

**New Recommendations  
for  
Antibiotic Prophylaxis  
Prior to Dental Procedures**

**by:**

**Paria Baharvand**

**Pharm. D**

**(Board Certified Pharmacotherapy Specialist)**

# Main topics

❖ Following guidance from the American Academy of **Orthopedic Surgeons (AAOS)** and the **American Heart Association (AHA)**, the **ADA** has established recommendations in the past for antimicrobial prophylaxis prior to dental procedures :

- those with heart conditions that may predispose them to infective endocarditis;
- those who have a prosthetic joint(s) and may be at risk for developing hematogenous infections at the site of the prosthetic.



What's important  
to you?



- ✓ General and specialty dentists are the third highest outpatient prescribers for antibiotics, and data from 2017 to 2019 suggest 35% to 80% of these antibiotic prescriptions are either not indicated or suboptimal.
- **Antibiotic resistance:** when bacteria no longer respond to antibiotics—is a growing problem. According to the Centers for Disease Control and Prevention, at least 2 million people in the U.S. become infected with bacteria that are resistant to antibiotics and at least 23,000 people die each year as a direct result of these infections.
- In addition to problems associated with antibiotic resistance, **antibiotics are a major cause of adverse effects** from systemically administered medications. A 2018 study found over 145,000 emergency hospital visits for systemically administered antibiotic adverse events in adults between 2011 and 2015 in the United States. More than half of the visits were from adults aged 20 to 50 years, and approximately 75% of the cases involved allergic reactions to antibiotics. Oral sulfonamides were the most frequent cause of adverse events, followed closely by penicillins, and, lastly, fluoroquinolones.
- There is some overlap among the antibiotics commonly prescribed by dentists and those reported to carry higher risk for CDI. Antibiotics associated with higher risk of CDI include clindamycin, the cephalosporins, and the fluoroquinolones.



# Microbiology of Odontogenic Infections

Organism	Occurrence
<b>Aerobic</b>	
<i>Staphylococcus aureus</i>	20%
Coagulase-negative staphylococci	10%
<i>Streptococcus viridans</i>	45%
<i>Corynebacterium</i> spp.	5%

<i>Pseudomonas aeruginosa</i>	5%
<b>Anaerobic</b>	
<i>Prevotella</i>	30%
<i>Bacteroides</i>	30%
<i>Peptostreptococcus</i>	20%
<i>Porphyromonas</i>	5%

The pathogenesis of infective endocarditis (IE) is presumed to involve the following sequence of events:

- Formation of a small thrombus on an abnormal endothelial surface
- Secondary infection of this nidus with bacteria that are transiently circulating in the bloodstream
- Proliferation of bacteria resulting in the formation of vegetations on the endothelial surface

Since the occurrence of bacteremia is crucial to the initiation of an episode of IE, in theory it is reasonable to conclude that preventing or promptly treating transient bacteremia can prevent the above events



Antimicrobial prophylaxis is suggested for patients with the cardiac lesions in the setting of procedures likely to result in bacteremia with a microorganism that has the potential ability to cause endocarditis.

Antibiotics may be required:

- Dental work
- Respiratory tract procedures
- Skin or soft tissue procedures
- Cardiac surgery with prosthetic material



Antibiotics generally not required

- Genitourinary and gastrointestinal tract procedures
- Vaginal or cesarean delivery





- The ADA provided updated recommendations for antimicrobial prophylaxis prior to dental procedures in May of 2021.
- These recommendations highlight that there is a relatively **small subset of patients that are indicated to receive antibiotic prophylaxis** when compared to older versions of guidelines published by AAOS and AHA.
- The cumulative exposure to random bacteremias from daily oral activities is estimated to be 5,730 minutes during a 1-month period compared with only 6 to 30 minutes for a dental procedure. **Furthermore, it is estimated that the cumulative exposure to bacteremia from routine daily activities may be up to 5.6 million times greater than a single tooth extraction**



# CLINICAL APPROACH

- Evidence to support antimicrobial prophylaxis for prevention of viridans group streptococcal (VGS) infective endocarditis (IE) endocarditis **is weak**.
- Guidelines issued prior to 2007 recommended prophylaxis for patients at moderate to high risk of IE, a much larger population.
- There is no convincing evidence that antimicrobial prophylaxis provides significant benefit in terms of prevention of IE in many cases.
- IE is much more likely to result from frequent exposure to random bacteremias associated with daily activities such as tooth brushing than from bacteremia caused by a dental, gastrointestinal, or genitourinary procedure.
- **Maintenance of oral hygiene may reduce the incidence of bacteremia is more important than prophylactic antibiotics for a dental procedure to reduce the risk of IE.**
- Furthermore, the risk of antibiotic-associated adverse events may exceed the benefit, if any, from prophylactic antibiotic therapy.
- We are in agreement with the American Heart Association guideline for the prevention of infective endocarditis (IE), which was updated in 2021.

