What's New in Dentistry

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Single-tooth implants vs fixed bridges. Since their reintroduction into dentistry nearly 25 years ago, implants are now influencing the way dentists treatment plan their patients. When patients are missing teeth, implants are usually considered first before other methods of restoring edentulous spaces. However, fixed bridges have been used for decades with reasonable results. Which is better: an implant or a fixed bridge? That issue was addressed in a systematic review on this topic that was published in the *International Journal of Oral and Maxillofacial Implants* (2007;[suppl]:71–95). In this critical review of the existing literature, the authors searched several different databases to identify articles that compared survival and success of fixed bridges (conventional bridges and resin-bonded Maryland bridges) and single implant-supported crowns. Inclusion criteria for implant and fixed bridge articles included a minimum 2-year follow-up, a minimum of 12 implants or bridges, as well as inclusion data regarding implant and prosthetic performance. The search failed to identify any articles that *directly* compared success of single implants with fixed bridges. However, 51 articles were identified in the implant literature and 41 articles were identified in the fixed bridge literature that satisfied the inclusion criteria. A comparison of the pooled success rates based upon these articles showed that the success of single implants at 60 months was 95.1%, while fixed bridges (conventional bridges and resin-bonded Maryland bridges) showed an 84% success rate. However, when the data for conventional bridges and resin-bonded Maryland bridges were ungrouped, so the comparison could be made directly between conventional bridges and implants at 60 months, the difference in success rate disappeared.

Speech outcome after pharyngeal flap in cleft palate children. Children born with a cleft palate typically have speech difficulties due to inadequate seal of the pharynx because of the abnormal shape and mobility of the soft palate. In order to compensate for the air escape that produces the hypernasal speech, a cranial-based pharyngeal flap is often performed to create a better seal and to reduce the airflow. But are these always successful? If so, are there any differences between unilateral and bilateral cleft defects? Are these flaps effective in patients with velopharyngeal insufficiency and no cleft palate? An article published in the *Journal of Oral and Maxillofacial Surgery* (2006;64:1736–1742) evaluates and compares the speech outcome differences between these three anatomically different situations after pharyngeal flap surgery. The sample consisted of 234 children born with clefts and 22 children born with primary velopharyngeal insufficiency. Pharyngeal flaps were performed on all children. When these samples were compared, the results showed that the positive effect on speech of a cranial-based pharyngeal flap is greater in children born with a unilateral cleft palate than in those born with a bilateral cleft palate. In addition, for children born with primary velopharyngeal insufficiency, a cranial-based pharyngeal flap has only a slightly positive effect on speech. The authors believe that the results of this study should be shared with the parents of these children prior to surgery, so the parents will be aware of what to expect from the surgical procedure.

Complications with alveolar distraction osteogenesis. Distraction osteogenesis is a technique used by orthopedic surgeons to lengthen bones in order to overcome a growth deficit. In recent years, the principles of distraction osteogenesis have been applied to various areas of the body, including the oral cavity. Occasionally, the maxillary alveolus will be damaged by trauma, periodontal disease or tooth extraction. It has been proposed that distraction osteogenesis can be used to recreate alveolar bone in that area in order to place an implant. But does this procedure always work? Are there any complications from attempting this procedure in patients? The answers to these questions can be found in an article published in the *Journal of Oral and Maxillofacial Surgery* (2007;65:267–274). The purpose of this study was to evaluate distraction osteogenesis for reconstruction of vertically deficient alveolar ridges and to investigate the occurrence of complications. The sample consisted of 23 patients who underwent a total of 29 distraction procedures. The results showed that the prevalence of cases with complications was 41% intraoperative, 24% postoperative, 65% during distraction and consolidation, and 58% postdistraction. Because many of the complications coincided in some patients, the overall prevalence of complications throughout the treatment

was 79%. Of these, 3% of the complications jeopardized subsequent implant placement. In conclusion, although a high frequency of complications is encountered during distraction osteogenesis, the authors commented that the incidence of severe complications was rare, and most complications had simple solutions and did not jeopardize the final outcome.

Tooth size and shape dependent on growth hormone status. Growth hormone definitely influences tooth development. Children suffering from pituitary dwarfism display hypodontia, microdontia, and delayed tooth eruption. The mechanisms whereby growth hormone deficiency affects tooth size/shape are unknown. However, two lines of mice have been developed that mimic human pituitary gigantism and pituitary dwarfism. A study published in the *Journal of Dental Research* (2007;86:463–468) has investigated the dimensions of the teeth in these strains of mice to determine whether growth hormone status influences crown and root size and shape. The authors measured the dentin matrix dimensions in longitudinal sections of first molars from these genetically modified mice: giant mice and dwarf mice. They found that growth hormone status was found to influence crown width, root length, and dentin thickness. Analysis of the data suggests that growth hormone influences both tooth crown and root development prior to dentinogenesis as well as during appositional growth of the dentin. Common sense would suggest that giant mice would have bigger teeth. However, this was not the case. The lower first molars of giant mice had longer roots, but their total crown area and mesiodistal width at the cementoenamel junction were unchanged. In contrast, with growth hormone deficiency, the crown dimensions were clearly affected. In the dwarf mice, the total crown area and mesiodistal width at the cementoenamel junction were significantly smaller than in the control mice. Deficiencies of growth hormone therefore can affect mouse molar crown development. In conclusion, the authors have shown that growth hormone influences dentin size and shape not only during dentin appositional growth, but also during crown and root morphogenesis prior to dentinogenesis.

Vaccine prevents alveolar bone loss in mice. *Porphyromonas gingivalis* is an anaerobic bacterium that is a leading pathogen in the development of chronic periodontitis. This bacterium possesses multiple pathogenic factors including gingipains, a group of proteases, which attack the periodontal region and play a major role in degrading host proteins, thereby resulting in alveolar bone resorption. Immunization of the host against this bacterium could help to prevent the destruction of the alveolar bone. However, is this possible? Can a vaccine be created to prevent periodontal bone loss? That research question was addressed in a study that was recently published in the *Journal of Dental Research* (2007;86:446–450). This article evaluated the effect of intranasal immunization of mice with a DNA vaccine against *P gingivalis*. The mice were immunized with this vaccine via the abdomen using a gene gun or via the nasal cavity weekly for 6 weeks. After immunization, the mice were challenged orally with *P gingivalis*Immunization elicited immunoglobin (IgG) responses against *P gingivalis* in both groups. Reduction of alveolar bone loss was observed in both groups at 42 days following initial infection. This effect was more pronounced in the intranasal immunization group. The results of this study suggest that immunization with a vaccine against *P gingivalis* given via the nasal cavity in mice is an effective method for preventing bone loss incurred by infection with this periodontally pathogenic bacterium. Perhaps this treatment will be available for humans with periodontal disease sometime in the future.