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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RIGID FIXATION PROMOTES FASTER HEALING -- Many recent studies have evaluated and compared rigid and nonrigid fixation following orthognathic surgery. Most of these studies have been cephalometric evaluations to study the relapse potential of both techniques. But are there any differences histologically? Will one technique cause faster healing than the other? These questions were addressed in an article published in the Journal of Oral and Maxillofacial Surgery (50:718-723, 1992). This investigation compared the histologic healing processes of two groups of adult monkeys who had undergone sagittal osteotomy of the mandible. One group had transosseous wiring in addition to intermaxillary fixation to stabilize the two fragments. In the second group, three bicortical screws were placed across the osteotomy site. The surgical sites were evaluated histologically at 6 and 12 weeks after the operation. There was a difference in the type of healing. The rigid fixation produced direct bone to bone contact and more rapid union of the bony fragments. The wire fixation initially produced a callus which was then replaced by bone. The authors hypothesize that the more rapid healing with rigid fixation may account for the reduced short-term relapse seen in most cephalometric studies that have evaluated and compared the two fixation techniques.

BONDING TO METAL ALLOYS NOW POSSIBLE -- Now that orthodontists routinely bond brackets to most teeth, it's perplexing when adults present with crowns or large alloy restorations on their posterior teeth. Although porcelain crowns may be prepared with silanating agents to facilitate bonding, metallic surfaces present a problem. However, a recent study published in the Journal of Dental Research (71:1326-1331, 1992) describes a new technique for bonding directly to gold and silver alloys. The technique, which was developed in Japan, involves the preparation of the metallic surface with a liquid. The liquid, Adlloy, is composed of two metals — gallium and tin. The process is very simple: when Adlloy is placed on a metallic surface, it forms a new alloy layer composed of gallium and tin. In this study, the authors then mixed composite and bonded attachments to these surfaces. The adhesive was allowed to set for one day. The tensile strength of the bond was tested. The results show that the Adlloy-modified metallic surfaces showed very high bond strengths. The material is easy to apply, requires no special equipment, appears to be harmless and causes no irritation to the oral tissues. This breakthrough in dental research may make it much easier to treat many adult patients.

SURGICAL OR CONSERVATIVE TREATMENT OF CONDYLAR FRACTURES? Orthodontists often encounter patients who have fractured the neck of a condyle unilaterally. What's the best means of correcting the fracture? Do these patients require surgery, or will the fracture heal on its own? These questions have been

debated for many years. A recent study published in the Journal of Oral and Maxillofacial Surgery (50:349-352, 1992) sheds some new light on this issue. This investigation studied 80 patients with unilateral condylar process fractures. Fifty-four had been treated conservatively and 26 were treated surgically by wire osteosynthesis via a submandibular approach. The patients were evaluated both radiographically and clinically. The average follow-up time was 2.5 years. At the posttreatment follow-up, the authors evaluated the degree of dislocation of both groups based upon their radiographic interpretation. The authors found no statistically significant difference between surgically and conservatively treated fractures with respect to the location of the condylar head. The degree of reduction of the condylar process was better in the surgically treated group than in the conservatively treated group. There were no differences in maximal mouth opening or degree of deviation of the mandible between the two groups. The type of procedure depends upon the degree of fracture. If the condylar head is more significantly displaced, surgical treatment is indicated. Minimal displacements should be treated nonsurgically.

NEURAL ELEMENTS FOUND IN THE TMJ ARTICULAR DISC -- In addition to clicking or popping, patients with temporomandibular disorders often experience pain. But where is the pain perceived? Usually it is localized in the muscles of mastication. It is due to overloading of the muscles and muscular fatigue. But how about pain that is localized right in the area of the temporomandibular joint? Are there any nerve innervations in the disc? Although conflicting reports have been found in the literature, a recent study published in the Journal of Oral and Maxillofacial Surgery (50:334-337, 1992) has shed some new light on this question. The investigation evaluated six articular discs from human TMJs at autopsy. The discs were cut into segments in an anteroposterior orientation. They were prepared with specific histologic stains to identify nerve endings and any neural elements present within the disc. Contrary to popular opinion, the discs did have a neural network extending from the outer capsular connective tissue into the disc. The nerves entered the superior surface from the connective tissue. Three types of mechanoreceptors were found within the disc. These included Type IV receptors that are not encapsulated and occur as a nerve plexus in articular tissue. These are typically defined as pain receptors. The authors believe that the presence of these nerves and pressure receptors indicate that the status of the disc is monitored by the central nervous system.

IS TOOTH BLEACHING DESTRUCTIVE TO ENAMEL? External tooth bleaching is currently a popular technique in dentistry. At the conclusion of orthodontic treatment, many patients ask whether or not bleaching or whitening of the teeth is possible. In fact, the technique works very well. Bleaching agents are placed in a night guard which the patient wears for varying periods of time. After several applications, the teeth become whiter. But are there any long-term detrimental effects to the structure of the enamel? Those questions were answered in an article published in the Journal of Dental Research (71:1340-1344, 1992). This study evaluated the use of a common whitening agent, carbamide peroxide. The authors used extracted teeth. They evaluated the fracture and abrasion resistance of the whitened enamel surface after the procedure had been performed. The teeth were submersed in carbamide peroxide gel for 12 hours at a temperature and moisture level that would be similar to the oral cavity. After submersion, the fracture and abrasion resistance of the enamel surfaces were tested. The authors found that bleaching had a significant effect on the fracture toughness of the enamel. The crack lengths produced by the testing apparatus were significantly longer on the bleached teeth than on the untreated controls. In addition, the effect of bleaching on the abrasion resistance of human enamel was also significant. The reason for the change is that the carbamide peroxide produces a dissolution of the organic matrix. Although the long-term clinical implications are unclear, the authors believe that long-term bleaching may cause increased enamel attrition or cuspal fractures, particularly on already weakened and restored teeth.