What's New in Dentistry

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Gastric reflux is a significant cause of tooth erosion. Erosion is a common type of tooth wear defined as the loss of tooth substance by a chemical process not involving bacteria. It is typically caused by acid that may be extrinsic, usually in the form of soft drinks or citrus fruits, or intrinsic in the form of refluxed gastric acid. The etiology is complex, with an interplay of extrinsic and intrinsic factors together with other types of tooth wear, such as attrition or abrasion. In order to delineate the participation of gastric reflux in the process of tooth erosion, a recent study published in the *Journal of Dental Research* (88:422–26, 2009), investigated a large group of individuals in a standardized manner. The purpose of this study was to determine the interplay of possible causative and reparative factors in tooth erosion and to identify the location and severity of erosive lesions. The sample consisted of 249 individuals who had a detailed medical history, clinical oral examination, saliva sampling, and analysis for flow rate, pH, and buffering capacity of the saliva. Gastric reflux was assessed in 91 individuals by gastroscopy, esophageal manometry, and 24-hour esophageal-pH monitoring. Reflux symptoms were reported by 36% of the individuals. An abnormal esophageal pH was found in 17% of individuals, and a pathologic 24-hour pH recording was found in 21% of the sample. Although normal salivary flow was found in 92%, low salivary buffering occurred in 10% of the sample and was associated with erosion into the dentin. The authors concluded by stating that significant associations were found between erosion and diagnosed reflux disease with an odds ratio of 2.7 and daily consumption of acidic drinks with an odds ratio of 2.2. Since persons with gastric reflux are at risk of developing erosion, attention should be focused on early diagnosis and the risk level of the individual.

Obesity may be an oral bacterial disease. A worldwide explosion of overweight people has occurred in the United States and the problem has reached epidemic proportions. Could obesity be associated with one or more of the 700 bacterial species that can inhabit the oral cavity? A study published in the *Journal of Dental Research* (88:519–23, 2009) evaluated the role of oral bacteria as a potential direct contributor to obesity. The authors measured salivary bacterial populations of overweight women. Saliva was collected from 313 female volunteers with a body mass index between 27 and 32, indicating moderate to severe obesity. Their bacterial populations were measured by DNA probe analysis. In addition, a group of 232 healthy individuals were used as the control population. When the authors performed classification tree analysis of the salivary microbiological composition, it revealed that 98.4% of the overweight women could be identified by the presence of a single bacterial species (Selenomonas noxia) at levels greater than 1.05% of the total salivary bacteria. Analysis of these data suggests that the composition of salivary bacteria changes in overweight women. Is there a possibility that weight gain is directly the result of a change in oral flora? The results of this study suggest that of the 40 species surveyed, levels of many bacteria differed in the saliva of overweight women, when compared with levels in the saliva of healthy individuals. Therefore, these bacterial species could perhaps serve as biological indicators of a developing overweight condition. Future research should investigate the role of oral bacteria in the pathology that leads to obesity.

Laser irradiation may be a promising tool to manage peri-implantitis. Endosseous implants have revolutionized the restoration of patients with missing teeth. However some of these missing teeth could have been lost due to periodontal disease. The periodontal pathogenic bacteria that facilitate crestal bone loss around teeth can also affect the bony and soft tissue support around implant restorations. The bacterial endotoxin lipopolysaccharide represents a prime pathogenic factor of peri-implantitis, because of its ability to adhere tenaciously to dental titanium implants. Most therapeutic methods in periodontally susceptible patients are directed at removing the bacteria. Little attention is typically paid to neutralizing the bioactive bacterial byproducts. One method for neutralizing these toxic products would be through the use of low-energy lasers. A study published in the *Journal of Periodontology* (80:977–84, 2009) explored the efficacy of the Nd:YAG laser in the treatment of peri-implant disease by evaluating its anti-inflammato-

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ry effects on lipopolysaccharide biologic activity. This was an in vitro study. The authors cultured human cells on titanium disks that had been coated with the lipopolysaccharide from one of the known periodontal pathogens. Some of the disks were irradiated with the laser and others were not and served as controls. Then, the authors evaluated the substrate to determine the effectiveness of the laser on the destruction of the bacterial byproducts. The authors found that laser irradiation significantly reduced the lipopolysaccharide-induced inflammatory response. The authors conclude that laser irradiation may be a promising tool for the therapeutic management of peri-implantitis.

Immediate loading does not impede bone formation. Traditionally, endosseous implants were buried for four to six months prior to restoration to allow adequate osseointegration of the implant. However, in recent years, clinicians have been shortening the time for osseointegration, and many articles suggest that immediate loading is not deleterious to implant survival. But some of the studies that document bone healing around implants have been done in experimental animals. What happens to the osseointegration process in humans if the time to loading is shortened? An article published in the *International Journal of Oral and Maxillofacial Implants* (24:896–901, 2009), compared immediate and delayed loading histologically in humans. In this small study, four patients underwent rehabilitation of their mandibular posterior edentulous spaces with implants. An additional implant was placed in each patient for observation. In two of these patients, the additional implants were placed into nonfunctional immediate loading with a fixed provisional prosthesis on the same day of the implant surgery. In the other two patients, the implants were submerged. After 4 and 8 weeks, the loaded and buried implants were retrieved using a trephine, so that the bone adjacent to the implant surface could be evaluated. The authors found that the percentage of bone-implant-contact in the immediately loaded implants was 65% after four weeks, and 76% after eight weeks. On the other hand, the percentage of bone-implant-contact for the buried implants was 54% and 62% at four and eight weeks, respectively. The authors conclude that immediate loading stimulates rather than retards osseointegration of endosseous implants.

Construction of an anti-caries vaccine. Dental caries is a transmissible infectious disease. *Streptococcus mutans* is recognized as an important member of a relatively small group of acidogenic bacteria that are in the indigenous plaque microflora and are generally considered to be the principal etiologic agent of dental caries. *Streptococcus sobrinus* is another commonly found bacteria in human plaque and is also associated with dental caries. In a study published in 2006, researchers documented the development of a fusion anti-caries DNA vaccine that successfully reduced the levels of dental caries caused by *S mutans* in experimental animals. However, there was little effect on *S sobrinus*. In a recent study by these same researchers published in the *Journal of Dental Research* (88:455–460, 2009), they described their attempts to create a similar vaccine for *S sobrinus*. The authors cloned a vaccine for *S sobrinus*. Then, they infected a group of rats with the same bacteria. On day 28 after the infection, the rats were immunized with the new anti-caries DNA vaccine for *S sobrinus*. After 63 days, the teeth of these animals were sectioned to determine the caries activity. The results of the experiment showed a distinct reduction in the caries activity in the immunized rats. In summary, the authors believe that this study was the first to construct successfully a new fusion anti-caries DNA vaccine encoding antigens of both *S mutans* and *S sobrinus*.

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