John Ley, DDS, Editor

BONE GRAFTING

"Maxillary Sinus and Ridge Augmentations Using a Surface-Derived Autogenous Bone Graft," by M. Peleg, A. Garg, C. Misch, Z. Mazor. J Oral Maxillofac Surg, 62:1535–1544, 2004.

This study examined the efficacy of using autogenous bone grafts obtained from scraping cortical bone surfaces. The study included 156 patients who required sinus augmentation due to severe ridge resorption and 37 patients who had dehiscence or fenestration defects at the time of implant placement in the anterior maxilla. Half of the sinuses were grafted using 50% autogenous bone and 50% Bio-Oss (Osteohealth, Shirley, NY). The other half of the sinuses were grafted using autogenous bone alone. In the anterior fenestration or dehiscence sites, autogenous bone alone was used. The autogenous bone was obtained by scraping the cortical bone from several intraoral sites with the use of the Mx-Grafter (Maxilon Laboratories Inc, Hollis, NH). In all cases, implants were placed at the time of grafting and resorbable membranes were used to effect guided tissue regeneration (either collagen or lyophilized dura mater). A total of 477 implants were placed. Second-stage surgery was performed 4 to 8 months after placement. The implants were assessed for stability and bone loss using clinical and radiographic methods. Patients were followed up for an average of 16 months. The results indicated that the donor sites experienced no deleterious effects. In the sinus grafts, 3 implants (of 436 implants placed) failed to integrate and were successfully replaced with a wider diameter implant. None of the 41 implants placed into the anterior maxilla failed to integrate. Core biopsy specimens demonstrated new bone formation within the grafts. These results suggest that bone obtained by surface shaving can be used as successfully as autogenous bone obtained by more invasive techniques.

"Early Healing Pattern of Statin-Induced Osteogenesis," by R. Wong, A. Rabie. Br J Oral Maxillofac Surg, 43:46–50, 2005.

This study examined the effect of local placement of a statin cholesterol-lowering drug (Zocor, Merck & Co, Whitehouse Station, NJ) on the bone healing in surgically created defects in rabbits. Thirty defects were created in the parietal bones of 15 rabbits. In 9 of the rabbits, the defects were grafted with a combination of a collagen matrix mixed with a Zocor solution (tablet dissolved in water to a concentration of 2.5 mg/mL). In the other 6 rabbits, the defects were grafted with collagen and mixed with water. The rabbits were killed 1 to 6 days after the grafts were placed. The tissues were examined histologically and using immunolocalization for the expression of vascular endothelial growth factor (VEGF), bone morphogenetic protein 2 (BMP-2), and core binding factor (Cbfa1). The results indicated that the statin sites expressed VEGF, BMP-2, and Cbfa1 1 day earlier than the control group. New bone formation was seen 1 day earlier in the statin group. In addition, there was a greater amount of new bone formation in the statin sites. These results suggest that statin drugs enhance bone formation when used locally in bone defects.

"The Combined Use of Two Endosteal Implants and Iliac Crest Onlay Grafts in the Severely Atrophic Mandible by a Modified Surgical Approach," by E. van der Meij, J. Blankestijn, R. Berns, et al. Int J Oral Maxillofac Surg, 34: 152–157, 2005.

This study reported on a tech--nique that uses simultaneous placement of root form implants and an autogenous iliac crest bone graft in severely resorbed mandibles. Seventeen patients received 2 implants in the intraforaminal region of the anterior mandible. The implants were 13 to 15 mm in length and either 3.8 or 4.5 mm in diameter and were placed so that the neck of the implant was above the crest of the ridge. After the implants were placed, 2 corticocancellous iliac crest grafts were placed distally to the implants in previously prepared subperiosteal tunnels. In the region between the implants, the ridge was grafted with cancellous bone. After a tension-free closure, the patients were instructed not to wear their lower dentures for 4 weeks. Three months postoperatively the implants were uncovered and the implant overdenture was constructed. The patients were followed up for 0.5 to 7.9 years after loading (average follow-up, 4.3 years). Radiographically, the grafted areas were assessed for the initial gain in height, and at the last follow-up visit the resorption was calculated. Clinically, the patients were monitored for wound dehiscence, neurosensory disturbances, and implant failure. The implants were deemed a failure if they were

