implant Surfaces Treated With an Er:YAG Laser and an Air Powder System," by M. Kreisler, W. Kohnen, A. Christoffers, et al. Clin Oral Implants Res, 16:36–43, 2005.

This in vitro study examined the efficacy of 2 methods to decontaminate titanium surfaces populated with a bacterial colony. Forty-eight titanium platelets were sandblasted and acid etched. Thirty-six platelets were then incubated with a suspension of *Porphyromonas gingivalis*. Twelve were left untreated (negative control). The 36 platelets that had the bacterial growths were separated into 3 groups of 12 and treated in 1 of 3 ways. The first were treated using an Er:Yag laser for 60 seconds. The second group was treated with an air powder system for 60 seconds. The third group received no treatment (positive control). Each of the 4 groups then had a human fibroblast cell solution placed onto the test surface and was evaluated for cell proliferation and thus the biocompatibility of the titanium surface. The amount of cell proliferation was compared at 12, 24, 48, and 72 hours. The results indicated that the sterile, untreated negative controls had significantly greater cell proliferation than the positive controls. The platelets treated with air powder and Er:YAG laser were not significantly different than the sterile group but had significantly greater cell growth compared with the positive control group. Surface analysis demonstrated that the air powder treatment altered the surface morphology, whereas the laser did not. The conclusion of the study was that cell growth after Er:YAG laser and air powder treatment was similar to sterile controls, and thus this treatment has a good potential to remove bacterial cell components from implant surfaces. The Er:YAG laser does not alter the titanium surface.

"Therapy of Peri-implantitis With Resective Surgery: A 3-Year Clinical Trial on Rough Screw Shaped Oral Implants, Part I: Clinical Outcome," by E. Romeo, M. Ghisolfi, N. Murgolo, et al. Clin Oral Implants Res, 16:9–18, 2005.

This study examined the efficacy of combining resective surgery and modification of implant surface topography for the treatment of peri-implantitis. The study was conducted during a 5-year period and included 17 patients with 35 ailing implants with a titanium plasma sprayed surface. Patients with peri-implantitis were randomly assigned to 1 of 2 groups. Ten of the patients (test group) were treated with a combination of an apically repositioned flap in conjunction with osseous recontouring and smoothing of the implant surface that was to be left exposed to the oral environment. The second group (control) had the apically repositioned flap without any implant smoothing. Both groups had the implant surface treated with a metronidazole gel followed by a tetracycline solution for 3 minutes (before implant smoothing in the test group). All patients were given a 0.2% chlorhexidine rinse for 2 weeks after surgery. The implants were then compared for the following clinical parameters: suppuration, modified plaque index, modified bleeding index , mucosal recession, probing pocket depth, pseudopocket, and probing attachment level. The results indicated that the test group had 100% survival at 3 years, whereas the control group lost 2 implants for a survival rate of 87.5%. The test group had significantly better clinical parameters than the test group. The conclusion of the study was that the combination of resective surgery smoothing of exposed rough surfaces improved both implant survival and clinical health of ailing implants.

"Biological and Biomechanical Evaluation of Bone Remodeling and Implant Stability After Using an Osteotome Technique," by A. Buchter, J. Kleinheinz, H. Wiesmann, et al. Clin Oral Implants Res, 16:1–8, 2005.

This study compared the osseointegration of implants placed into osteotomies prepared by either the osteotome technique or conventional drilling using an animal model. Six minipigs had a total of 56 sandblasted, acid-etched implants placed in the tibia. The osteotomies were prepared either with conventional drills (group A) or by a pilot drill followed by increasing diameter osteotomes (group B). Animals were killed at 7 and 28 days after implant placement. The implants and the surrounding bone were analyzed by removal torque testing, resonance frequency measurements (RFM), and histologic observation. The results indicated that with removal torque testing, the group A implants were significantly more difficult to remove

at both 7 and 28 days. The RFM demonstrated no significant difference between the groups. Histologic examination demonstrated fracture trabeculae in the osteotome group at 7 days, which was not evident at 28 days. The conclusion of the study was that the osteotome technique offers less implant stability and this might be due to the microfractures in the peri-implant bone.

"Success and Failure Rate of Osseointegrated Implants in Function in Regenerated Bone for 72 to 133 Months," by P. Fugazzatto. Int J Oral Maxillofac Implants, 20:77–83, 2005.

