Implants displaced into the maxillary sinus

By Dov M. Almog, DMD, Kenneth Cheng, DDS & Mohammad Rabah, DMD

As some have predicted, the growth in dental implant-based procedures increased considerably in recent years. As a result, there has been a rapid increase in the number of practitioners involved in implant placement, including specialists and generalists, with different levels of expertise.

At the same time, although at a low frequency, we are witnessing a diversity of unusual complications associated with these procedures, some of which are displaced implants into the maxillary sinus. A literature search revealed several published reports of displaced foreign bodies into the maxillary sinus. Generally speaking, foreign bodies in the maxillary sinus include multiple displaced objects. These include teeth, roots, impression materials, dental instruments, broken burs and, more recently, dental implants.

Although foreign bodies in the maxillary sinus are not common, it behooves us to familiarize ourselves with such an unusual complication and its management. Displacement of such foreign bodies into the maxillary sinus occurs following dental procedures that create an unplanned oroantral perforation.

Washington cracks down on tobacco, and ADA approves

By Fred Michmershuizen, Online Editor

The American Dental Association (ADA) is applauding new legislation to regulate tobacco. The Family Smoking Prevention and Tobacco Control Act gives the U.S. Food and Drug Administration (FDA) the express authority to regulate the manufacture, marketing, and distribution of tobacco products.

The ADA has a long-standing policy that nicotine is a drug and that cigarettes are tobacco products and should be regulated.

"Dentists are the first line of defense in the war against oral cancer and many other tobacco-related diseases," said ADA President Dr. John S. Findley. "About nine out of 10 people who will die from oral and throat cancers use tobacco."

"Tobacco products are also associated with higher rates of gum disease, one of the leading causes of tooth loss in adults," Findley said.
Orange juice bad for teeth, scientists say

By Fred Michmershizen, Online Editor

Scientists at the University of Rochester Medical Center who were recently studying the effects of whitening agents on human teeth discovered something alarming: acidic fruit juices markedly decreased hardness and increased roughness of tooth enamel. No significant change in hardness or surface enamel was found from whitening.

“Orange juice decreased enam- el hardness by 84 percent,” said YanFang Ren, DDS, PhD, of the university’s Eastman Institute for Oral Health.

In the study, “Effects of tooth whitening and orange juice on surface properties of dental enam- el,” published in the Journal of Dentistry (Volume 37, Issue 6, June 2009), Ren and his team determined that the effects of 8 percent hydrogen peroxide, the common ingredient in profession- al and over-the-counter whitening products, are insignificant com- pared to acidic fruit juices.

Weakened and eroded enamel may speed up the wear of the tooth and increase the risk for tooth decay to quickly develop and spread.

“Most soft drinks, including sodas and fruit juices, are acidic in nature,” Ren said. “Our studies demonstrated that orange juice, as an example, can potentially cause significant erosion of teeth.”

It’s long been known that juice and sodas have high acid content and can negatively affect enamel hardness.

“There are also some studies that showed whitening can affect the hardiness of dental enamel, but until now, nobody had com- pared the two,” Ren explained.

“This study allowed us to under- stand the effect of whitening on enamel relative to the effect of a daily dietary activity, such as drinking juices.”

“It’s potentially a very serious problem for people who drink sodas and fruit juices daily,” said Ren, who added that den- tal researchers nationwide are increasingly studying tooth ero- sion and are investing significant resources into possible preven- tions and treatments.

“We do not yet have an effective tool to avert the erosive effects, although there are early indica- tions that higher levels of fluoride may help slow down the erosion,” he said.

(Source: University of Rochester Medical Center)

The procedure associated with the removal of foreign bodies from the maxillary sinuses is considered very invasive. In this case report, the authors describe a systematic approach to the removal of two implants displaced into the right and left maxillary sinuses.

Currently, there are two accepted methods for removing foreign bodies displaced into the maxillary sinus. One method is the endoscopic transnasal maxillary sinus surgery. 14,15 Access to the maxillary sinus is achieved through the nose via the ostium. The foreign body is captured and removed using an urological retrieval basket through the endoscopic working channel port. The advent of endoscopic techniques has made it the preferable choice, especially for patients with chronic sinusitis.

