Bisphosphonates, 
an Orthodontic Concern

Presented by James J. Zahrowski DMD, MS, PharmD, at the PCSO Central Region meeting, Sept. 26, 2008.
Summarized by Dr. Gerald Nelson, PCSO Bulletin Editor

Adverse effects from bisphosphonates have been reported to decrease tooth movement, impair bone healing, and induce osteonecrosis within the mandible and maxilla. Dr. Zahrowski presented a very comprehensive review of the problem with cogent advice to orthodontic practitioners. He is an excellent speaker and has the experience and education to speak with authority, given an orthodontic certificate and a pharmacy PhD. Former UCLA faculty, Angle Society member, ABO Diplomate, and author of many publications, he has a private orthodontic practice in Tustin, CA.

Bisphosphonates are used to treat osteoporosis, bone disease, and bone pain from some types of cancer. Some drugs you might recognize in patients include Fosamax, Didronel, Boniva, Aredia, Actonel, Skelid, and Zometa. Where things get serious for the orthodontist is when drugs are administered intravenously rather than orally. Systemic administration provides 12 times the blood level of oral administration. Since the drugs inhibit resorption of bone, the effect on orthodontic treatment can be serious. Good for periodontal health, but a negative for tooth movement. Also, the drugs can decrease capillary formation in the alveolus, decreasing blood flow. Weirdly, a condition of osteonecrosis in the jaws was connected in the 19th century to workers exposed to white phosphorus in the match, fireworks and brass industries. This is apparently the same process that has caused necrosis in the jaw (not any other bones in the body) in connection with prolonged IV administered bisphosphate drugs.

Long-term oral administration of these drugs is also a concern. The drug accumulates in alveolar bones.

There have been reports of rampant osteonecrosis of alveolar bone in some patients experiencing prolonged IV bisphosphonate administration for severe bone disorder. This side effect does not appear to be preventable or treatable with bone debridement, hyperbaric oxygen, bone grafting, tissue grafting, or even discontinuing the drug. Now that is pretty scary.

James took the audience through the biochemistry of the drug and reviewed the literature. I suggest the reader read his article in the AJO/DO March 2007 issue, “Bisphosphonate treatment: An orthodontic concern calling for a proactive approach”

So what does Dr. Zahrowski advise the orthodontist to do?

1. Ask all patients whether they take the drugs. He provided a sample screening question to include in your medical history document:

   Are you currently taking or have been given intravenous bisphosphonates for serious bone cancers, such as Zometa or Aredia? Yes No

   Are you currently taking or have been given oral or intravenous bisphosphonates for osteoporosis, osteopenia, or other uses such as: Fosamax, Actonel, Boniva, Reclast, Skelid, Didronel, or Bonefos? Yes No

2. Evaluate the risk in relation to osteoclastic inhibition. Intravenous administration of these drugs for severe bone disorders and cancers suggests a very high risk for osteonecrosis. Oral application for osteoporosis or osteopenia is lower risk, but duration of treatment, dose and frequency affects the risk. Oral administration over three years is a red flag.

3. If a high risk, avoid orthodontic treatment. Communicate with the oncologist, the dentist and the patient to balance risk/benefit. Avoid invasive procedures.

4. If a low risk, be aware that tooth movement is very slow, osteonecrosis is a risk, and bone healing with invasive procedures may be impaired. Orthodontic treatment without invasive procedures might be possible with the caveat of slow tooth movement. With consent of physician, consider a drug holiday before beginning orthodontic treatment.

Dr. Zahrowski is an asset to the specialty, and his warning about this particular drug regime is a welcome caution.