

ADVISORY STATEMENT

Antibiotic prophylaxis for dental patients with total joint replacements

AMERICAN DENTAL ASSOCIATION;
AMERICAN ACADEMY OF
ORTHOPAEDIC SURGEONS

Approximately 450,000 total joint arthroplasties are performed annually in the United States. Deep infections of these total joint replacements usually result in failure of the initial operation and the need for extensive revision. Owing to the use of perioperative antibiotic prophylaxis and other technical advances, deep infection occurring in the immediate postoperative period resulting from intraoperative contamination has been reduced markedly in the past 20 years.

Patients who are about to have a total joint arthroplasty should be in good dental health prior to surgery and should be encouraged to seek professional dental care if necessary.

Antibiotic prophylaxis is not routinely indicated for most dental patients with total joint replacements.

Patients who already have had a total joint arthroplasty should perform effective daily oral hygiene procedures to remove plaque (for example, by using manual or powered toothbrushes, interdental cleaners or oral irrigators) to establish and maintain good oral health. The risk of bacteremia is far more substantial in a mouth with ongoing inflammation than in one that is healthy and employing these home oral hygiene devices.¹

Bacteremias can cause hematogenous seeding of total joint implants, both in the early postoperative period and for many years following implantation.² It appears that the most critical period is up to two years after joint placement.³ In addition, bacteremias may occur in

Background and Overview.

In 1997, the American Dental Association and the American Academy of Orthopaedic Surgeons convened an expert panel of dentists, orthopaedic surgeons and infectious disease specialists and published their first Advisory Statement on Antibiotic Prophylaxis for Dental Patients with Prosthetic Joints. This represented the first time that national health organizations had gone on record on this topic. This 2003 advisory statement is the first periodic update of the 1997 statement. In addition, the organizations have created a new patient handout (included at the end of the statement) that dentists may share with their patients. The 1997 Advisory Statement has been well-used by dentists and orthopaedic surgeons. Following their standard protocols for periodic review of existing advisory statements, the ADA and AAOS and their expert consultants recently reviewed the 1997 statement.

Conclusions and Clinical

Implications. The 2003 statement includes some modifications of the classification of patients at potential risk and of the incidence stratification of bacteremic dental procedures, but no changes in terms of suggested antibiotics and antibiotic regimens. The statement concludes that antibiotic prophylaxis is not indicated for dental patients with pins, plates or screws, nor is it routinely indicated for most dental patients with total joint replacements. However, it is advisable to consider premedication in a small number of patients who may be at potential increased risk of experiencing hematogenous total joint infection.

the course of normal daily life⁴⁻⁶ and concurrently with dental and medical procedures.⁶ It is likely that many more oral bacteremias are spontaneously induced by daily events than are dental treatment-induced.⁶ Presently, no scientific evidence supports the position



TABLE 1

PATIENTS AT POTENTIAL INCREASED RISK OF EXPERIENCING HEMATOGENOUS TOTAL JOINT INFECTION.*	
PATIENT TYPE	CONDITION PLACING PATIENT AT RISK
All patients during first two years following joint replacement	N/A†
Immunocompromised/immunosuppressed patients	Inflammatory arthropathies such as rheumatoid arthritis, systemic lupus erythematosus Drug- or radiation-induced immunosuppression
Patients with comorbidities‡	Previous prosthetic joint infections Malnourishment Hemophilia HIV infection Insulin-dependent (type 1) diabetes Malignancy

* Based on Ching and colleagues,¹² Brause,¹⁶ Murray and colleagues,¹⁷ Poss and colleagues,¹⁸ Jacobson and colleagues,¹⁹ Johnson and Bannister,²⁰ Jacobson and colleagues²¹ and Berbari and colleagues.²²
 † N/A: Not applicable.
 ‡ Conditions shown for patients in this category are examples only; there may be additional conditions that place such patients at risk of experiencing hematogenous total joint infection.

that antibiotic prophylaxis to prevent hematogenous infections is required prior to dental treatment in patients with total joint prostheses.¹ The risk/benefit^{7,8} and cost/effectiveness^{7,9} ratios fail to justify the administration of routine antibiotic prophylaxis. The analogy of late prosthetic joint infections with infective endocarditis is invalid, as the anatomy, blood supply, microorganisms and mechanisms of infection are all different.¹⁰

It is likely that bacteremias associated with acute infection in the oral cavity,^{11,12} skin, respiratory, gastrointestinal and urogenital systems and/or other sites can and do cause late implant infection.¹² Any patient with a total joint prosthesis with acute orofacial infection should be vigorously treated as any other patient with elimination of the source of the infection (incision and drainage, endodontics, extraction) and appropriate therapeutic antibiotics when indicated.^{1,12} Practitioners should maintain a high index of suspicion for any unusual signs and symptoms (such as fever, swelling, pain, joint that is warm to touch) in patients with total joint prostheses.

