Oral Bisphosphonates as a Cause of Bisphosphonate-Related Osteonecrosis of the Jaws: Clinical Findings, Assessment of Risks, and Preventive Strategies

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Purpose: Oral bisphosphonates are known to have potentially profound effects on oral health. A review of the evidence supporting answers to key clinical questions is necessary to assist surgeons in the care of their patients who are receiving oral bisphosphonates.

Materials and Methods: The literature is reviewed to address several questions, ie, what is the risk of bisphosphonate-related osteonecrosis of the jaws (BRONJ) in my patient on oral bisphosphonates? Why are so few cases of BRONJ attributable to oral bisphosphonate use? What is the importance of cofactors in the development of osteonecrosis? How major a clinical problem is BRONJ, typically, in the oral bisphosphonate patient? What dental procedures are associated with a risk of BRONJ? Are other findings apart from BRONJ of importance in the oral bisphosphonate patient? Are there proven strategies to prevent BRONJ in the oral bisphosphonate patient? Should my patient discontinue the use of oral bisphosphonates temporarily or permanently?

Results: A review of the evidence offers information that will help in clinical decision-making. In general, the risk of BRONJ is between 1 in 10,000 and 1 in 100,000, but may increase to 1 in 300 after dental extraction. The great majority of BRONJ cases will likely remain in the intravenous population. Cofactors have not been firmly established, although smoking, steroid use, anemia, hypoxemia, diabetes, infection, and immune deficiency may be important. Rarely does BRONJ in the oral bisphosphonate patient appear to progress beyond stage 2, and many cases reverse with discontinuation of oral medication. Extraction is the only dental procedure shown to increase the risk of BRONJ. Dental implant therapy should be used with caution in the oral bisphosphonate patient. The benefits and risks of oral bisphosphonate use must be weighed individually and in consultation with the prescribing physician, before determining the need for temporary or permanent cessation of medication.

Conclusion: Emerging evidence supports clinical decisions in favor of the oral and maxillofacial surgery patient taking oral bisphosphonates.

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Oral bisphosphonates are now a ubiquitous medication seen in daily oral and maxillofacial surgery practice. Alendronate (Fosamax; Merck, Whitehouse Station, NJ) emerged during clinical trials in the 1990s, primarily for the purpose of treating osteoporosis in at-risk populations. Alendronate was approved by the Food and Drug Administration for the treatment of postmenopausal osteoporosis, but is also used for osteoporosis in males, Paget's disease, renal osteodystrophy, and other diseases where a reduction of osteoclastic activity is believed desirable. Risendronate (Actonel; Procter and Gamble, Cincinnati, OH) was approved in 2000 for the treatment of postmenopausal osteoporosis and for corticosteroid induced osteoporosis.[1] Then in 2005, ibandronate (Boniva; Roche, Basel, Switzerland) was approved for the treatment of postmenopausal osteoporosis.[2] Up to September 2007, over 225 million prescriptions were written for the oral bisphosphonates noted above (74% of which were for Fosamax).[3] Thus oral bisphos-

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