

John Ley, DDS, Editor

BASIC SCIENCE AND RESEARCH

"Preliminary Study of Tissue-engineered Odontogenesis in the Canine Jaw," by M. Honda, T. Ohara, Y. Sumita, et al. *J Oral Maxillofac Surg*, 64:283–289, 2006.

This in vivo study investigated the ability of cells harvested from a tooth bud to induce tissue-engineered odontogenesis in the canine jaw. Eight dogs aged 8 to 12 weeks had their unerupted first molars removed bilaterally from the mandibles. One half of the tooth buds were minced and single-cell suspensions were created. The single-cell suspensions were placed into a polygalactic acid fiber mesh and incubated for 12 hours. The other half of the tooth buds were incubated intact for the same amount of time. The cell-polymer constructs and the tooth buds were then transplanted back into the tooth bud sockets from the dog that they were harvested from. The healing in the sockets was monitored radiographically. At 24 to 26 weeks posttransplantation, the dogs were sacrificed and the mandibles were harvested. The shape of the transplanted tissue was analyzed by microcomputed tomography. Afterward, the tissues were subjected to histological and immunohistochemical analysis. The results indicated that the cell-polymer constructs formed hard tissue in only 25% (2 of 8) of the sites. The size and shape was both smaller and irregular compared with a normal tooth. The transplanted tooth buds demonstrated root formation at a slower pace than would normally be expected. Histological analysis of the cell polymer demonstrated dentin and bone forma-

tion but not enamel formation. There was no evidence of root formation. These results suggest that a tissue-engineered tooth may be possible in the future, but more research is needed beforehand.

BONE GRAFTING

"The Clinical Significance of Sinus Membrane Perforation During Augmentation of the Maxillary Sinus," by L. Ardekian, E. Oved-Peleg, E. Mactei, M. Peled. *J Oral Maxillofac Surg*, 64:277–282, 2006.

This study examined the effect of sinus membrane perforations on the healing and success of sinus augmentation procedures. The authors performed a retrospective analysis on patients who received simultaneous sinus augmentation and implant placement. Thirty-five patients who had perforations of the schneiderian membrane were compared with a similar group of 35 patients who did not experience membrane perforations during the sinus augmentation procedure. The perforations were classified as to their location and were repaired with collagen membranes. All perforations were <10 mm. The implant success rate 4 years after implantation was 93.9% for the nonperforation group and 94.4% for the perforation group. This difference was not significant. Before augmentation, membrane perforation occurred in 85% of cases in ridges of 3 mm height and in 25% of cases in ridges of 6 mm height. This difference was significant. The conclusion of the study is that membrane perforation did not affect implant success rate.

"Platelet-rich Plasma and Fibrin as Delivery Systems for Recombinant Human Bone Morphogenetic Protein-2," by R. Jung, H. Schmoekel, R. Zwahlen, et al. *Clin Oral Implants Res*, 16:675–682, 2006.

This study examined the efficacy of using recombinant human bone morphogenetic protein-2 (rhBMP-2) to repair bone defects and also evaluated whether platelet-rich plasma (PRP) or fibrin enhanced bone formation when used with rhBMP-2. Sixteen rabbits had 4- to 6-mm-diameter bone defects created in their skulls. The defects were randomly treated with one of the following: no treatment, fibrin alone, PRP alone, fibrin with rhBMP-2, and PRP with rhBMP-2. After 4 weeks of healing, the rabbits were killed and the defects were examined histologically and by histomorphometry. The results indicated that the PRP and fibrin alone did not offer significantly increased bone growth compared with the nongrafted control. The addition of rhBMP-2 increased the amount of bone growth significantly. There was no difference between the PRP and fibrin carriers. These results demonstrated that PRP and fibrin do not enhance bone growth. Both fibrin and PRP are adequate carriers for rhBMP-2.

"Effect of Platelet Rich Plasma on the Healing of Autologous Bone Grafted Mandibular Defects in Dogs," by D. Gerard, E. Carlson, J. Gotcher, M. Jacobs. *J Oral Maxillofac Surg*, 64:443–451, 2006.