This retrospective study examined the success rates for implants that were placed in conjunction with a variety of grafting procedures. The grafting materials included demineralized freeze-dried bone and tricalcium phosphate. In all cases the membranes used were expanded polytetrafluoroethylene. The reason for grafting included immediate implant placement into fresh extraction sites, buccal fenestration and dehiscence defect repair, and both vertical and horizontal ridge augmentation. A total of 319 patients received a total of 607 titanium plasma sprayed implants of varying diameters and lengths. The patients were followed up on a regular basis and evaluated both clinically and radiographically. The patients were followed up for 72 to 133 months after restoration. Implants were deemed successful if there was no mobility, there was an absence of pain, suppuration, or periimplant radiolucency, and there was less than 1.5 mm of bone loss in the first year of function and less than 0.2 mm of bone loss annually in subsequent years. The cumulative success rate up to 133 months was 97.2% in the maxilla and 97.4% in the mandible. The author concluded that these implants yielded success rates comparable to those placed in nonregenerated host bone.

IMPLANT PROSTHODONTICS

"Nonsurgical Management of Interdental Papilla Associated With Multiple Maxillary Anterior Implants: A Clinical Report," by S. Al-Harbi. J Prosth Dent, 93:212–216, 2005.

This paper reported on a technique that was used to improve the esthetics in a patient who had a fixed partial denture (FPD) supported by 2 implants, replacing the maxillary left canine and lateral incisor. The patient was concerned over the absence of an interdental papilla between the implant-supported crowns. The patient reported that several attempts were made to surgically recreate the papilla but were unsuccessful. The FPD that the patient had was a splinted 2-tooth FPD supported by 2 root form implants that were well integrated into the surrounding bone. The area where the papilla was missing was masked by pink porcelain. There was 9 mm from the bone crest to the proximal contact point and less than a 2-mm interim plant distance at the bony crest. The solution to this situation involved the following. The abutments and the FPD were removed and the implant in the lateral incisor position had an implant cover screw placed on it, taking it out of function. The canine was then restored with a provisional acrylic FPD with a cantilevered ovate pontic in the lateral position. After sufficient healing a porcelain-metal FPD was fabricated, keeping the ovate pontic in the lateral position. The paper included clinical photographs that demonstrated an excellent esthetic outcome for this patient.

BONE GRAFTING

"Reduction of Autogenous Bone Graft Resorption by Means of Bio-Oss Coverage: A Prospective Study," by C. Maioriana, M. Beretta, S. Salina, F. Santoro. Int J Periodontics Restorative Dent, 25:19–25, 2005.

This study examined the use of a xenograft (Bio-Oss, Osteohealth, Shirley, NY) to reduce the resorption of autogenous block grafts used for ridge augmentation before implant placement. Twenty-six consecutively treated patients were included in this study. All underwent monocortical block grafts to augment deficient alveolar ridges. The donor sites were either the mandibular ramus or symphysis. Twelve of the 26 grafts were covered with Bio-Oss before closure. No membranes were used. The width of the ridge was measured before and after grafting. The amount of resorption of the grafted ridges was calculated by measuring ridge thickness at the time of implant placement, which was performed after a mean of 5.3 months of healing. The Bio-Oss sites underwent 9.3% resorption, and the sites without Bio-Oss suffered 18.3% resorption. These results suggest that Bio-Oss may act to reduce graft shrinkage when placed over monocortical autogenous grafts.

"Evaluation of Platelet-Rich Plasma in Combination With Freeze-dried Bone in the Rabbit Cranium: A Pilot Study," by T. Aghaloo, P. Moy, E. Freymiller.

Clin Oral Implants Res, 16:250–257, 2005.

This study examined the efficacy of adding platelet-rich plasma (PRP) to freeze-dried bone grafts in a rabbit model. Fifteen rabbits had four 8-mm defects created in their cranial bone. The defects were grafted with 1 of 4 graft combinations: freeze-dried mineralized bone (FMB), FMB in combination with PRP, freeze-dried demineralized bone (FDDB), and FDDB in combination with PRP. The rabbits were killed at 1, 2, and 4 months postoperatively. The grafted sites were examined radiographically, histologically, and by histomorphometry. The results indicated that the addition of PRP did not offer a statistically significant increase in bone formation.