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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BONDING MATERIAL INHIBITS BACTERIAL GROWTH. Decalcification can be an unfortunate consequence of poor oral hygiene during orthodontic treatment. If this occurs in the maxillary anterior region, enamel scars can be obvious and unesthetic. In the past, researchers added agents such as Chlorhexidine to bonding composites to inhibit bacterial plaque formation. However, the mechanical properties of the composite are usually weakened. A recent study in the *Journal of Dental Research* (1994;73:1437-1443) describes the development of a new product that may overcome the inadequacy of previous antibacterial composite resins. A group of researchers from Japan has developed a new monomer containing an antibacterial agent called Dodecylpyridinium. The composite containing this antibacterial monomer proved very effective. First, when it was suspended in solution for 30 days, no antibacterial agent was given off into the liquid. When the composite material was exposed to plaque, the bacterial growth in the area of the composite was dramatically reduced. Finally, an Instron testing machine showed that the mechanical properties of the composite had not been altered. Eventually, if this material has no systemic side effects, it may be beneficial for orthodontic patients with poor hygiene.

MAJOR BLOOD FLOW REDUCTION DOES NOT AFFECT LEFORT SURGERY. During LeFort osteotoemies, the maxilla is down-fractured away from the skull and pedicled from the soft palate. The greater palatine arteries supply the blood flow to the segmented maxilla. In the past, surgeons were not aware of the impact of this procedure on gingival blood flow around the teeth. A recent study published in the *Journal of Oral and Maxillofacial Surgery* (1994;52:827-831) uses laser Doppler flowmetry to document the changes in blood flow during LeFort surgery. A sample of 14 patients underwent LeFort osteotomies. A laser Doppler flowmeter was used to assess the gingival blood flow labial to the maxillary lateral incisors. Blood flow was measured at 10 different times before, during, and after the surgical procedure. The results show that the gingival blood flow decreased by 64% during the osteotomy. Although the results are interesting, the reduction in blood flow apparently has no long-term effect on healing. Collateral circulation of the maxilla is apparently sufficient to permit adequate healing postoperatively. The significance of reduced blood flow is unknown.

TMJ DISCS GROWN IN CULTURE MAY PROVE USEFUL. A common disorder of the temporomandibular joint is displacement of the cartilaginous disc. If the disc is displaced for a significant period of time, it becomes deformed

and in some cases, perforated. This can result in significant problems for the patient. In the past, synthetic materials have been tested as replacements for the disc. However, most are inadequate. A recent study published in the *Journal of Oral and Maxillofacial Surgery* (1994;52:1172-1177) describes a process in which chondrocytes from an animal were used to grow a cartilaginous disc using tissue-engineering. Twelve bioabsorbable transplantation devices in the shape of TMJ discs were implanted into mice and chondrocytes were implanted within the devices. After 12 weeks, these researchers found that hyaline cartilage in the shape of the TMJ disc was produced. Further testing showed that the engineered discs were similar to those of the native donor cartilage. This type of tissue engineering to grow cartilage may have application in reconstructive TMJ surgery in the future.

INTRANASAL SPRAY INDUCES MILD SEDATION. Most orthodontic patients are not fearful during orthodontic procedures. However, occasionally orthodontists treat young children who may be apprehensive during certain procedures. Although sedation is rarely used during orthodontic appointments, it would be helpful to have a mild, quick-acting sedative for certain patients at certain times. This may be possible in the future. A recent study in *Journal of Oral and Maxillofacial Surgery* (1994;52:840-843) compared the effectiveness of intranasal and intravenous Midazalom sedation. Midazalom is a mild sedative. It has a rapid onset, short half-life, and minimal residual effects. The usual mode of delivery is through intravenous infusion. However, in this study, researchers compared intravenous delivery with delivery via an intranasal spray. The drug was given to 40 individuals who had been randomly divided into two groups and the dosage was minimal. The study showed that 80% of the patients were adequately sedated 5 minutes after use of the nasal spray, and 95% of the children showed sufficient premedication after 10 minutes. Perhaps in the future, orthodontists may be able to use an intranasal spray to medicate patients who are anxious or apprehensive during some appointments.

DRUG DECELERATES TOOTH MOVEMENT. Increased orthodontic anchorage is sometimes desirable during space closure. It is usually achieved with headgear, rubber bands, or other mechanical devices that prevent certain teeth from moving. But in the future, orthodontists may use locally administered drugs to slow down bone resorption and restrict movement of individual teeth. A recent research project published in the *Journal of Dental Research* (1994;73:1478-1484) identified a drug that reduces osteoclastic activity in rats. The drug is called Risedronate. Researchers placed palatal expanders in a group of rats, injected Risedronate subperiosteally on one side in the molar area, and then activated the appliance for 21 days. The molars on the injected side expanded half as much as the molars on the control side. When the animals were examined histologically, the authors counted twice as many osteoclasts per section on the control side compared with the injected side. In a second experiment, the maxillary molars were expanded but no drug was administered until after expansion. In this experiment, the authors found that the amount of relapse that occurred following removal of the expansion appliance was less on the injected side. Risedronate appears to be a potent osteoclastic inhibitor. Perhaps in the future, this type of selective tooth movement may be possible in patients.