Antibiotic prophylaxis is not indicated for

dental patients with pins, plates and screws, nor is it routinely indicated for most dental patients with total joint replacements. This position agrees with that taken by the ADA Council on Dental

Any perceived potential benefit of antibiotic prophylaxis must be weighed against the known risks of antibiotic toxicity; allergy; and development, selection and transmission of microbial resistance.

Therapeutics¹³ and the American Academy of Oral Medicine¹⁴ and is similar to that taken by the British Society for Antimicrobial Chemotherapy.¹⁵ There is limited evidence that some immunocompromised patients with total joint replacements (Table 1) may be at higher risk of experiencing hematogenous infections.^{12,16-23}

Antibiotic prophylaxis for such patients undergoing dental procedures with a higher bacteremic risk (as defined in Table 2) should be considered using an empirical regimen (Table 3). In addition, antibiotic prophylaxis may be considered

when the higher-risk dental procedures (again, as defined in Table 2) are performed on dental patients within two years post-implant surgery,³ on those who have had previous prosthetic joint infections and on those with some other conditions (Table 1).

Occasionally, a patient with a total joint prosthesis may present to the dentist with a recom-

TABLE 2

INCIDENCE STRATIFICATION OF BACTEREMIC DENTAL PROCEDURES.*

INCIDENCE	DENTAL PROCEDURE
Higher incidence [†]	Dental extractions Periodontal procedures, including surgery, subgingival placement of antibiotic fibers/strips, scaling and root planing, probing, recall maintenance Dental implant placement and replantation of avulsed teeth Endodontic (root canal) instrumentation or surgery only beyond the apex Initial placement of orthodontic bands but not brackets Intraligamentary and intraosseous local anesthetic injections Prophylactic cleaning of teeth or implants where bleeding is anticipated
Lower incidence ^{‡§}	Restorative dentistry [¶] (operative and prosthodontic) with/without retraction cord Local anesthetic injections (nonintraaligamentary and nonintraosseous) Intracanal endodontic treatment; post placement and buildup Placement of rubber dam Postoperative suture removal Placement of removable prosthodontic/orthodontic appliances Taking of oral impressions Fluoride treatments Taking of oral radiographs Orthodontic appliance adjustment

* Adapted with permission of the publisher from Dajani AS, Taubert KA, Wilson W, et al.²³

† Prophylaxis should be considered for patients with total joint replacement who meet the criteria in Table 1. No other patients with orthopedic implants should be considered for antibiotic prophylaxis prior to dental treatment/procedures.

‡ Prophylaxis not indicated.

§ Clinical judgment may indicate antibiotic use in selected circumstances that may create significant bleeding.

¶ Includes restoration of carious (decayed) or missing teeth.

TABLE 3

SUGGESTED ANTIBIOTIC PROPHYLAXIS REGIMENS.*

PATIENT TYPE	SUGGESTED DRUG	REGIMEN
Patients not allergic to penicillin	Cephalexin, cephradine or amoxicillin	2 grams orally 1 hour prior to dental procedure
Patients not allergic to penicillin and unable to take oral medications	Cefazolin or ampicillin	Cefazolin 1 g or ampicillin 2 g intramuscularly or intravenously 1 hour prior to the dental procedure
Patients allergic to penicillin	Clindamycin	600 milligrams orally 1 hour prior to the dental procedure
Patients allergic to penicillin and unable to take oral medications	Clindamycin	600 mg intravenously 1 hour prior to the dental procedure*

* No second doses are recommended for any of these dosing regimens.

mendation from his or her physician that is not consistent with these guidelines. This could be due to lack of familiarity with the guidelines or to special considerations about the patient's medical condition that are not known to the dentist. In this situation, the dentist is encouraged to consult

with the physician to determine if there are any special considerations that might affect the dentist's decision on whether or not to premedicate, and may wish to share a copy of these guidelines with the physician if appropriate. After this consultation, the dentist may decide to follow the

physician's recommendation or, if in the dentist's professional judgment antibiotic prophylaxis is not indicated, may decide to proceed without antibiotic prophylaxis. The dentist is ultimately responsible for making treatment recommendations for his or her patients based on the dentist's professional judgment. Any perceived potential benefit of antibiotic prophylaxis must be weighed against the known risks of antibiotic toxicity; allergy; and development, selection and transmission of microbial resistance.

