What's New in Dentistry

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Stem cells enhance periodontal tissue regeneration. In recent years, bone marrow–derived mesenchymal stem cells have been the focus of research aimed at regenerating various body tissues. As an extension of this theoretical paradigm, researchers recently attempted to regenerate periodontal tissues with an animal model. The results or their experiment are published in the *Journal of Periodontology* (2006;77: 1003–1007). These researchers initially created osseous defects in the molars of laboratory animals. They then harvested bone marrow mesenchymal cells from the same animals and transplanted the cells into the experimental periodontal defects. Some of the osseous defects did not receive the stem cells and served as the controls. Four weeks after transplantation, the periodontal defects were almost completely regenerated with periodontal tissue. Cementoblasts, osteoblasts, osteocytes, and fibroblasts of the regenerated periodontal tissue showed staining that indicated that these cells had been derived from the stem cell transplant. In the control defects that had not received the transplanted stem cells, periodontal tissue regeneration was insufficient. The findings of this study suggest that transplanted mesenchymal stem cells can survive and differentiate into periodontal tissue cells, resulting in enhancement of periodontal tissue regeneration.

No evidence to indicate that abfraction is a component of cervical tooth wear. Tooth wear refers to the pathologic loss of tooth tissue by a disease process other than dental caries. Noncarious cervical wear is defined as the loss of tooth substance at the cemento-enamel junction. Abfraction is a term that evolved in the early 1980s to describe a theoretical process whereby occlusal forces create stresses in enamel and dentin along the cervical area and predispose it to erosion and abrasion. To evaluate the existence of abfraction, a critical review of the available literature was published recently in the *Journal of Dental Research* (2006;85:306–312). Tooth wear can be separated into attrition, erosion, and abrasion. Attrition is the loss of enamel, dentin, or restoration by tooth-to-tooth contact; erosion is the loss of dental hard tissues by chemical action not involving bacteria; and abrasion is the loss of tooth substance from factors other than tooth contact. Abfraction means to break away. Engineering studies have demonstrated that when teeth are loaded in a horizontal direction, the effect of the stress becomes concentrated in the cervical region, causing flexure. But much of the evidence for abfraction has been derived from finite element studies. Clinical and laboratory studies do not necessarily support such a simple etiology for abfraction. In their exhaustive search of the literature on this topic, these authors conclude that cervical wear lesions, like other forms, are probably created by a combination of erosion, abrasion, and attrition. There is strong support that erosion and abrasion are important in the development of wedge-shaped lesions along the cervical margins of teeth, but, as yet, there is insufficient evidence to confirm that abfraction truly exists.

Oral bisphosphonate usage not associated with osteonecrosis of the jaws. Recently, bisphosphonates have been implicated in severe osteonecrosis of the jaws in patients who are taking this drug and have had some type of maxillofacial surgery. Oral bisphosphonate drugs are widely used to treat osteoporosis. These medications are chemically absorbed into bone, decreasing osteoclast number and activity, thereby decreasing bone resorption. An article published in the *International Journal of Oral and Maxillofacial Implants* (2006;21:349–353) reported on the results of two controlled studies of subjects who are receiving oral bisphosphonates to determine the risk of these drugs causing osteonecrosis. One study evaluated a total of 335 patients who had taken either a placebo or alendronate, an inhibitor of bone resorption. Alveolar bone height and safety were assessed over a 2-year period. The second study was a longitudinal single-blind controlled design comparing implant success in 50 consecutive patients. Half of these patients had received bisphosphonate therapy, and the other half was an age-matched control group. Implant success and osteonecrosis of the jaws was blindly assessed for 3 years. Neither study had any patients who developed osteonecrosis of the jaws. On the basis of these two controlled clinical studies, oral bisphosphonate usage was not associated with occurrence of osteonecrosis of the jaws.

Maxillary sinus augmentation not a risk factor

for implant failure. Sinus pneumatization and alveolar bone loss limit the bone available for implant support in the posterior maxilla. If bone support is inadequate, maxillary sinus augmentation may be indicated to reconstruct a deficient alveolus. However, the potential negative effect on the long-term survival of implants in grafted sinuses is not known. A study published in the *International Journal of Oral and Maxillofacial Implants* (2006;21:366–374) sought to determine whether maxillary sinus augmentation was an independent risk factor for implant failure. These authors used a retrospective cohort study design. Their sample consisted of 318 patients and 762 posterior maxillary implants. The mean duration of follow-up was nearly 2 years. The survival rates for the implants in the ungrafted and grafted posterior maxilla were 88.0% and 87.9%. After the authors adjusted for covariates, the maxillary sinus augmentation status was not associated with implant failure. The authors conclude that grafting the maxillary sinus to create adequate bone for implant placement is not a risk factor for implant failure.

Rough implant surfaces are associated with stable connective tissue attachment. Most implant research has focused on the interface between the titanium implant and the bone. However, the soft tissue attachment between the titanium and the connective tissue is extremely important to the esthetic appearance of the implant restoration long-term. If the soft tissue attachment is not stable, tissue migration and recession may result in an esthetic failure. Therefore, different types of implant surfaces have been developed to maintain the soft tissue attachment. A study published in the *International Journal of Oral and Maxillofacial Implants* (2006;21:354–365) evaluated the connective tissue attachment to titanium implants with various well-defined surface topographies. The samples consisted of replicas of polished, finely blasted, coarsely blasted, acid-etched, coarsely blasted and acid-etched, and micromachined grooved surfaces of titanium implants that were implanted subcutaneously in 74 rats for up to 11 weeks. A total of 153 test surfaces were analyzed. Statistical analysis revealed that textured and rough surfaces exhibited significantly greater connective tissue attachment and thinner fibrous encapsulation when compared with polished surfaces. The authors conclude that rough implant surfaces have the most stable connective tissue attachment.