

Editorials represent the opinions of the authors and not necessarily those of the American Dental Association.



GUEST EDITORIAL

American Dental Association guidance for utilizing appropriate use criteria in the management of the care of patients with orthopedic implants undergoing dental procedures

American Dental Association–
Appointed Members of the Expert
Writing and Voting Panels
Contributing to the Development of
American Academy of Orthopedic
Surgeons Appropriate Use Criteria

Approximately 332,000 primary total hip arthroplasties and 719,000 primary total knee arthroplasties were performed in the United States in 2010; 96% of hip replacement and 98% of knee replacement surgeries were performed on patients 45 years and older.¹ Reported infection rates for such operations range from 0.8% to 2.2%.^{2–4} Infections can be caused by introduction of microorganisms at the time of surgery, hematogenous seeding, or contiguous spread of infection from an adjacent site.^{2,3} Infections of total joint replacements can result in failure of the initial surgical procedure and the need for extensive revision, prolonged antibiotic treatment, functional impairment, considerable cost of care, and even death.

In 2014, the American Dental Association (ADA) Council on Scientific Affairs (CSA) assembled an expert panel to update and clarify the clinical recommendations found in a 2012 joint ADA and American Academy of Orthopaedic Surgeons (AAOS) evidence report and guideline.^{4,5} In accord with the 2012 ADA/AAOS evidence report, the updated ADA systematic review (published in the January 2015 issue of *The Journal of the American Dental Association*) found no statistically significant association between dental procedures and prosthetic joint infections (PJI). On the basis of the review of the evidence, the 2015 ADA Clinical Practice Guideline stated, “In general, for patients with prosthetic joint implants, prophylactic antibiotics are not recommended prior to dental procedures to prevent prosthetic joint infection.”⁵

The ADA panel found no association between dental procedures and PJIs and no scientifically based efficacy for using antibiotics to prevent PJIs.⁵ The panel did acknowledge that there may be special circumstances in which a clinician may consider antibiotic prophylaxis despite the lack

of scientific evidence. However, the guidelines did not list any special circumstances.

DEVELOPMENT OF APPROPRIATE USE CRITERIA FOR THE MANAGEMENT OF THE CARE OF PATIENTS WITH ORTHOPEDIC IMPLANTS UNDERGOING DENTAL PROCEDURES

Because there is weak evidence that some patients with certain medical conditions, diseases, and disorders may be at higher risk of experiencing PJI independent of dental procedures, the AAOS contacted the ADA to participate in the development of appropriate use criteria (AUC) to assist orthopedic surgeons and dentists in managing the care of these patients. (Note: The AAOS began developing AUC in 2011 as a tool to implement evidence-based clinical practice guidelines. AUC are

clinical indications or scenarios, and convening an expert panel comprised of representatives from multiple stakeholders to determine the appropriateness of each of the proposed clinical indications for treatment as “appropriate,” “may be appropriate,” or “rarely appropriate.” The literature reviewed for the AUC was derived primarily from the scientific articles used to develop the 2012 AAOS/ADA guidelines⁴ and 2015 ADA clinical practice guidelines.⁵

With the AUC,⁶ subject matter experts attempted to define clinical situations in which antibiotic prophylaxis in defined potentially at-risk patients might reduce the theoretical risk of experiencing post-surgical PJI. A writing panel comprised of AAOS and ADA representatives developed clinical scenarios of situations in which dental

prophylaxis for each scenario (that is, when antibiotic prophylaxis is “rarely appropriate,” “may be appropriate,” or is “appropriate”). The voting panel identified relatively few patient subpopulations for whom antibiotic prophylaxis might be indicated before certain dental procedures. Of 64 total prophylactic antibiotic voting items, 8 (12%) items were rated as “appropriate,” 17 (27%) items were rated as “may be appropriate,” and 39 (61%) were rated as “rarely appropriate.” A Web-based application of the AUC is available at www.orthoguidelines.org/go/auc.

