What's new in dentistry

As orthodontists, we are often unaware of the technical and methodological advances in other dental specialties. However, many of these new experimental developments may ultimately become accepted dental therapy and influence the diagnosis and treatment of our orthodontic patients. Therefore, as part of the dental community, we must keep abreast of current information in all areas of dentistry. The purpose of this section of The Angle Orthodontist *is to provide a brief summary of what's new in dentistry.*

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PERIODONTAL DISEASE PASSED FROM PARENT TO CHILD—Today, orthodontists know that periodontal disease requires two factors. First, one of the six or seven pathogenic bacteria that are responsible for causing periodontal destruction must be present. Second, a patient must be susceptible to the destruction of the pathogens. Without the pathogenic bacteria, the disease will not exist. How do patients become infected with the pathogenic bacteria? A recent study published in the *Journal of Dental Research* (1994;73:1636-1640) reports that the bacteria are passed from parent to child. In this study, the investigators gathered a sample of 52 children from 34 parents. Each of the parents was given a thorough periodontal clinical examination. Specific pathogenic bacteria that usually cause periodontal disease were present in the adults. Then the researchers looked at each of the children. Subgingival plaque was sampled to see if similar bacteria were present. When analyzed statistically, 70% of the children were positive for the same bacteria as their parents. These researchers concluded that children of a parent with periodontitis are 12 times more likely to be colonized with the same pathogenic bacteria.

EXTERNAL DISTRACTION GROWS LONGER MANDIBLES—Several years ago a Russian doctor named Gavriel Ilizarov developed a technique to lengthen long bones. He sectioned the bone, placed metal posts on either side of the osteotomy, then used a distraction device—either a spring or a screw—to move the two fragments apart. As the fragments move, the bone lengthens. A recent study published in the *Journal of Oral and Maxillofacial Surgery* (1994;52:1179-1183) shows that this method of lengthening bone can now be applied to the mandible. In this study, Italian researchers performed a similar surgery on 15 rabbits. After the osteotomy, a distraction appliance was fixed to the fragments and the mandibles were lengthened. The researchers identified three specific stages of healing. Immediately after the osteotomy, a blood clot is formed. This is followed by a fibrous phase. The collagen fibers invade the distracting osteotomy site behind the penetration of blood vessels. During the third phase, osteogenesis occurs. This is similar to the way a suture reacts during palatal expansion. In the future, we may see distraction osteogenesis applied to humans with extremely short mandibles.

BLEACHING AGENTS HARMFUL TO FIBROBLASTS—Tooth bleaching is popular in dentistry today. Over-the-counter products as well as dentist-prescribed systems are available for bleaching teeth. The process is usually done at home. The most common bleaching material is carbamide peroxide. Although only a few side effects apparently exist clinically, researchers now are concerned about the potential harmful effects of bleaching on soft tissues. A study published in the *Journal of Periodontology*

(1995;66:7-13) reports that peroxide adversely affects gingival fibroblasts. In this study, fibroblasts were cultivated from a human donor. They were grown in a laboratory setting and subjected to varying concentrations of the peroxide that would be found in commercially available bleaching agents. These researchers discovered that bleaching agents kill fibroblasts in culture. This side effect would be detrimental to the production of collagen and fibronectin in gingival tissues. But why isn't this problem experienced clinically in patients? These researchers believe that the saliva in the oral cavity dilutes the peroxide and that enzymes are present in the gingival tissue and/or saliva that neutralize the effect of the peroxide. So although bleaching agents are harmful to fibroblasts, the clinical impact is not significant.

OSTEOPOROSIS NOW A RISK FACTOR FOR PERIODONTAL DISEASE—As orthodontists treat more adult patients, they occasionally treat female patients who are going through menopause. During this time, many women undergo osteoporosis, or loss of mineral content from bone. If this process becomes severe, patients may experience atraumatic fractures of long bones. Now, researchers are suggesting that osteoporosis may also contribute to the severity of periodontal disease. In an article published in the *Journal of Periodontology* (1994;65:1134-1138) researchers from the University of Copenhagen compared alveolar bone loss in a group of women who had proven osteoporosis with alveolar bone loss in a group of matched controls. Bone mineral content was evaluated for each group using a dual-photon scanning radiographic technique. In addition, the periodontal status of each subject was evaluated. After comparing information, the authors found that although the two samples were almost identical with respect to gingival index, plaque index, and bleeding index, the patients with osteoporosis showed significantly more attachment loss. In addition, the bone mineral content level of the osteoporotic women was much lower when measured on the mandibular radiographs. This study suggests that women who have osteoporosis have less bone mineral content, and therefore the bone loss that occurs secondary to periodontal inflammation progresses much more rapidly.

AUTOLOGOUS BONE IS BEST FOR IMMEDIATE IMPLANTS—Now that implants have become accepted in dentistry, surgeons are replacing single hopeless teeth with implants. A popular method is to place the implant immediately after extraction of the tooth. However, gaps are present between the implant surface and the tooth socket. These gaps need to be filled with bone. But what type of bone is the best for grafting around an immediate implant? A study in the *Journal of Periodontology* (1994;65:1128-1133) strongly favors the use of autologous bone. In this clinical study, researchers from the U.S. used a split mouth design to evaluate this question. In the mandibular incisor regions of seven patients, periodontally hopeless teeth were extracted and replaced with implants. On one side, freeze-dried cadaver bone was placed around the implants. On the other side, autologous bone from the patient was used as the bone graft material. After 8 months of healing, histologic samples were taken from these sites. The autologous bone underwent normal remodeling within the socket but the cadaver bone had not remodeled. The authors believe that autologous bone is preferable to freeze-dried cadaver bone around immediate implants.