

THE NEW AAOS/ADA CLINICAL PRACTICE GUIDELINES ON PREVENTION OF ORTHOPAEDIC IMPLANT INFECTION IN PATIENTS UNDERGOING DENTAL PROCEDURES

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The American Academy of Orthopaedic Surgeons (AAOS) and the American Dental Association (ADA), along with input from the Infectious Disease Society of America (IDSA), American Association of Oral and Maxillofacial Surgeons (AAOMS), American Association of Neurological Surgeons (AANS), American Society of Plastic Surgeons (ASPS), Musculoskeletal Infection Society (MIS), Scoliosis Research Society (SRS), American Association of Hip and Knee Surgeons (AAHKS), Society for Healthcare Epidemiology of America (SHEA), College of American Pathologists, and The Knee Society, recently published their collaborative clinical practice guideline (CPG)

“Prevention of Orthopaedic Implant Infection in Patients Undergoing Dental Procedures.” This evidence-based guideline, with three recommendations, replaces the previous AAOS Information Statement “Antibiotic Prophylaxis for Bacteremia in Patients with Joint Replacements¹.” That information statement contained differences from a previous advisory statement from the AAOS/ADA published in 2003². The 2003 advisory statement concluded: “The risk/benefit and cost/effectiveness ratios fail to justify the administration of routine antibiotic prophylaxis” for patients with total joint replacements. The 2009 AAOS information statement promoted a different position: “Given the potential adverse outcomes and cost of treating an infected joint replacement, the AAOS recommends that clinicians consider antibiotic prophylaxis for all total joint patients prior to any procedure that may cause bacteremia.” It is important to note that an AAOS information statement is “an educational tool based on the opinion of the authors.” The American Academy of Oral Medicine (AAOM) followed in 2010 highlighting: “...the major points of concern for a future systematic review by multispecialty collaboration³. In the meantime, given that the 2009 information statement is more an opinion than an official guideline; the AAOM believes that it should not replace the 2003 joint consensus statement prepared by the relevant organizations: the ADA, the AAOS and the IDSA.” This collaborative clinical practice guideline addresses the differences in the previous approaches.

The new clinical practice guideline was developed using the published AAOS CPG development process, and meets or exceeds all recommended Institute of Medicine standards for the development of systematic reviews and clinical practice guidelines except for allowing patient input in the selection of topics and questions. Of note, the AAOS CPG program does not allow members with relevant conflicts of interest, and the collaborating societies followed the same conflict of interest rules in selecting their

members. The workgroup, at its first meeting, developed three recommendations regarding prophylaxis for patients with joint replacements who are undergoing dental procedures. These recommendations formed the basis for systematic reviews of the literature related to dental procedures and periprosthetic joint infection (PJI). The workgroup also established strict criteria to evaluate the quality of published data and avoid bias.

The AAOS uses predetermined, specific language for its recommendations to avoid bias. The exact wording is governed by the final grade of the recommendation. The three recommendations are accompanied by rationales, with each being graded strong, moderate, limited, inconclusive, or consensus. The use of the term limited is definitive; in that it means low levels of evidence exist to support the recommendation. Consensus recommendations can only be proffered by the workgroup for two reasons: The first is for procedures that have virtually no associated harm, are of relatively low cost, and that reflect current, routine clinical practice. The second is when providing (or not providing) a service could result in loss of life or limb. Consensus recommendations are the weakest form of recommendation, and cannot be used to override recommendations derived from higher grades of evidence. Due to the limitations in available evidence, the three recommendations in the current guideline are limited (one), inconclusive (one), and consensus (one). Higher grade recommendations are relatively uncommon within published CPGs.

Recommendation 1 is supported by the highest grade of evidence of the three recommendations, and it proposes that the practitioner consider changing the longstanding practice of prescribing prophylactic antibiotics for patients who undergo dental procedures. The recommendation is founded in evidence that dental procedures are unrelated to PJI and that subsequent antibiotic prophylaxis does not reduce the risk for PJI. There is no conclusive evidence to support otherwise. High strength evidence suggests that antibiotic prophylaxis reduces the incidence of post-dental procedure related bacteremia, but there is no evidence that bacteremia increases the risk of PJI. Other studies have questioned the use of similar surrogate measures that have not been validated. For example, a study of 4,000 patients assessed the effects of intranasal mupirocin on the incidence of postsurgical infections. Patients who harbor nasal *Staphylococcus aureus* are known to be at risk for surgical site infections and intranasal mupirocin is highly effective in reducing the presence of nasal *S. aureus*. However, no effect on the rate of *S. aureus* infections at surgical sites was noted.⁴ This calls into question the use of surrogate measures or outcomes. Dental prophylaxis can be useful in reducing subsequent bacteremia, but bacteremia is a surrogate measure since no direct evidence exists linking bacteremia to PJI.