lost or probing depths exceeded 5 mm. The results indicated an average of 95% gain in ridge height immediately after grafting. At the final follow-up appointment, the grafts experienced an average of 15% resorption. There were 4 cases of wound dehiscence. Two were minor and healed without intervention. The other 2 were deemed major; one patient lost both implants and part of the graft, and the other patient was treated with antibiotics and sequestrectomy while sparring the implants. Both of these patients had experienced previous implant loss. Long-term paresthesia of the lip or chin was seen in 4 patients, none bilaterally, for a rate of damage to the mental nerves of 14.7%. The implant success rate was 88.2%. The authors concluded that this was a predictable procedure in all patients except those with a history of prior surgery in the anterior mandible.

"Long Term Outcome of Augmentation of the Maxillary Sinus Using Deproteinised Bone Particles: Experimental Study in Rabbits," by H. Xu, Y. Shimizu, K. Onodera, K. Ooya. Br J Oral Maxillofac Surg, 43:40–45, 2005.

This study examined the results of grafting the maxillary sinus in a rabbit model with deproteinized bone. Deproteinized bone particles were prepared from dead male rabbits with a previously published protocol. Twenty rabbits had their maxillary sinus grafted with the bone particles using a lateral wall approach. The sinus access window was covered by a collagen membrane before closure to prevent soft tissue ingrowth. The rabbits were then divided into groups of 4 and killed at 4, 8, 16, 32, and 64 weeks postoperatively. The grafted sinuses were then examined histologically and histomorphometrically. The results indicated that bone formation progressed in the grafted regions from 4 to 16 weeks. From 16 to 64 weeks the amount of bone decreased significantly and the amount of bone marrow increased significantly. There was no difference in the graft particles over time. The authors concluded that the deproteinized bone did not resorb over time and that the newly formed bone in the grafted regions was not stable.

"Postextraction Tissue Management: A Soft Tissue Punch Technique," by R. Jung, D. Siegenthaler, C. Hammerle. Int J Periodontics Restorative Dent, 24:545–553, 2004.

This article reports on the efficacy of using a tissue punch to obtain soft tissue to cover grafted extraction sockets. Twenty patients were included in the study. Each required tooth extraction before implant placement. In each patient one extraction socket was selected for this technique. The teeth were atraumatically extracted, granulation tissue was removed, and the soft tissue previously in contact with the tooth was removed with a diamond drill. The widest diameter of the socket was measured and a corresponding soft tissue punch was selected. Using the punch, palatal tissue was obtained in a region distal to the rugae and 4 to 5 mm from the free gingival margin of the teeth. Grafts 2 to 3 mm in thickness were harvested. The sockets were grafted with Bio-Oss Collagen (Osteohealth, Shirley, NY), and the sockets were covered with the free gingival grafts sutured into place with 6 to 10 6-0 sutures. Patients were followed up at 1, 3, and 6 weeks postoperatively. At these appointments, photographs were taken of the sites and later evaluated for healing. The healing surfaces were classified as integrated, fibrinoid, necrotic, or incomplete (incomplete wound closure). The integration of the soft tissue with the surrounding tissues was assessed using colorimetric analysis. At 1 week after surgery, 64.3% of the soft tissues were fully integrated. Most of the remaining sites were described as fibrinoid with 0.1% of the sites necrotic. At 3 weeks 92.3% were integrated and at 6 weeks 99.7% were integrated. At 6 weeks 4 of the 20 grafts showed minor signs of incomplete zones but no fibrinoid or necrotic zones. Colorimetric analysis demonstrated good integration with surrounding tissues. The authors concluded that this was an effective technique for gaining soft tissue closure over grafted sockets.

