

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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PALATAL IMPACTION CORRELATED WITH CONGENITAL ABSENCE OF TEETH—A common problem requiring orthodontic correction is palatal impaction of maxillary canines. Although the incidence of palatal impaction is not high in the general population, it is a relatively common feature of patients requiring orthodontic treatment. A recent study published in the *Journal of Dental Research* (1996;75:1742-1746) has shown that palatal impaction may be a hereditary defect that can be recognized in families with congenitally missing teeth. In order to test this hypothesis, researchers determined the relationship between congenital absence of teeth and maxillary palatal impaction in a group of 100 consecutively treated patients. Each of these 100 patients had a palatally impacted canine. Pretreatment records were evaluated to determine the incidence of congenitally missing teeth. Then parents and siblings of each of these patients were contacted to determine the occurrence of palatal impaction and congenital absence in that group. The results showed that 35% of the patients with palatal impaction had congenitally missing teeth. This incidence was nearly five times greater than in the normal population. In addition, nearly 20% of both first and second degree relatives of patients with palatal impaction had congenitally missing teeth. This was 2.5 times greater than the normal population. Although the correlation was not high, there is a tendency for an association between congenitally missing teeth and palatal impaction in families.

SYNOVIAL FLUID CHEMICALS CAN PREDICT TMJ ARTHRITIS—One of the most devastating of all temporomandibular disorders is osteoarthritis of the temporomandibular joint. Although this problem is not common, it may occur gradually over time in some patients whose temporomandibular joints are traumatized. The problem for the clinician is to accurately diagnose which patients may be susceptible to arthritis during the early stages of the temporomandibular disorder. Researchers now believe that markers in the synovial fluid of the temporomandibular joint in certain patients can be used to predict the tendency toward osteoarthritis at early stages. A study published in the *Journal of Oral and Maxillofacial Surgery* (55:20-27, 1997), evaluated the presence of both Interleukin 1 and plasma proteins as possible early indicators of the disease. Their sample consisted of 25 temporomandibular joints from 22 patients with closed lock. The diagnosis was confirmed with magnetic resonance imaging. These individuals were compared with 15 temporomandibular joints from 12 asymptomatic subjects. Synovial fluid was extracted from all joints. The results showed that Interleukin 1 and plasma proteins were found in much higher concentrations in affected joints than in asymptomatic individuals. These researchers believe that plasma proteins, which are released because of increased capillary permeability, and Interleukin 1, which is released in response to cartilage and bone breakdown, are potential indicators for susceptibility to osteoarthritis. Perhaps in the future, these mark-

ers can be used clinically to recognize patients who may be susceptible to osteoarthritic changes after temporomandibular joint injury.

JAW FUNCTION IMPROVES AFTER MAXIL-LARY ADVANCEMENT SURGERY

Individuals with Class III malocclusion and anterior crossbites obviously have compromised chewing ability. During orthodontic and orthognathic surgical correction of Class III malocclusion, the maxilla is often moved anteriorly to correct the problem. Although normal occlusal relationships are reestablished, little has been known about the effect of surgery on mandibular function postoperatively. A recent study published in the *Journal of Oral and Maxillofacial Surgery* (1997;55:41-49) evaluated the changes in mandibular mobility and maximum bite force following isolated LeFort osteotomy with advancement of the maxilla. The sample consisted of nine patients who had undergone isolated LeFort osteotomies with advancement. They were compared with 25 control subjects. Mandibular function was evaluated preoperatively and then at regular intervals up to 3 years after surgery. The results showed that the range of mandibular motion was reestablished to preoperative levels very shortly after surgery. The surprising finding was that maximum bite force increased steadily up to 3 years after surgery. Final maximum bite force was significantly greater than the preoperative level for each patient or the control subjects. The study has shown LeFort osteotomy substantially improves mandibular function in patients with anterior cross-bite following surgery.

SEVERED LINGUAL NERVES CAN BE RE-PAIRED

An unfortunate sequelae of third molar extraction and sagittal osteotomy of the mandible is severing of the lingual nerve. Unfortunately, this results in loss of taste and touch to the anterior portion of the tongue on the affected side. A study

published in the *Journal of Oral and Maxillofacial Surgery* (1997; 55:2-13) has shown relatively high levels of success following surgery to reunite the segments of severed lingual nerves. The sample in this study consisted of 10 patients whose lingual nerves had been severed during third molar extraction or jaw surgery during the prior year. An operation was performed to reunite the fragments. After healing, 90% of the patients regained the sensation of touch to the anterior part of the tongue. In 50% of the sample, taste sensation was reestablished. Since the success rate is reasonably high and morbidity from reoperation is relatively low, this type of surgery should be considered for patients whose lingual nerves have been severed accidentally during third molar extraction or sagittal osteotomy.

RISEDRONATE INHIBITS ROOT RESORPTION DURING TOOTH MOVEMENT

A common sequelae of orthodontic treatment is root resorption. In most cases the amount of root shortening is minimal. However, in some patients, root resorption can be substantial. Researchers in Japan have shown that a drug given systemically in laboratory animals could inhibit root resorption. In their most recent study, published in the *Journal of Dental Research* (75:1644-1649), Risedronate was injected locally in laboratory animals over the roots of first molars that were being moved buccally; the opposite side served as a control to evaluate the amount of root resorption that occurred. After tooth movement had been completed, the side that received the injection of Risedronate showed significantly less root resorption than the control roots. In the future, perhaps a drug such as Risedronate can be incorporated into the cementum of teeth to help prevent root resorption during orthodontic treatment in the same way that fluoride prevents caries when incorporated into enamel.