

Endodontic Considerations for Bisphosphonate-Related Osteonecrosis of the Jaw (BRONJ).

by **Scott T. Baur, Ph.D., D.M.D., Forbes Endodontics**

Bisphosphonates are an increasingly important class of drugs commonly used in medicine to maintain bone density in patients with osteoporosis, Paget's disease and in managing hypercalcemia related with certain malignancies such as multiple myeloma and bone metastasis from the breast or prostate. Bisphosphonates act primarily by inhibiting osteoclastic activity, thereby directly preventing bone resorption, although other actions such as inhibition of angiogenesis have also been reported. Intravenous bisphosphonates are primarily used and effective in the treatment and management of cancer-related conditions. The IV bisphosphonates are effective in preventing and reducing hypercalcemia, stabilizing bone pathology and preventing fractures. Oral bisphosphonates are approved to treat osteoporosis with nearly 21 million prescriptions issued for alendronate (Fosamax) alone in the United States in 2004.

A serious adverse effect of bisphosphonates related to oral health is Bisphosphonate-Related Osteonecrosis of the Jaw (BRONJ). Clinical manifestations of BRONJ include exposed, necrotic bone in the maxillofacial region that has persisted for more than eight weeks, pain or swelling in the affected jaw, infection, and/or altered sensation such as numbness. BRONJ has substantial clinical implications because many of these patients fail to heal after dental surgical procedures and in many cases the post-surgical defect is larger than the preoperative defect. Based on the limited number of retrospective studies available, the cumulative incidence of BRONJ is estimated to be between 0.8%-12% for patients taking intravenous bisphosphonates and between 0.01% and 0.34% for patients taking oral bisphosphonates. The risk of BRONJ for patients taking intravenous bisphosphonates appears to be significantly greater than the risk for patients receiving oral bisphosphonates. However, given the large number of patients taking oral bisphosphonates for the treatment of osteoporosis, it is likely that most practitioners will encounter BRONJ in their patient population at some time.



Risk factors contributing to the development of BRONJ include invasive dental procedures such as extractions, placement of dental implants, periapical surgeries, periodontal surgeries, mandibular or maxillary tori, concomitant oral disease such as periodontal disease or periapical abscesses, corticosteroid therapy, diabetes, smoking, alcohol use, poor oral hygiene, and chemotherapeutic drugs.

Treatment for BRONJ is problematic because surgical resection of the necrotic area does not appear to eliminate the osteonecrotic process. In addition, hyperbaric oxygen therapy or extensive antibiotic treatment does not appear to promote healing in these cases. The primary focus should therefore be on preventing BRONJ.

Recent recommendations from both the American

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Association of Endodontists and the American Association of Oral and Maxillofacial Surgeons suggest the following management strategies for patients being treated with bisphosphonates:

Prior to initiating intravenous bisphosphonate treatment

Prior to treatment with an intravenous bisphosphonate, patients should have a comprehensive oral examination to identify and treat any active dental disease. All non-restorable teeth should be removed and all invasive dental procedures should be completed and optimal periodontal health achieved. Patients with full or partial dentures should be examined for areas of mucosal trauma, especially along the lingual flange area. It is critical that patients be educated as to the importance of dental hygiene and regular dental evaluations.

Patients currently receiving intravenous bisphosphonate treatment

Regular dental prophylaxis, caries control and conservative restorative dentistry are critical to maintaining optimal oral health and thereby minimizing dental disease that may require invasive dentoalveolar procedures. Preventive measures including fluoride and possibly 0.12% chlorhexidine mouth rinses may be considered to reduce the potential for dental caries or periodontal conditions. Non-surgical endodontic treatment (or retreatment) should be considered as the alternative to extraction or surgical endodontic treatment. If non-surgical endodontic treatment is initiated, then procedures minimizing trauma to the gingival and osseous tissues, such as positioning the rubber dam clamp above the gingiva and avoiding over instrumentation and obturation, should be considered. Procedures involving direct osseous injury should be avoided. Non-restorable teeth may be treated by removal of the crown and endodontic treatment of the remaining roots.

Patients currently receiving oral bisphosphonate treatment

Patients taking oral bisphosphonates are also at risk for developing BRONJ, although to a much lesser degree. These patients appear to have less severe manifestations of osteonecrosis and respond more readily to noninvasive treatment with oral antimicrobial

rinses. Elective dentoalveolar surgical procedures are not contraindicated for patients currently taking oral bisphosphonates. However, it is recommended that patients be adequately informed of the small risk of compromised bone healing. The risk of developing BRONJ in these patients appears to correlate with the duration of bisphosphonate treatment. For patients who have taken oral bisphosphonates for less than three years and have no clinical risk factors, no alteration or delay in the planned dentoalveolar procedure is necessary. For those patients who have taken oral bisphosphonates for less than three years and have also taken corticosteroids concomitantly or have taken oral bisphosphonates for more than three years, the physician should be contacted to consider discontinuation of the oral bisphosphonate for at least three months prior to the planned dentoalveolar procedure. The bisphosphonate should not be restarted until complete mucosal healing has occurred.

If BRONJ is suspected in a patient taking bisphosphonates, immediate referral to an oral surgeon for evaluation is advised.

References and Further Reading

1. American Association of Endodontists Bisphosphonate Position Statement. Available online at <http://www.aae.org/dentalpro/ClinicalTopics/>
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3. American Dental Association Position Statement on Bisphosphonates and Osteonecrosis. Available online at <http://www.ada.org/prof/resources/topics/osteonecrosis.asp>
4. Katz, H. Endodontic Implications of Bisphosphonate-Associated Osteonecrosis of the Jaws: A Report of Three Cases. *Journal of Endodontics* 2005;31(11):831-834.
5. Sarathy, A.P., Bourgeois, S.L., Goodell, G.G. Bisphosphonate-Associated Osteonecrosis of the Jaws and Endodontic Treatment: Two Case Reports. *Journal of Endodontics* 2005;31(10):759-763.
6. Sedghizadeh, P.P., Stanley, K., Caligiuri, M., Hofkes, S., Lowry, B., Shuler, C.F. Oral bisphosphonate use and the prevalence of osteonecrosis of the jaw: An institutional inquiry. *Journal of the American Dental Association* 2009;140:61-66.