Pharmacology

By Dr. Randall Y. Kam

Zinc

The element, Zinc—atomic number 30 on the periodic chart—is the 24th most abundant element in the earth's crust. Zinc is an essential mineral for good health, and zinc deficiency affects about two billion people in the developing world and is associated with many diseases. However, recent high profile cases of zinc toxicity involving denture adhesives illustrate the importance of awareness on the part of practicing dentists.

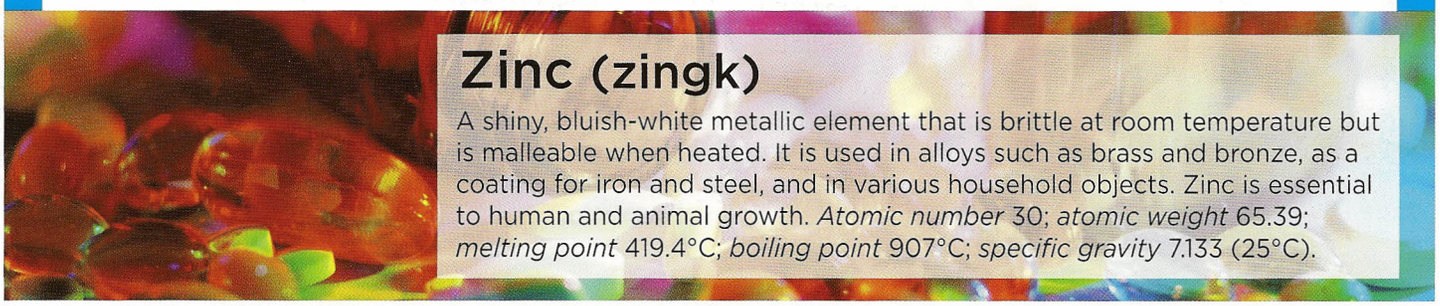
The USDA RDA for zinc is 11 mg/day for men and 8 mg/day for women. In the U.S., zinc inadequacy is usually the result of compromised absorption and those at risk for deficiencies are those with gastrointestinal disorders, vegetarians, pregnant and lactating women, older infants that are exclusively breast fed, those with sickle cell disease, and alcoholics.

Zinc toxicity can occur in both acute and chronic forms. Acute adverse effects of high zinc intake include nausea, vomiting, loss of appetite, abdominal cramps, diarrhea, and headaches. This is the result of the formation of corrosive zinc chloride when metallic zinc is ingested and oxidized by hydrochloric acid in the stomach. Since 1982, pennies in the U.S. have been made with copper coated zinc, and there was one case of a death due to the ingestion of 425 pennies.

Chronic zinc toxicity can be seen beginning with increased urinary complications in elderly men at doses of 80 mg/day. Intakes of 150–450 mg of zinc per day have been associated with such chronic effects as low copper status, altered iron function, reduced immune function, and reduced levels of high-density lipoproteins. The long term result cited in the denture adhesive case is "bone marrow suppression and degeneration of the spinal cord, usually resulting in crippling nerve damage." Symptoms began with numbness and movement difficulty affecting the feet and legs. This rapidly progressed to the arms, and patients began losing their sense of balance.

Prior to May 2010, one denture adhesive contained 17 mg of zinc per gram, so a 2.4 oz tube would therefore contain about 1155 mg of zinc. The manufacturer recommends that this tube should last 7–8 weeks, but the people suffering from zinc toxicity were using 2–3 tubes per week. Using the lower figure of two tubes per week, that would be an average daily intake of 330 mg of zinc. On the other hand, one tube used for 7 weeks would average out to about 24 mg per day. Combine this intake with a 3 oz. serving of oysters containing 74 mg of zinc, or 30–50 mg of zinc in a supplement tablet and a denture wearer may get into the chronic toxicity levels of zinc.

Dental professionals should be aware of the potential zinc content of dental products, and of other sources of zinc intake. In combination, there is some potential to attain toxic levels of zinc intake. For more information on zinc, see *www.ods.od.nih.gov/factsheets/Zinc/*. **NOW.**



Zinc (zingk)

A shiny, bluish-white metallic element that is brittle at room temperature but is malleable when heated. It is used in alloys such as brass and bronze, as a coating for iron and steel, and in various household objects. Zinc is essential to human and animal growth. *Atomic number* 30; *atomic weight* 65.39; *melting point* 419.4°C; *boiling point* 907°C; *specific gravity* 7.133 (25°C).