This statement provides guidelines to supplement practitioners in their clinical judgment regarding antibiotic prophylaxis for dental patients with a total joint prosthesis. (Editor's note: The patient handout on page 899 can be duplicated to provide patients with an overview of these guidelines.) It is not intended as the standard of care nor as a substitute for clinical judgment, as it is impossible to make recommendations for all conceivable clinical situations in which bacteremias originating from the oral cavity may occur. Practitioners must exercise their own clinical judgment in determining whether or not antibiotic prophylaxis is appropriate. ■

Address reprint requests to the ADA Council on Scientific Affairs, 211 E. Chicago Ave., Chicago, Ill. 60611.

The ADA/AAOS Expert Panel that developed the original of this statement consisted of Robert H. Fitzgerald Jr., M.D.; Jed J. Jacobson, D.D.S., M.S., M.P.H.; James V. Luck Jr., M.D.; Carl L. Nelson, M.D.; J. Phillip Nelson, M.D.; Douglas R. Osmon, M.D.; and Thomas J. Pallasch, D.D.S. The staff liaisons were Clifford W. Whall Jr., Ph.D., for the ADA, and William W. Tipton Jr., M.D., for the AAOS. The ADA and the AAOS reviewed and updated this statement in 2003.

Dentists and physicians are encouraged to reproduce the above Advisory Statement for distribution to colleagues. Permission to reprint the Advisory Statement is hereby granted by ADA and AAOS, provided that the Advisory Statement is reprinted in its entirety including citations and that such reprints contain a notice stating "Copyright © 2003 American Dental Association and American Academy of Orthopaedic Surgeons. Reprinted with permission." If you wish to use the Advisory Statement in any other fashion, written permission must be obtained from ADA and AAOS.

1. Pallasch TJ, Slots J. Antibiotic prophylaxis and the medically compromised patient. *Periodontol* 2000;10:107-38.
2. Rubin R, Salvati EA, Lewis R. Infected total hip replacement after dental procedures. *Oral Surg Oral Med Oral Pathol* 1976;41(1):13-23.
3. Hansen AD, Osmon DR, Nelson CL. Prevention of deep prosthetic joint infection. *Am J Bone Joint Surg* 1996;78-A(3):458-71.
4. Bender IB, Naidorf IJ, Garvey GJ. Bacterial endocarditis: a consideration for physicians and dentists. *JADA* 1984;109:415-20.
5. Everett ED, Hirschmann JV. Transient bacteremia and endocarditis prophylaxis: a review. *Medicine (Baltimore)* 1977;56:61-77.
6. Guntheroth WG. How important are dental procedures as a cause of infective endocarditis? *Am J Cardiol* 1984;54:797-801.
7. Jacobson JJ, Schweitzer SO, DePorter DJ, Lee JJ. Antibiotic prophylaxis for dental patients with joint prostheses? a decision analysis. *Int J Technol Assess Health Care* 1990;6:569-87.
8. Tsevat J, Durand-Zaleski I, Pauker SG. Cost-effectiveness of antibiotic prophylaxis for dental procedures in patients with artificial joints. *Am J Public Health* 1989;79:739-43.
9. Norden CW. Prevention of bone and joint infections. *Am J Med* 1985;78(6B):229-32.
10. McGowan DA. Dentistry and endocarditis. *Br Dent J* 1990;169:69.
11. Bartzokas CA, Johnson R, Jane M, Martin MV, Pearce PK, Saw Y. Relation between mouth and haematogenous infections in total joint replacement. *Br Med J* 1994;309:506-8.
12. Ching DW, Gould IM, Rennie JA, Gibson PI. Prevention of late haematogenous infection in major prosthetic joints. *J Antimicrob Chemother* 1989;23:676-80.
13. Council on Dental Therapeutics. Management of dental patients with prosthetic joints. *JADA* 1990; 121:537-8.
14. Eskinazi D, Rathburn W. Is systematic antimicrobial prophylaxis justified in dental patients with prosthetic joints? *Oral Surg Oral Med Oral Pathol* 1988;66:430-1.
15. Cawson RA. Antibiotic prophylaxis for dental treatment: for hearts but not for prosthetic joints. *Br Dent J* 1992;304:933-4.
16. Brause BD. Infections associated with prosthetic joints. *Clin Rheum Dis* 1986;12:523-35.
17. Murray RP, Bourne MH, Fitzgerald RH Jr. Metachronous infection in patients who have had more than one total joint arthroplasty. *J Bone Joint Surg Am* 1991;73(10):1469-74.
18. Poss R, Thornhill TS, Ewald FC, Thomas WH, Batte NJ, Sledge CB. Factors influencing the incidence and outcome of infection following total joint arthroplasty. *Clin Orthop* 1984;182:117-26.
19. Jacobson JJ, Millard HD, Plezia R, Blankenship JR. Dental treatment and late prosthetic joint infections. *Oral Surg Oral Med Oral Pathol* 1986;61:413-7.
20. Johnson DP, Bannister GG. The outcome of infected arthroplasty of the knee. *J Bone Joint Surg Br* 1986;68(2):289-91.
21. Jacobson JJ, Patel B, Asher G, Wooliscroft JO, Schaberg D. Oral *Staphylococcus* in elderly subjects with rheumatoid arthritis. *J Am Geriatr Soc* 1997;45:1-5.
22. Barbari EF, Hanssen AD, Duffy MC, Ilstrup DM, Harmsen WS, Osmon DR. Risk factors for prosthetic joint infection: case-control study. *Clin Infect Dis* 1998;27:1247-54.
23. Dajani AS, Taubert KA, Wilson W, et al. Prevention of bacterial endocarditis: recommendations by the American Heart Association. From the Committee on Rheumatic Fever, Endocarditis and Kawasaki Disease, Council on Cardiovascular Disease in the Young. *JAMA* 1997;277:1794-801.