TAKE-HOME MESSAGES

There is no evidence to support an association between dental procedures and risk of experiencing PJIs. The parameters that were used as potential scenarios for the AUC, in which antibiotic prophylaxis may be appropriate, do not indicate an increased risk of experiencing PJI due to hematogenous spread (bacteremia) from dental procedures or possibly other daily, oral health-related hygiene behaviors.⁷ These scenarios may indeed have some added risk of developing PJI in a small number of patients, but they are independent of dental treatment.

The AUC is a decision-support tool to supplement clinicians in their judgment regarding antibiotic prophylaxis for patients with a prosthetic joint who are undergoing dental procedures. It is not intended as the standard of care or as a substitute for clinical judgment. As developed, the AUC could facilitate the treatment of defined “high risk” and “immune compromised” patients. It affects a narrow cohort of patients for whom antibiotic prophylaxis might be considered. Although there was not complete consensus on all aspects of the AUC development process or outcomes, a consensus of ADA-appointed expert panel members and CSA members agreed that this tool could benefit dentists, physicians, and

A consensus of American Dental Association-appointed expert panel members and American Dental Association Council on Scientific Affairs members agreed that this tool could benefit dentists, physicians, and patients by reducing antibiotic prescriptions.

created to inform clinicians for whom a procedure should be performed. This involves using clinician expertise and experience, in conjunction with the relevant evidence, to rate the appropriateness of various treatments in a set of hypothetical, but clinically realistic, patient scenarios. For more information, visit <http://www.orthoguidelines.org/go/auc/>.) Although dental treatment is not considered a risk factor for PJI, the AAOS and ADA convened a group of subject matter experts to consider if antibiotic prophylaxis might be appropriate in any of these higher-risk patients.

To create the AUC, the AAOS used the RAND/University of California Los Angeles Appropriateness Method (RAM).⁶ The process involved reviewing the available evidence, compiling a list of potential

treatment might theoretically create a higher risk of experiencing PJI. The following medically complex patient populations and related issues were used to develop a matrix to gain consensus on any potential benefit from antibiotic prophylaxis until more definitive scientific data becomes available:

- planned dental procedure;
- an immunocompromised status;
- glycemic control;
- history of periprosthetic or deep PJI of the hip or knee that required an operation;
- time since hip or knee joint replacement procedure.

Once approved by the writing panel, the theoretical risk scenarios were presented to a separate expert voting panel (made up of ADA and AAOS representatives) to determine the appropriateness of antibiotic

patients by reducing antibiotic prescriptions.

Discussion of available treatment options applicable to each patient relies on communication between the patient, dentist, and orthopedic surgeon, weighing the potential risks and benefits for that patient. Prophylactic antibiotics before any clinical procedure that may cause bacteremia are chosen based on the nature and susceptibility of microflora at the treatment site, as well as the possible economic and health impact to patients and populations. Any perceived potential benefit of antibiotic prophylaxis must be weighed against the known risks of antibiotic use, including *Clostridium difficile* infection, allergic reaction, and the development, selection, and transmission of antimicrobial resistance factors.⁸

It is appropriate for the dentist to make the final judgment to use antibiotic prophylaxis for patients potentially at higher risk of experiencing PJI (independent of dental treatment) using the AUC as a guide, without consulting the orthopedic surgeon. However, if the orthopedic surgeon recommends antibiotic prophylaxis or the patient prefers it, despite the dentist's recommendation against premedication, the prescription should be provided by the surgeon.

The 2015 ADA clinical practice guideline is valid and should continue to inform clinical decisions for dental patients in ambulatory settings. The guideline

states clearly that the “[e]vidence fails to demonstrate an association between dental procedures and PJI or any effectiveness for antibiotic prophylaxis. Given this information in conjunction with the potential harm from antibiotic use, using antibiotics before dental procedures is not recommended to prevent PJI.” The CSA and ADA-appointed expert panel members encourage dental health care professionals to continue to use the 2015 ADA clinical practice guideline, consult the AUC as needed, and respect the patient's specific needs and preferences when considering antibiotic prophylaxis before dental treatment.