Emerging Evidence Base in Third-Molar Management

For several generations now, dental treatment of third molars has been based on clinical impressions rather than on published scientific data, says Dr. Matthew Dennis in the November issue of the *Journal of the Michigan Dental Association*. But, as he notes, "questions about third-molar management are beginning to be answered."

Impacted third molars, because of the lateness of their emergence, should always be evaluated for removal or observation. Most impactions involve arch length that is less than total tooth mass, resulting in inadequate space for eruption to occur.

The average age for eruption of third molars is 20, but some eruptions can occur as late as 25. Predicting eruption is, as Dr. Dennis says, an inexact science, requiring radiographic as well as clinical evaluation.

Dr. Dennis goes over the indications for third molar removal, including findings in the American Association of Oral and Maxillofacial Surgeons' Third Molar Clinical Trials that show an association of third molars and periodontal disease.

"Even when symptom-free, two-thirds of young adult subjects were found [by the clinical trials] to have periodontal pathology in their third molar regions," he writes. The trials suggest that the inaccessible third molar anatomy can harbor periodontal pathogens in up to four-fifth of patients with third molar symptoms. "A large review of population and clinical studies with more than 8,000 subjects showed that patients with third molars had a worsened periodontal status on other teeth in the quadrant over those patients without third molars." Other conditions that may have greater incidences associated with third molar impactions are pericoronitis and caries.

Dr. Dennis explains how dentists can deal with impacted teeth that may be coming in under prostheses, including fixed dental restoratives. "Partially erupted teeth almost always cause problems with an overlying prosthesis and must be removed prior to denture fabrication," he says.

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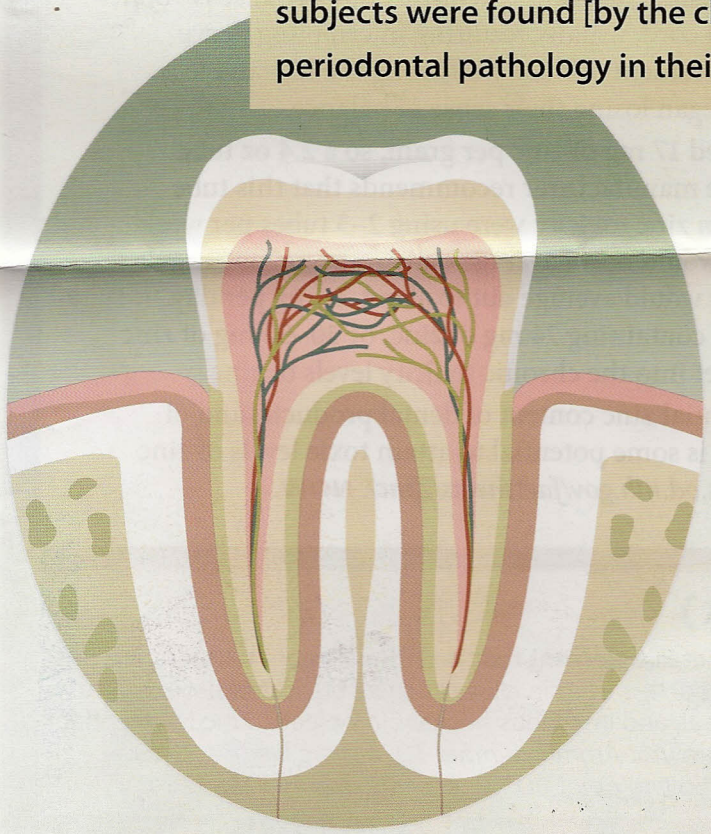

Other indications for third molar removal include reduction of risk for jaw fracture (a small subgroup of patients), treatment for facial pain, and post-orthodontic treatment, a common reason for third molar removal despite a paucity of data linking the retention of third molars and orthodontic relapse or crowding.

Counterindications and complications of third molar removal include age and medical conditions like diabetes. Increased risk of nerve injury or sinus complications is greater in patients with hypercementosis.

Dr. Dennis concludes by stating that all wisdom teeth require either removal or observation over time. He notes that patient satisfaction studies show patients prefer extraction to retention. If a patient elects for retention, then he or she is committing to a lifetime of observation and monitoring. **NOW.**