This study examined the effects of platelet-rich plasma (PRP) on

the healing of autogenous bone grafts in a canine model. Thirteen dogs were included in the study. All the dogs had inferior mandibular border defects created bilaterally measuring 2 cm × 1 cm. In 12 of the dogs the defects were grafted with milled autogenous iliac crest bone. One half (the right side) had PRP added to the graft. Three dogs were sacrificed at 1, 2, 3, and 6 months postoperatively. The 13th dog had PRP alone added to the right-side defect. It was sacrificed at 6 months. Before sacrifice, the dogs received intravenous tetracycline to label bone activity. After sacrifice, the bone was analyzed radiographically and histologically. The results indicated that PRP increased new bone formation (and resorbed more grafted bone) at 1 and 2 months. At 3 and 6 months there was no difference. The addition of PRP did not increase the bone apposition rate at any time. These results suggest that PRP affects early bone healing but does not affect overall bone healing.

ENDOSSEOUS IMPLANTS

"A Distinguishable Observation Between Survival and Success Rate Outcome of Hydroxyapatite-coated Implants in 5–10 Years in Function," by Z. Artzi, G. Carmeli, A. Kozlovsky. *Clin Oral Implants Res*, 17:85–93, 2006.

This study examined the survival rate of hydroxyapatite (HA)-coated implants after 5 to 10 years in function. A total of 248 HA-coated implants were placed in 62 patients. All implants were placed by a 2-stage surgical pro-

cedure and were restored 4 to 6 months postplacement. Implants were of varying widths and lengths and were placed in both edentulous and partially edentulous patients. The health of the implants was monitored by both clinical and radiographic analysis. By using previously published parameters for success, the success rate was 89.9% at 5 years and 54% at 10 years. The implant survival rate was 94.4% at 5 years and 92.8% at 10 years. The maxillary implants experienced markedly greater failures compared with those in the mandible. Implants with narrow diameters and shorter lengths experienced increased failures. These results suggest that in the long-term the HA-coated implants experience increasing failure rates.

SPECIAL REPORT

"Osteonecrosis of the Jaws in Patients With a History of Receiving Bisphosphonate Therapy: Strategies for Prevention and Early Recognition," by M. Melo, G. Obeid. *J Am Dent Assoc*, 136: 1675–1681, 2005.

This study is one of several that have been published recently that describe a new form of osteonecrosis: bisphosphonate osteonecrosis (BON). Bisphosphonates have been used in the treatment of patients with metastatic bone cancers and osteolytic lesions from any solid tumor. Bisphosphonates have been shown to inhibit angiogenesis and induce apoptosis in tumor cells. In addition, they act to decrease pain and pathologic fracture. This study describes 11 patients presenting with osteonecrosis of the jaw and

no history of radiation to the neck or head. All had metastatic bone cancers and had been treated with intravenous (IV) bisphosphonates (either pamidronate or zoledronic acid) for a mean period of 34 months. Nine of the patients had a recent history of surgery at the site of necrosis. One had no history of surgery or trauma to the area, and the last patient had ill-fitting dentures that may have contributed to the lesions. Two of the patients had mandibular parasthesia associated with the BON. The authors report differences compared with osteoradionecrosis: Hyperbaric oxygen therapy is not an effect treatment. The maxilla is a common site for BON and not osteoradionecrosis. Also, BON does not appear to be easily treated, for it is resistant to healing after surgical intervention. The authors recommend limiting surgery to those sites that are symptomatic. In these cases the surgery should be limited to debridement of the necrotic bone, and no attempt should be made to extend the debridement to healthy bone margins. In nonsymptomatic cases, BON should be treated with antibiotics. The authors recommend that in patients who are to undergo IV bisphosphonate therapy, preventive dental measures should be taken to ensure a healthy mouth. In patients who have received IV bisphosphonates, all measures should be taken to avoid tooth extraction. It should also be noted that other studies seen by this editor have reported BON in a few patients receiving oral bisphosphonates. This information suggests that patients receiving bisphosphonates should avoid implant therapy.