CONCLUSIONS

“In general, for patients with prosthetic joint implants, prophylactic antibiotics are not recommended prior to dental procedures to prevent prosthetic joint infection.”⁵ ■
<http://dx.doi.org/10.1016/j.adaj.2016.12.002>

Copyright © 2017 American Dental Association. All rights reserved.

American Dental Association Council on Scientific Affairs Antibiotic Prophylaxis Working Group. ADA-Appointed Members of the Expert Writing Panel: Elliot Abt, DDS, MS, MSc; John W. Hellstein, DDS, MS; Peter B. Lockhart, DDS; Angelo J. Mariotti, DDS, PhD; Thomas P. Sollecito, DMD, FDSRCS Ed; Edmond L. Truelove, DDS, MSD. ADA-Appointed Members of the Expert Voting Panel: Steven Armstrong, DDS, PhD; Scott S. De Rossi, DMD; Joel B. Epstein, DMD, MSD; Joel M. Laudenschlager, DMD; Lauren L. Patton, DDS; Thomas M. Paumier, DDS; Robert J. Weyant, DMD, DrPH. Commentary Authors: Elliot Abt, DDS, MS, MSc; Peter B. Lockhart, DDS; Thomas M. Paumier, DDS; Thomas P. Sollecito, DMD, FDSRCS Ed; Joel B. Epstein, DMD, MSD; Marcelo W.B.

Araujo, DDS, MS, PhD; James M. Lyznicki, MS, MPH. All other Working Group members and the Council on Scientific Affairs approved the document.

Address correspondence to Dr. Araujo at American Dental Association, 211 E. Chicago Ave., Chicago, IL 60611, e-mail araujom@ada.org.

Disclosure. None of the authors reported any disclosures.

The ADA expert panel members thank the following ADA staff members for their leadership and support throughout this project: Alonso Carrasco Labra, DDS, MSc, PhD(c); and Michael Valerio, PhD.

1. Centers for Disease Control and Prevention (CDC). National Hospital Discharge Survey: 2010 table, procedures by selected patient characteristics. Atlanta, GA: CDC; 2010. Available at: www.cdc.gov/nchs/data/nhds/4_procedures/2010pro4_numberprocedure.pdf. Accessed October 27, 2016.

2. Tande AJ, Patela R. Prosthetic joint infection. *Clin Microbiol Rev.* 2014;27(2):302-345.

3. Lamagni T. Epidemiology and burden of prosthetic joint infections. *J Antimicrob Chemother.* 2014;69(suppl 1):i5-110.

4. Watters W, Rethman MP, Hanson NB, Abt E, Anderson PA, et al. Prevention of orthopaedic implant infection in patients undergoing dental procedures. *J Am Acad Orthop Surg.* 2013;21(3):180-189.

5. Sollecito TP, Abt E, Lockhart PB, Truelove E, Paumier TM, et al. The use of prophylactic antibiotics prior to dental procedures in patients with prosthetic joints: evidence-based clinical practice guideline for dental practitioners—a report of the American Dental Association Council on Scientific Affairs. *JADA.* 2015;146(1):11-16.

6. American Academy of Orthopaedic Surgeons (AAOS). *Appropriate Use Criteria for the Management of Patients with Orthopaedic Implants Undergoing Dental Procedures.* Rosemont, IL: AAOS; 2016. Available at: www.aaos.org/poiudpauc. Accessed October 27, 2016.

7. Lockhart PB. Guidelines for prevention of infective endocarditis: an explanation of the changes. *JADA.* 2008;139(suppl 1):S2.

8. World Health Organization (WHO). *Handle Antibiotics With Care: 2016 Campaign Toolkit.* Geneva: WHO; 2016. Available at: <http://www.who.int/waaw>. Accessed November 15, 2016.