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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SINUS GRAFTS FOR MAXILLARY IMPLANTS ARE HIGHLY PREDICTABLE—Some adult orthodontic patients are missing maxillary molars and are candidates for implant replacement after orthodontic treatment. If the molars have been missing for several years, the maxillary sinus may have expanded occlusally, leaving little bone to support an implant. In this type of situation, surgeons currently recommend bone grafting of the sinus and placement of implants in the grafted bone. But does this procedure offer predictable results? Is the success rate of implants in sinus grafts as high as the success rate of implants placed in a nongrafted alveolus? These questions were addressed in a study published in the *Journal of Oral and Maxillofacial Implants* (1998;13:52-58). Researchers evaluated over 500 implants placed in grafted sinuses. Various types of bone material were used to provide a bed for the implants. About 40 of the implants were placed at the time of grafting and 60% were placed 7 to 10 months after the graft. Only 15 of the 500 implants failed. Six were declared unsuccessful at the time of uncovering and 9 failed in three patients who had severe bruxing habits. Therefore, it seems that in the hands of experienced surgeons, the success rate of implants placed in grafted sinuses is high after 6 years.

SYNOVIAL FLUID MARKERS CAN PREDICT TMJ OSTEOARTHRITIS—Although many individuals with temporomandibular joint dysfunction symptoms will improve over time with no treatment, some will develop osteoarthritis, which could result in the breakdown of cartilage and bone. The clinician must be able to diagnose which patients have the potential to become worse. Are clinical tests available that can help indicate which TMD patients are at the greatest risk of developing osteoarthritis? If this potential could be discovered early during the disease process, then perhaps the breakdown could be prevented or made less severe. This possibility was tested in an article published in the *Journal of Oral and Maxillofacial Surgery* (1998;56:192-198). In this study, researchers evaluated the synovial fluid from 25 osteoarthritic TM joints, and compared the findings with synovial fluid from 15 asymptomatic TM joints. The researchers were evaluating the presence of two cytokines: interleukin 1 and interleukin 6. These cytokines mediate inflammation and are detected in synovial fluid that is undergoing osteoarthritis. Based on a detailed evaluation of their data, these investigators found much higher levels of both interleukin 1 and interleukin 6 in the osteoarthritic joints compared with controls. In the future, it may be possible to determine at an early stage those patients with TMD symptoms who are at risk of developing osteoarthritis by analyzing the synovial fluid.

METAL PARTICLES RELEASED FROM TITANIUM MINIPLATES—Although titanium miniplates and stainless steel wires are routinely used to fix bony fragments after orthognathic surgery, some patients express concern about

leaving metal imbedded in the mandible or maxilla after the osteotomy site has healed. A common concern is that the plates and/or screws will give off metallic ions that could be carried elsewhere in the body and perhaps cause systemic problems if they accumulate in a critical body organ. Are these concerns justified? Do titanium and/or stainless steel plates release metallic ions? These questions were addressed in an article published in the *Journal of Oral and Maxillofacial Surgery* (1998;56:45-50). In this study, the authors placed miniplates over the calvaria of experimental animals. Then, after 4, 12, and 24 weeks, these investigators evaluated the histologic response in the adjacent tissues to determine if any metal particles could be found. Based upon microscopic examination, this study showed that titanium particles were found both in the tissues and also in the cells adjacent to the miniplates. However, the number of particles decreased from 4 weeks to 24 weeks. The authors believe that these particles have the potential to produce a mild inflammatory response in the surgical site. Whether they cause any long-term toxicological effects is unknown. However, since the number of particles is so small, the likelihood of any significant adverse effect is slight.

EFFECTS OF NOT TREATING ANTERIOR DISK DISPLACEMENT—Anterior disk displacement is a common problem pretreatment for some orthodontic patients. This anomaly may also arise during orthodontic therapy. If anterior disk displacement is accompanied by symptoms of pain and limited opening, some clinicians recommend the use of an occlusal splint prior to, during, or after orthodontic treatment. But what if no treatment is performed? Will the symptoms become worse? What is the natural course of anterior disk displacement without reduction if no treatment is performed? This issue was addressed in a study published in the *Journal of Dental Research* (1998;77:361-365). In this investigation, the authors evaluated a sample of 40 subjects who had unilateral anterior disk displacement without reduction. Their symptoms consisted of moderate to severe pain and limitation to opening. These individual agreed to participate in a study where no treatment would be given for their disk displacement for a period of 2.5 years. After the experimental period, the subjects were reevaluated. Of the 40 individuals who originally had moderate to severe symptoms, 17 (42%) were asymptomatic and 13 (32%) had mild symptoms. Only 10 subjects (25%) continued to be symptomatic or requested treatment. Based on the results of this study, the authors suggest that clinicians should not rush into treating patients who have anterior disk displacement, especially using irreversible treatment procedures, until or unless symptoms become severe. The results of this study show that 75% of subjects with moderate to severe symptoms and disk displacement improve or become asymptomatic without treatment.

HOW OFTEN ARE SCREWS AND PLATES REMOVED AFTER JAW SURGERY?—Today, titanium miniplate screws are routinely used to rigidly fix the proximal and distal fragments after maxillary osteotomy. Initially, rigid fixation is wonderful for the patient because it eliminates intermaxillary fixation and permits the patient to resume relatively normal speaking and eating soon after surgery. However, these plates must be removed in some patients. How often does this occur? What are the reasons for removal of the screws and miniplates? These questions were answered in a study published in the *Journal of Oral and Maxillofacial Surgery* (1998;56:184-188). The authors of this article evaluated all patients who had undergone maxillary surgery from 1985 to 1994 at a major university medical center. The sample consisted of 190 individuals. All patients had rigid fixation with plates and screws after LeFort osteotomy. These patients were recalled to determine how many had the plates removed and their reasons for removal. Their data showed that 11.5% of the patients had plates removed an average of 1 year after surgery. The most common reasons cited were pain, and pain in combination with temperature sensitivity or palpation. In fact, one-third of the patients had the plates removed because they could palpate the metal framework beneath the mucosa. In conclusion, the results of this study on consecutively treated patients shows that the incidence of removal of titanium miniplates after maxillary surgery is relatively low.