See accompanying sidebar.

Your joint replacement, dental procedures and antibiotics

AMERICAN DENTAL ASSOCIATION AND AMERICAN ACADEMY OF ORTHOPAEDIC SURGEONS

For the first two years after a joint replacement, all patients may need antibiotics for all high-risk dental procedures. After two years, only high-risk patients may need to receive antibiotics for high-risk procedures.

The bacteria commonly found in the mouth may travel through the bloodstream and settle in your artificial joint. This increases your risk of contracting an infection. Ask your dentist about preventive antibiotics for all dental procedures with a high risk of bleeding or producing high levels of bacteria in your blood. Your dentist and your orthopaedic surgeon, working together, will develop an appropriate course of treatment for you.

You may need preventive antibiotics before all high-risk dental procedures if

- you had a joint replacement less than two years ago.

- you've had previous infections in your artificial joint.

- you have an inflammatory type of arthritis, type 1 diabetes or hemophilia.

- you have a suppressed immune system or are malnourished.

- you have a history of prior or present malignancy.

These dental procedures have a high risk

of bleeding or producing high levels of bacteria in your blood:

- all dental extractions;
- all periodontal procedures;
- dental implant placement and replantation of teeth that were knocked out;
- some root canal work;
- initial placement of orthodontic bands (not brackets);
- certain specialized local anesthetic injections;
- regular dental cleanings (if bleeding is anticipated).

One of these preventive antibiotics may be prescribed for you:

— **if you are not allergic to penicillin:**

2 grams of amoxicillin, cephalexin or cephadrine (orally) **OR** 2 grams of ampicillin or 1 gram of cefazolin (intramuscularly or intravenously) 1 hour before the procedure.

— **if you are allergic to penicillin:**

600 milligrams of clindamycin (orally or intravenously) 1 hour before the procedure.

These guidelines were developed by the American Academy of Orthopaedic Surgeons and the American Dental Association. They are designed to help practitioners make decisions about preventive antibiotics for dental patients with artificial joints. They are not a standard of care or a substitute for the practitioner's clinical judgment. Practitioners must exercise their own clinical judgment in determining whether or not preventive antibiotics are appropriate. Pediatric doses may be different.

Date of joint surgery _____

Orthopaedic surgeon _____

Phone number: () _____

Unlike other portions of JADA, this page may be clipped and copied as a handout for patients, without first obtaining reprint permission from the American Dental Association Publishing Division. Any other use, copying or distribution, whether in printed or electronic form, is strictly prohibited without prior written consent of the ADA Publishing Division.