What's New in Dentistry

Vincent Kokich, DDS, MSD

Short-term oral bisphosphonates do not affect implant survival. In recent years, oral and maxillofacial surgeons have recognized that patients who take intravenous bisphosphonates to reduce the bone pain and hypercalcemia of malignancy occasionally will develop necrotic bone lesions after undergoing oral surgical procedures. Today, millions of adults take oral bisphosphonates on a regular basis to limit the negative effects of osteopenia and osteoporosis. Many of these individuals require the placement of dental implants to restore edentulous areas of the mouth. However, surgeons are concerned that osteonecrosis could be a negative surgical side effect in these oral bisphosphonate users. A study published in the *Journal of Periodontology* (2007;78:1664–1669) reported on a 2-year follow-up of a group of patients with a history of oral bisphosphonate therapy that was conducted to determine whether this drug caused bone necrosis after implant placement. The sample for this study consisted of 61 female patients ranging in age from 51 to 83 years who were receiving oral bisphosphonate therapy in the form of alendronate or risedronate, 35 or 70 mg/wk. Each of these patients was treated with immediate implant placement at the time of tooth removal or by implant placement in an edentulous area. These implants were restored 6 months postoperatively, and patients were reexamined for final data collection 12 to 24 months after implant placement. Only one patient exhibited exposed bone (2–3 mm) on a torus adjacent to the lower first molar after 1 week. The area was debrided, and it healed. Other than this minor problem, no untoward postoperative sequelae or complications were noted in any patient. All implants were deemed clinically stable with no necrotic bone loss. The authors conclude that although larger controlled studies are needed, these 61 patients who were taking oral bisphosphonates longer than 3 years on average did not develop osteonecrosis after implant placement and restoration.

Tooth bleaching causes reduction in dentin fracture toughness. Direct or indirect bleaching with carbamide peroxide or hydrogen peroxide is commonly used to whiten teeth in adolescents and adults. In fact, these products are sold over-the-counter, so the patient actually is regulating the frequency of their use. Now that tooth whitening has been popular for a few years, reports of sensitivity and negative effects on dental hard tissues are appearing in the dental literature. Does tooth bleaching actually cause structural defects in the tooth? A study published in the *Journal of Dental Research* (2007;86:1193–1197) performed an in vitro evaluation of the effect of these bleaching agents on dentin fracture toughness. This laboratory experiment was performed on human molar teeth that were extracted within 3 months of the study. Compact test specimens of these teeth were directly or indirectly exposed to 16% carbamide peroxide, 10% carbamide peroxide, or 3% hydrogen peroxide for 6 hours each day for 2 or 8 days. Then the fracture toughness of the dentin was analyzed. Results showed significant decreases in mean fracture toughness of the dentin after 2- and 8-week direct (19%–34% and 61%–68%, respectively) and indirect (up to 17% and 37%, respectively) bleach application. The authors conclude that the reduction in dentin fracture toughness caused by bleach was greater for the direct application method, with a longer application time, and at a higher bleach concentration. Patients should be cautioned against prolonged use of these materials so that damage to the structure of the dentin can be avoided.

Psychological factors influence TMD risk. Temporomandibular disorders (TMDs) consist of a group of chronic orofacial pain conditions that affect about 10% of adults in developed nations. Human experimental studies have confirmed interindividual variability in reported levels of pain elicited by noxious stimuli, suggesting that both genetic and environmental factors influence pain perception. However, do psychological characteristics associated with pain sensitivity influence the risk of first onset of TMD, irrespective of any genetic effect? This question was addressed in a study published in the Journal of Dental Research (2007;861120–1125). This prospective cohort study of healthy female volunteers aged 18 to 34 years at the time of recruitment was conducted to evaluate first-onset TMD among healthy individuals. Initially, significant baseline data were gathered following the completion of psychological questionnaires and quantitative sensory testing to determine pain sensitivity. In addition, the genotypes of patients were assessed to

determine whether they were genetically at risk for TMD. Researchers followed this sample of 171 women for up to 3 years, and during that time, first-onset TMD was diagnosed in 8.8% of them. When the authors analyzed the psychological profiles and pain sensitivity of these individuals, they found that depression, perceived stress, and melancholy mood were associated with pain sensitivity and were predictive of a two- to threefold increase in risk for TMD. When researchers then adjusted for genetic factors, the magnitude of increased TMD risk caused by psychological factors remained unchanged. The authors conclude that psychological factors linked to pain sensitivity may influence TMD risk independent of genetic effects.

Predicting the value of oral appliances in treating sleep apnea. Sleep apnea is a common sleep-related breathing disorder characterized by disruptive snoring and repetitive upper airway collapse. A common method of treating this disorder is continuous positive airway pressure (CPAP). However, this treatment modality requires that patients wear an obtrusive device during sleep; therefore, patients may abandon the therapy. Another mode of treatment involves wearing oral appliances during sleep to place the mandible and the tongue in a more forward position to open the airway. Although evidence suggests that oral appliance therapy is effective for sleep apnea, it generally is considered less effective than CPAP. Therefore, it would be beneficial if predictors of treatment outcome were available to assist the clinician in determining which patients could best benefit from the use of oral appliances. This study was completed and published in the *Journal of Dental Research* (2007;86:1181–1186). The objective was to assess the value of relevant clinical, polysomnographic, and cephalometric variables, separately and jointly, in predicting outcomes of oral appliance and CPAP therapy. Two groups were observed in this study. The first was a group of 51 patients treated with oral appliances, and the second was a cohort of 52 patients treated with CPAP. All relevant clinical data were collected at the outset of the experiment. After patients had used an oral appliance or CPAP for about 2 to 3 months, the treatment effect was assessed with polysomnography. Then pretreatment predictors were established that were based on the success of the two treatments. Results generally show that the outcome of oral appliance therapy is favorable in less obese patients with milder sleep apnea and with mandibular retrognathism. The authors conclude that the variables found in their study are valuable for use in preselecting suitable candidates for oral appliance therapy.

Replacement of failed implants reduces the implant success rate. Implants are commonly used to replace missing teeth. After restoration, the success rates of implants are generally well over 90%. However, some implants fail after placement. In these situations, the usual treatment is to remove the failed implant and replace it with another implant at the same site. However, will the fact that the implant has already failed once affect the outcome of implant replacement? This question was addressed in a study that was published in the *Journal of Periodontology* (2007; 78:1670–1674). The study consisted of a sample of 1215 consecutively treated subjects who received 1387 single implants for single tooth replacement over a 6-year period. A total of 75 patients experienced the failure of 96 implants. Therefore, the initial overall survival rate was generally good, at 93%. Implant failures generally occurred during the healing period and the early loading phase. The average time to original implant failure was about 6 months. Then a total of 31 implants in 28 patients were replaced by another implant at the same location. On average, implant replacement occurred about 6 months after the original failed implant had been removed. Follow-up after implant replacement ranged from 6 months to 4 years. It was found that nine of the replacement implants failed, resulting in an overall survival rate of 71%. The authors conclude that if an implant fails after initial placement, the survival rate for a replacement implant at that same site is dramatically reduced.