What's New in Dentistry

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Smoking is a risk factor for failure of smooth surface implants. Dental endosseous implants are routinely used to replace missing teeth in adults and are also used by orthodontists to enhance anchorage during difficult tooth movement. Both rough surface and smooth surface implants are commercially available. Because smoking has been associated with higher potential failure around implants, is there any difference in the failure rates of smooth and rough surface implants in smokers and nonsmokers? That question was addressed in a study published in the *International Journal of Oral and Maxillofacial Implants* (2008;23:1117–1122). The purpose of the study was to retrospectively evaluate two large samples of implants that had been placed over two 5-year periods at a large institutional clinic. During the first 5-year period, 2182 smooth surface implants were placed in 593 subjects. During the second 5-year period, 2425 rough surface implants were placed in 905 patients. Background information concerning implant location, patient oral hygiene, periodontal status, gender, age, and smoking status was collected for each patient. The authors then recalled the patients to determine the success rates of the implants. Study results showed that the risk of failure in smokers was three times greater for smooth surface implants than for rough surface implants. Location of the implant placement and gender were not associated with implant failure. Because orthodontists typically use smooth surface mini-implants to assist in orthodontic anchorage, it seems likely that smoking is a high risk factor for failure of smooth surface mini-implants used in orthodontic patients.

Mesenchymal stem cells enhance bone formation in ridge defects. Bone grafting is a common requirement either before or after implant placement in humans. Although both cadaver and autogenous grafts can be used, the predictability of bone grafting is often questionable. Therefore bone-stimulating methods have been used to enhance the effectiveness of bone-grafting techniques. Platelet-rich plasma has been added to bone grafts to improve the success rates. Including mesenchymal stem cells in the graft material is another possible method for improving bone-grafting success. That technique was attempted in a study published in the *Journal of Oral and Maxillofacial Surgery* (2009;67:265–272). The authors conducted this experiment in adult minipigs. A trephine was used to create bone defects in the alveolar ridges of the animals. Then three different grafting techniques were attempted to fill these bony defects. One group of defects was filled with autogenous bone from the same animal. A second set of defects was filled with autogenous bone mixed with platelet-rich plasma. Finally, in the third group, the bone defects were filled with a combination of autogenous bone, platelet-rich plasma, and mesenchymal stem cells that had been cultured from the bone marrow of each of the animals. After 3 months, the authors biopsied the grafted sites to determine the extent of fill of the defects with remodeled bone. They found that the sites treated with the mesenchymal stem cells had the greatest amount of vital new bone between the residual grafting particles compared with the other two groups, which had only autogenous bone or bone combined with platelet-rich plasma. In the future, surgeons may harvest and culture mesenchymal stem cells from individuals who require bone grafting before implant placement to enhance the predictability and success of grafting techniques.

Removal of asymptomatic mandibular third molars improves the periodontal health of second molars. Orthodontists are routinely asked whether mandibular third molars should be removed after orthodontic treatment of young adults. In some patients, the decision is clear because the third molar is impacted. But what if the third molars are erupted and asymptomatic? Should these teeth be allowed to remain? Will asymptomatic mandibular third molars adversely affect the periodontal health of the adjacent second molar? That question was addressed in a study published in the *Journal of Oral and Maxillofacial Surgery* (2009;67:245–250). The researchers evaluated a sample of 70 young adults (average age = 26 years) who had their third molars removed. This group of subjects had been enrolled in a longitudinal study where baseline records, including full-mouth periodontal probings, had been gathered over a 2-year period before third molar extraction. The periodontal probings were completed again just before third molar extraction and 9 months after extraction. The authors wanted

to ascertain whether extracting the mandibular third molars had any effect on the probing pocket depth distal to the remaining second molars. The authors classified a probing of greater than 4 mm as an indicator of periodontal pathology. The authors found that significantly fewer subjects who had all third molars removed had a pocket depth greater than 4 mm on the distal mandibular second molars after surgery compared with those subjects who retained at least one mandibular third molar. The authors conclude that removing asymptomatic mandibular third molars significantly improves the periodontal status on the distal second molars, positively affecting overall periodontal health.

Interdental brushing is better than flossing for interproximal tissue health. Adequate removal of plaque from the teeth is necessary to enhance periodontal health and reduce caries susceptibility. However, interproximal plaque removal requires special efforts with either dental floss or by using small interproximal brushes made specifically for cleaning between the teeth. Is there any difference in the effectiveness of these two techniques for interproximal plaque removal? That question was addressed in a study published in the *Journal of Dental Research* (2008;87:1037–1042). The study was a prospective randomized clinical trial involving a total of 67 subjects. The periodontal status of all participants was assessed by measuring the plaque index, bleeding index, and probing pocket depth of all teeth. Subjects were then randomly assigned to one of two groups. One group was given a customized interproximal flossing tool to be used once each day to remove the interproximal plaque. The other group was given an interproximal brush that could be used to accomplish the same task. The sample was reevaluated after 12 weeks to determine if there were any differences between the two groups. The authors found that those individuals who used the interproximal brushes showed a greater reduction in plaque index, which resulted in reduced probing pocket depths and greater reduction in bleeding upon probing. The authors attributed the difference mainly to the greater efficiency in plaque removal with the interdental brushes compared with the floss. Interdental brushes are much easier for orthodontic patients to use than floss, especially when archwires interfere with flossing techniques.

Immediate repair of transected inferior alveolar nerves shows promising outcomes. Unfortunately, a risk of sagittal split mandibular osteotomy is accidental transection of the inferior alveolar nerve during the surgical procedure. This outcome is often extremely difficult for patients to overcome because of the permanent loss of nerve sensation in that area. However, with improved microsurgical techniques, trained microsurgeons now have the capability to reattach severed nerve fibers in order to reinstate sensory nerve function. Although the technique requires special skills and takes significant time, if the outcome is positive, then it may be worth the extra effort. An article published in the *Journal of Oral and Maxillofacial Surgery* (2008; 66:2476–2481) describes the outcome of three patients with transected inferior alveolar nerves during orthognathic surgery. All three patients had microsurgical nerve repair performed. In each case, the original operating surgeon secured the skeletal fragments in the other osteotomy sites. The nerve repair was then completed by a microsurgeon using a microscope and specific microsurgical instruments to reattach the nerve fibers. Finally, the osseous fragments in the area of the nerve transection were united by the microsurgeon after the nerve repair. The three patients were evaluated up to 1 year after the nerve repair, and all three showed recovery to only mild or no sensory impairment. None of the three had functional problems such as drooling, lip-biting, or speech difficulties at 1 year after surgery. The results of this study show that immediate nerve repair for a transected inferior alveolar nerve during sagittal osteotomy may be a feasible option, but this requires the availability of a microsurgeon, special instrumentation, and operating room time.