This is analogous to the differences seen previously between the AAOS Clinical Practice Guideline recommendations on Preventing Venous Thromboembolic (VTE)

Disease in Patients Undergoing Elective Hip and Knee Arthroplasty⁵ and those by the American College of Chest Physicians (ACCP). Previously, the ACCP had used the surrogate measure of deep venous thromboembolism (DVT) as diagnosed by venography or ultrasound in place of pulmonary embolism (PE). Direct evidence of a link between DVT and PE is lacking, so the most recent ACCP Guidelines⁶ used direct clinical outcomes as the primary measure of efficacy. To be scientifically and academically consistent, the current dental prophylaxis guideline should use PJI, and not bacteremia, as the primary outcome of interest.

Recommendation 2 addresses the use of oral topical antimicrobials in the prevention of PJI in patients undergoing dental procedures. There is no direct evidence that oral topical antimicrobials prevent PJI following dental procedures. There is conflicting evidence that these agents may decrease the incidence of post-procedure bacteremia. The discussion for this rationale highlights differences between high quality and lower quality studies.

Recommendation 3 is the only consensus recommendation in this Clinical Practice Guideline, and it addresses the maintenance of good oral hygiene. There is no direct evidence for this recommendation. In concordance with consensus recommendations, oral hygiene measures are low cost, provide potential benefit, are consistent with current practice, and are in accordance with good oral health.

The new AAOS/ADA guideline on prevention of orthopaedic implant infection in patients undergoing dental procedures addresses the weaknesses of previous efforts with an exhaustive systematic review of available evidence. Similar to previously published guidelines, the work group identified the need for further research in this area to provide clear evidence regarding the correlation between dental procedures and PJI in patients with orthopaedic implants. Evidence-based practice incorporates three components: scientific evidence, clinician's experience, and the patient's values. Therefore, this clinical practice guideline is not meant as a stand-alone document; rather, all three of these elements should be incorporated into the decision-making process in an effort to improve patient care. Physicians, dentists and patients should work collaboratively to customize a treatment plan that is based on the evidence, clinical judgment and patient preferences.

¹ Information Statement 1033: Antibiotic Prophylaxis for Bacteremia in Patients with Joint Replacements. February 2009 American Academy of Orthopaedic Surgeons. Revised June 2010. <http://www.aaos.org/about/papers/advistmt/1033.asp> (accessed 8/27/12).

² American Dental Association and American Academy of Orthopaedic Surgeons. Antibiotic prophylaxis for dental patients with total joint replacements. *J Am Dent Assoc.* 2003; 134(7):895-898.

³ Little JW, Jacobson JJ, Lockhart PB, for the American Academy of Oral Medicine. The Dental Treatment of Patients with Joint Replacements: A Position Paper From the American Academy of Oral Medicine. *J Am Dent Assoc.* 2010;141(6):667-671.

⁴ Perl TM, Cullen JJ, Wenzel RP, Zimmerman MB, Pfaller MA, Sheppard D, Twombly J, French PP, Herwaldt LA; Mupirocin And The Risk Of Staphylococcus Aureus Study Team. Intranasal mupirocin to prevent postoperative Staphylococcus aureus infections. *N Engl J Med.* 2002 Jun 13;346(24):1871-7.

⁵ AAOS Clinical Practice Guideline on Preventing Venous Thromboembolic Disease, Sept 2011, http://www.aaos.org/research/guidelines/VTE/VTE_guideline.asp (accessed on 10/23/12).

⁶ ACCP Guidelines for Prevention and Treatment of Venous Thromboembolism (VTE/PE/DVT), 9th edition, 2012, <http://pulmccm.org/2012/review-articles/accp-guidelines-for-diagnosis-and-management-of-dvt-pe-vte-9th-edition-review/> (accessed on 10/23/12). See also; Guyatt GH et al. Executive Summary: Antithrombotic Therapy and Prevention of Thrombosis, 9th ed: American College of Chest Physicians Evidence-based Clinical Practice Guidelines. *Chest* 2012; 141 (suppl2): 7s-47s.