ADA CE Program ARTICLE 1

COVER STORY

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

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In 2012, a panel of experts representing the American Academy of Orthopaedic Surgeons (AAOS) and the American Dental Association (ADA) (the 2012 Panel) published a systematic review and accompanying clinical practice guideline (CPG) entitled "Prevention of Orthopaedic

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ABSTRACT

Background. A panel of experts (the 2014 Panel) convened by the American Dental Association Council on Scientific Affairs developed an evidence-based clinical practice guideline (CPG) on the use of prophylactic antibiotics in patients with prosthetic joints who are undergoing dental procedures. This CPG is intended to clarify the "Prevention of Orthopaedic Implant Infection in Patients Undergoing Dental Procedures: Evidence-based Guideline and Evidence Report," which was developed and published by the American Academy of Orthopaedic Surgeons and the American Dental Association (the 2012 Panel).

Types of Studies Reviewed. The 2014 Panel based the current CPG on literature search results and direct evidence contained in the comprehensive systematic review published by the 2012 Panel, as well as the results from an updated literature search. The 2014 Panel identified 4 case-control studies.

Results. The 2014 Panel judged that the current best evidence failed to demonstrate an association between dental procedures and prosthetic joint infection (PJI). The 2014 Panel also presented information about antibiotic resistance, adverse drug reactions, and costs associated with prescribing antibiotics for PJI prophylaxis.

Practical Implications and Conclusions. The 2014 Panel made the following clinical recommendation: In general, for patients with prosthetic joint implants, prophylactic antibiotics are not recommended prior to dental procedures to prevent prosthetic joint infection. The practitioner and patient should consider possible clinical circumstances that may suggest the presence of a significant medical risk in providing dental care without antibiotic prophylaxis, as well as the known risks of frequent or widespread antibiotic use. As part of the evidence-based approach to care, this clinical recommendation should be integrated with the practitioner's professional judgment and the patient's needs and preferences.

Key Words. Antibiotic prophylaxis; evidence-based dentistry; practice guidelines; prostheses; joint replacement.

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Implant Infection in Patients Undergoing Dental Procedures: Evidence-based Guideline and Evidence Report."[1-3] The 2012 Panel initially considered 222 questions concerning the relationship between dental procedures, bacteremia (as an intermediate outcome), and the risk of developing a prosthetic joint infection (PJI) as a clinical end point. The 2012 Panel published a comprehensive evidence-based guideline. The release of this guideline was followed by calls to the ADA Member Service Center hotline requesting additional clarification, which indicated that this guideline was 1 of the top 2 issues of concern to dental practitioners. Therefore, the ADA's Council on Scientific Affairs convened a panel of experts (the 2014 Panel) to provide dental professionals with a more specific and practical set of guidelines, the results of which are included in this article.

Supplemental material is available online.

The 2014 Panel considered the direct evidence linking a PJI with a dental procedure but did not reevaluate intermediate outcomes, including bacteremia[4] from manipulation of oral mucosa. The full report of the 2012 Panel, which includes intermediate outcomes, is available online.[1] The 2014 Panel addressed the following clinical question: For patients with prosthetic joints, is there an association between dental procedures and PJI, and, therefore, should systemic antibiotics be prescribed before patients with prosthetic joint implants undergo dental procedures? In this article, we present the evidence to answer this question and provide clinical recommendations.

EVIDENCE REVIEW

Because the 2012 Panel[1] conducted a comprehensive search of the biomedical literature and screened the results of the search according to defined inclusion and exclusion criteria, the 2014 Panel chose to use the literature selected by the 2012 Panel as the foundation of this CPG. In addition, the 2014 Panel updated the literature search and screening process to identify additional evidence. The methods are presented in Appendix 1 (available online at the end of this article). The 2014 Panel assessed each identified study according to the Critical Appraisal Skills Programme case-control critical appraisal tool[5] and then summarized the body of evidence to determine the level of certainty in the effect estimate and corresponding strength of the recommendation. Details about the process for generating clinical recommendations are in Appendix 2 (available online at the end of this article). The 2014 Panel did not conduct a meta-analysis because a meta-analysis of observational studies can produce precise, but possibly spurious, estimates of risk owing to the effects of confounding.[6]

In their systematic review,[1] the 2012 Panel identified 1 study that provided direct evidence about dental procedures as risk factors for developing prosthetic hip and knee implant infections. The study by Berbari and colleagues[7] was a case-control study of 339 patients with infected hip or knee prostheses (cases), and the authors matched them with 339 patients who did not have infected hip or knee prostheses (controls) and who were hospitalized in an orthopedic service at the Mayo Clinic Care Network (Rochester, MN) from December 2001 through May 2006. The authors reviewed and abstracted information from dental records to determine the association between the dental procedures (exposure) and hip and knee infections. Exposure was measured within the previous 6 months and 2 years before hospital admission and classified as low-risk dental procedures (fluoride treatment, restorative dentistry, and endodontic treatment) and high-risk dental procedures (periodontal treatment, extractions, treatment of a dental abscess, oral surgery, and dental hygiene), as defined by Berbari and colleagues.[7]

The authors controlled for confounding variables by matching control patients to case patients on the basis of joint arthroplasty location, resulting in exactly the same number of prosthetic hip (n = 164) and knee (n = 175) replacements among cases and controls. The authors also controlled for confounding by providing each patient with a yes versus no propensity score regarding whether the patient had had a dental visit during the period of data abstraction. The score took into account several covariates—including sociodemographic and behavioral information, comorbidities, and the American Society of Anesthesiologists score—that influenced a patient's propensity to visit a dentist. The authors also controlled for covariates such as antibiotic prophylaxis, sex, and joint effect. The regression models included all of these covariates and confounding variables.

The regression modeling used odds ratios (ORs), and the results showed no statistical association between having undergone high-risk dental procedures without antibiotics and PJIs at either 6-months (OR = 0.8; 95% confidence interval [CI], 0.4-1.7) or 2-years (OR = 0.8; 95% CI, 0.4-1.6) after the procedure. High-risk dental procedures with antibiotics were statistically significant at 6 months (OR = 0.5; 95% CI, 0.3-0.9), but not at 2 years (OR = 0.7; 95% CI, 0.5-1.1). All 4 of these ORs are below the null value of 1, indicating that case patients

ABBREVIATION KEY. **AAOS:** American Academy of Orthopaedic Surgeons. **ADA:** American Dental Association. **CPG:** Clinical practice guideline. **PJI:** Prosthetic joint infection.