What's New in Dentistry

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Chlorhexidine varnish reduces caries incidence in primary teeth. Caries in primary teeth has been gradually reduced in recent years in most developed countries around the world. However, a recent study showed that the incidence of caries in young children of developing countries has increased. This was especially true in China. Because chlorhexidine is a proven chemotherapeutic agent against *Streptococcus mutans*, a study published in the *Journal of Dental Research* (2006;85:557–559) tested the effect of applications of 40% chlorhexidine varnish on the incidence of dental caries in primary molars in Chinese preschool children every 6 months over a period of 2 years. This was a double-blinded, randomized, placebo-controlled clinical trial of 334 children aged 4–5 years. Either the test varnish containing the chlorhexidine or a placebo varnish containing only alcohol was placed on all surfaces of the primary molars every 6 months for 2 years. No professional cleaning of the teeth was carried out before varnish application. The subjects were examined after 2 years to determine the number of decayed, missing, or filled primary molar surfaces for each subject. The results of this experiment showed that the mean caries increment of the primary molars was 1.0 in the test-group children and 1.6 in the placebo group. This difference produced a 37.3% reduction in caries increment and was statistically significant. In addition, no adverse effects such as staining of teeth were found at the 24-month examination. The authors conclude that applications of chlorhexidine varnish every 6 months were effective in reducing the incidence of dental caries in primary molars.

Treatment of temporomandibular disorders reduces tinnitus. Tinnitus is defined as a subjective sound in the ears or head without any external source of the sound. It is estimated that about 10%–15% of the general population experiences tinnitus. It has been reported that 20% of tinnitus patients are affected by their tinnitus to a degree that their quality of life is impaired, and about 60% report depression. The most common theory about the etiology of tinnitus is that it is caused by otological pathology, such as hearing loss, cochleovestibular disorders, or endolymphatic disorders. More recently it was reported that 60% of patients with chronic tinnitus had more than two symptoms of temporomandibular disorder (TMD) compared with 36% of healthy controls. In fact, the incidence of tinnitus in 1000 consecutive TMD patients over a 10-year period was found to be 7%. Therefore, the question is whether successful TMD treatment would also eliminate or reduce the incidence of tinnitus. A study published in *Acta Odontologica Scandinavica* (2006; 64:89–96) investigated the effect of TMD treatment on tinnitus after 2 years. The sample consisted of 96 patients who had tinnitus and coexisting TMD (most frequently localized myalgia). The TMD treatments included instruction in jaw relaxation techniques, an occlusal bite splint, and minor occlusal adjustment. A questionnaire was mailed to the patients 2–3 years after completion of the treatment, and they were asked if their tinnitus had changed compared with 2 years previously. Forty-three percent of the patients in the study group reported that their tinnitus was reduced at the follow-up 2 years after treatment, whereas 39% reported that it was unchanged and 18% said that it had increased. The severity of tinnitus was significantly decreased at follow-up, and the patients generally reported significant improvement regarding quality-of-life variables. Therefore, within the limitations of this study, the authors conclude that TMD symptoms and signs are frequent in patients with tinnitus and that TMD treatment has a good effect on tinnitus long-term.

Bisphosphonates are associated with increased risk during jaw surgery. Bisphosphonates are potent inhibitors of bone resorption, with long-lasting effects. The use of these drugs is a popular treatment modality for the management of osteoporosis or to treat hypercalcemia caused by bone metastasis in cancer patients. Although the clinical benefits of bisphosphonates are well studied, the long-term risks associated with prolonged bisphosphonate exposure are not adequately documented. In fact, there are now several well-documented cases of osteonecrosis among bisphosphonate users. Given the wide, frequent, and chronic use of bisphosphonates in millions of women nationwide, this link between use of the drug and osteonecrosis could have serious public health consequences. A study published in the *Journal of Oral and Maxillofacial Surgery* (2006;64:917–923) evaluated

over a 4-year period the medical claims data from a large health insurance plan that provides health coverage to about 20 million members. This study compared the frequency of outcome (surgical procedure to the mandible or maxilla) between users of bisphosphonates and nonusers. The authors calculated odds ratios based upon their data. The results showed that the odds ratio of jaw surgery for intravenous bisphosphonate users was 4:24. Breast cancer patients experienced a sixfold increase in risk as compared with nonusers. A trend of increased risk was noted for those patients on orally administered bisphosphonates, but the association was not significant. The authors encouraged more studies to determine the role of bisphosphonates in bone biology and necrosis.

Osseointegration of unloaded titanium implants begins with formation of a hematoma. Although titanium implants are commonly used throughout the world to replace missing teeth, a clear understanding of the early cellular events leading to osseointegration of implants is currently lacking. Many studies have investigated the process of osseointegration, but research has mainly focused on the quantification of the bone-to-implant contact. However, these reports lack information on the origin of the bone-implant bond, because quantification is performed only after several months or years of implant healing. A study published in the *Journal of Periodontology* (2006;77:1015–1024) evaluated the sequential events of osseointegration in cortical bone. To accomplish this level of documentation, the authors inserted 36 titanium implants into the tibial diaphysis of six rabbits. These implants were allowed to heal for 1 to 42 days. During the healing time, the histologic response of the bone surrounding the implants was analyzed histologically. The first response immediately after implant placement was the formation of a hematoma. After coagulum formation, osteoclasts and osteoblasts were observed at the bone surface about 1 week after healing. In the preexisting bone, osteocytic lacunae appeared to be devoid of cells. This region of altered nuclear morphology continued to extend for about 28 days after implant insertion. This event was accompanied by an invasion of the damaged bone by multicellular units that initiated intensive bone remodeling, which reached its maximum after 4 weeks but was ongoing 6 weeks after implant insertion. Therefore, these authors have shown that insertion of an implant into bone initiates a series of biological processes, including the formation of a hematoma, altered nuclear morphology of the osteocytes surrounding the implantation site, intensive bone remodeling, and the formation of new bone, eventually leading to the osseointegration of the implant.

Surface roughness of implants enhances bone-to-implant contact. A major parameter for the clinical success of endosseous implant therapy is the formation of a direct contact between implant and surrounding bone. The implant-bone response is thought to be influenced by implant surface topography. Although several meta-analyses have been performed to investigate this relationship in clinical situations, no studies have addressed the biological response in animals when viewed at the histologic level. A study published in the *Journal of Dental Research* (2006;85:496–500) performed a systematic meta-analysis of the data regarding implant surface roughness to determine its relationship, if any, with bone healing and biomechanical tests. The authors searched the literature published from 1953 to 2003. Inclusion criteria were (1) abstracts of animal studies investigating implant surface roughness and bone healing; (2) observations of 3-month bone healing, surface topography measurements, and biomechanical tests; and (3) provision of data on surface roughness, bone-to-implant contact, and biomechanical test values. The literature search revealed 5966 abstracts. There were 470, 23, and 14 articles included in the first, second, and third selection steps, respectively. Nearly all papers showed an enhanced bone-to-implant contact with increasing surface roughness. Also, a significant relationship was found between push-out strength and surface roughness. The authors conclude that the statistical analysis on the available data provided supportive evidence for a positive relationship between bone-to-implant contact and surface roughness (ie, the greater the surface roughness, the greater the bone-to-implant contact).