The most commonly used tech- nique for retrieval of foreign bodies displaced into the maxillary sinus is the Caldwell-Luc procedure. In contrast to the endoscopic technique, which involves accessing the maxillary sinus via the nose, the Caldwell-Luc procedure involves gaining access to the maxillary sinus by the fenestration of the anterior lateral wall of the maxillary sinus or canine fossa.16,17,20,23

The Caldwell-Luc procedure offers better direct visual access to the maxil- lary sinus as compared to the endo- scopic approach, but is considered more aggressive with potential for more serious complications. Some of the possible complications are dysesthesia of the infraorbital nerve, numbness of the maxillary teeth, injury to the floor of the orbit and facial edema. This older and perhaps less conservative technique for accessing the maxillary sinus was first introduced by two otolo- gynologists (American and French) in 1895.20

Case report

A 50-year-old African-American male Vietnam veteran presented to the VA New Jersey Health Care System Dental Service at East Orange seeking dental care.

A comprehensive oral and maxillofacial examination included an intra- oral and extraoral exam, including cancer screening, full-mouth X-rays, and a cone-beam CT (i-CAT™ 3D) CBCT Imaging Sciences International, Hatfield, Pa.) revealing, among other things, two implants displaced into the right and left maxillary sinuses.

Ultimately, the exam revealed a diversity of oral and maxillofacial prob- lems, such as retained roots, decay and missing teeth, to name a few. Never- theless, the chief complaint noted by the patient, and most profound clinical finding, was “two implants displaced into the right and left maxillary sinus- es” (Figs. 1–5). The medical history was non-contributory.

Proceeding with careful assessment of all the available diagnostic informa- tion, and upon further discussion with the patient, several treatment options were developed in association with his retained roots, caries and missing teeth. As far as the patient’s chief
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complaint, one treatment option was offered to him, that is, the Caldwell-Luc procedure to remove both displaced implants in his maxillary sinuses. After careful consideration, the patient chose to proceed with the proposed treatment plan.

A Caldwell-Luc procedure was performed bilaterally under general anesthesia. Specifically, the Caldwell-Luc procedure involved making an incision in the bucco-gingival sulcus in the area of the maxillary canine and bicuspids teeth, exposing the anterior lateral wall of the maxilla. Care was taken to avoid injury to the infraorbital nerve as it exits in the infraorbital foramen. Using a bur and Kerrison’s rongeurs, a window was made through the anterior lateral wall of the maxilla, thereby gaining direct access to the displaced implant.

In this case, the Caldwell-Luc procedure was performed bilaterally under general anesthesia. Specifically, the Caldwell-Luc procedure involved making an incision in the bucco-gingival sulcus in the area of the maxillary canine and bicuspids teeth, exposing the anterior lateral wall of the maxilla. Care was taken to avoid injury to the infraorbital nerve as it exits in the infraorbital foramen. Using a bur and Kerrison’s rongeurs, a window was made through the anterior lateral wall of the maxilla, thereby gaining access to the maxillary sinus. Antral curettes and a hemostat were used to retrieve the displaced implants (Fig. 4). The sinuses were then irrigated and packed with isoform gauze, which was later removed. The incision was closed. Postoperatively, the patient did well and no complications were reported.

Conclusions
As described in this case report, the clinical management associated with the removal of dental implants displaced into the maxillary sinuses is considered very invasive. While numerous dental reports described patients treated for displaced implants into the maxillary sinuses, none illustrated those from a preventive standpoint, that is, the use of CBCT-based dental imaging is becoming a reliable procedure from a precautionary standpoint based on a series of recent preliminary clinical studies and case reports. Therefore, the authors strongly believe that by making a CBCT-based study prior to placing dental implants, displacement of dental implants into the maxillary sinus can be avoided.

(A complete list of references is available from the publisher.)

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Fig. 1: Pre-operative diagnostic cone-beam CT revealing, among other things, two implants displaced into the right and left maxillary sinuses. By utilizing the i-CAT™ 3D CBCT (Imaging Sciences International, Hatfield, Pa.), which includes clear-cut panoramic and cross-sectional slices of any desired location, one obtains precise anatomical information.

Fig. 2: Axial slice is useful for revealing the two displaced implants from a different angle.

Fig. 3: Three-dimensional virtual rendering (3-DVR) of the displaced implants provides the surgeon feedback as to the surgical approach. In this case, a Caldwell-Luc procedure was performed using a bur to create an access window through the lateral wall of the maxilla, thereby gaining direct access to the displaced implant.

Fig. 4: Caldwell-Luc procedure is useful in gaining access to the maxillary sinus by the fenestration of the anterior lateral wall of the maxillary sinus. Note successful retrieval of implant from the maxillary right sinus through the access window.