Endosseous Implants

"Single Preoperative Dose Versus Long-term Prophylactic Antibiotic Regimens in Dental Implant Surgery," by A. Binahmed, A. Stoykewych, L. Peterson. Int J Oral Maxillofac Implants, 20: 115–117, 2005.

This study compared the effectiveness of 2 different antibiotic regimens in preventing implant failure and wound infections. In one group of 125 patients, 445 implants were placed by a 2-stage protocol. In this group, antibiotics were given preoperatively only (penicillin or clindamycin). In the second group of 90 patients, 302 implants were placed with the same 2-stage protocol. In this group, the patients were given both a preoperative dose and a

7-day postoperative regimen of antibiotics. All wounds were then assessed for pain, swelling, erythema, and purulence. In the preoperative dose only group, there were no implant failures and no patients had signs of infection. In the group receiving preoperative and postoperative antibiotics, one patient experienced an infection that required a second course of antibiotics. One implant failed shortly after it was uncovered due to mobility and bone loss. There was no statistical difference between the groups. These results suggest that a single preoperative dose of antibiotics is as effective as both a preoperative and postoperative dose of antibiotics in the prevention of wound infection and implant failure.

"Immediate Versus Delayed Loading of Dental Implants in the Maxillae of Minipigs: Follow-up of Implant Stability and Implant Failures," by E. Nkenke, B. Lehner, M. Fenner, et al. Int J Oral Maxillofac Implants, 20: 39–47, 2005.

This study examined the stability of implants placed in the posterior maxilla of minipigs that were loaded either immediately after placement or at varying times up to 5 months after placement. Twelve minipigs had their 3 premolars and first molar removed bilaterally. After 3 months of healing, 6 root form implants 3.8 by 13 mm were placed on each side. Half of the implant sites were prepared by drills and the other half by an osteotome technique. All implants were required to have a placement torque of at least 15 Ncm. One did not and was replaced by an implant of 4.5 mm diameter. All implants were then assessed for stability using resonance frequency analysis (RFA). A portion of the implants was restored immediately using a fixed provisional prosthesis. Those not restored immediately were treated using a 2-stage implant protocol, uncovered at 1, 2, 3, 4, or 5 months after placement, and restored when uncovered. The animals were examined monthly, lost implants documented, and damaged prostheses were repaired only if at least 3 implants were present. If 1 or 2 implants remained, the minipigs were allowed to chew on the abutments. At 6 months after placement, the prostheses were removed, implants assessed using RFA, and the animals killed. The implants loaded at 1, 2, and 3 months were pooled into one group and those loaded at 4 and 5 months were pooled into another group. The results indicated that 3 minipigs died after tooth removal. There was no significant correlation between initial implant stability and method used to prepare the implant site (drill vs osteotome). There was a significant correlation between initial implant stability and the healing period and between initial implant stability and placement torque. Implant stability decreased after 1 to 3 months of healing and increased after 4 and 5 months of healing. In sites prepared by the osteotome technique, 6 of 12 immediately loaded implants, 18 of 24 implants loaded after 1 to 3 months of healing, and 1 of 18 implants loaded after 4 or 5 months of healing were lost. In those prepared by drills, 7 of 12 immediately loaded implants, 12 of 24 implants loaded after 1 to 3 months of healing, and 2 of 18 implants loaded after 4 or 5 months were lost. There was no difference between immediately loaded implants and those loaded at 1 to 3 months after placement. When implants were loaded after 4 or 5 months of healing, implant survival increased. These results suggest that in this animal model there was no difference in implant survival when comparing immediately loaded implants and those that were allowed to heal for a short period (1 to 3 months). Implant survival is increased if the bone is allowed to heal for at least 4 months after placement.