Prosthetic cardiac valve or material
Presence of cardiac prosthetic valve
Transcatheter implantation of prosthetic valves
Cardiac valve repair with devices, including annuloplasty, rings, or clips
Left ventricular assist devices or implantable heart
Previous, relapse, or recurrent IE
CHD
Unrepaired cyanotic congenital CHD, including palliative shunts and conduits.
Completely repaired congenital heart defect with prosthetic material or device, whether placed by surgery or by transcatheter during the first 6 mo after the procedure
Repaired CHD with residual defects at the site of or adjacent to the site of a prosthetic patch or prosthetic device
Surgical or transcatheter pulmonary artery valve or conduit placement such as Melody valve and Contegra conduit
Cardiac transplant recipients who develop cardiac valvulopathy

AP for a Dental Conditions for Which AP Is Suggested

AP for a dental procedure not suggested
Implantable electronic devices such as a pacemaker or similar devices
Septal defect closure devices when complete closure is achieved
Peripheral vascular grafts and patches, including those used for hemodialysis
Coronary artery stents or other vascular stents
CNS ventriculoatrial shunts
Vena cava filters
Pledgets

AP for a Dental Conditions for Which AP Is not Suggested

AP suggested
All dental procedures that involve manipulation of gingival tissue or the periapical region of teeth or perforation of the oral mucosa
AP not suggested
Anesthetic injections through noninfected tissue, taking dental radiographs, placement of removable prosthodontic or orthodontic appliances, adjustment of orthodontic appliances, placement of orthodontic brackets, shedding of primary teeth, and bleeding from trauma to the lips or oral mucosa

The antibiotic regimens suggested for prophylaxis for a dental procedure in patients at a high risk of adverse outcome from viridans group streptococcal infective endocarditis are shown in Table 5.

AP indicates antibiotic prophylaxis.



- Matrix band placement
  - Subgingival rubber dam and clamp
  - Fixed prosthesis extending subgingivally
  - Root canal treatment before establishment of an apical stop
  - Prefabricated metal crowns
  - Six-point pocket charting in diseased tissue
  - Surgical subgingival scaling and root planning
  - Abscess incision and drainage
  - Tooth extractions
  - Surgical treatment requiring manipulation of a mucoperiosteal flap or mucogingival area (e.g., apicectomy)
  - Dental implants involving temporary anchorage devices, mini-implants
  - Implant substructures uncovering
- 

Dental procedures which are considered to be invasive

- ❖ 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



Lower incidence Bacteremic Risks of Various

Dental



**Antibiotic regimens for prevention of endocarditis prior to dental procedures\***

Situation	Agent	Adults	Children
Oral	Amoxicillin	2 g	50 mg/kg
Unable to take oral medication	Ampicillin <b>OR</b>	2 g IM or IV	50 mg/kg IM or IV
	Cefazolin or ceftriaxone	1 g IM or IV	50 mg/kg IM or IV
Allergic to penicillin or ampicillin—oral	Cephalexin <sup>¶</sup> <b>OR</b>	2 g	50 mg/kg
	Azithromycin or clarithromycin <b>OR</b>	500 mg	15 mg/kg
	Doxycycline	100 mg	< 45 kg, 4.4 mg/kg > 45 kg, 100 mg
Allergic to penicillin or ampicillin and unable to take oral medication	Cefazolin or ceftriaxone <sup>Δ</sup>	1 g IM or IV	50 mg/kg IM or IV

Clindamycin is no longer recommended for antibiotic prophylaxis prior to dental procedures.

IM: intramuscular; IV: intravenous.

\* Antibiotics should be administered 30 to 60 minutes prior to the procedure.

¶ Or other first- or second-generation oral cephalosporin in equivalent adult or pediatric dosing.

Δ Cephalosporins should not be used for patients with history of anaphylaxis, angioedema, or urticaria with penicillin or ampicillin. In such cases, vancomycin may be used (adults: 15 to 20 mg/kg, not to exceed 2 g per dose; children: 15 mg/kg to a maximum dose of 1g).



## What happens if a patient is already taking an antibiotic for either a medical or dental reason?

- Patients receiving antibiotics for other reasons at the time of a routine dental visit who are considered at risk for endocarditis have specific recommendations.
- The antibiotic that the patient is already taking is not adequate to prevent a dentally induced bacteria. Rather than increasing the dose of the drug currently being used, it is advisable to select an agent from a different class of antibiotic.
- If possible, the dental procedure is best postponed until at least 9 to 14 days after completion of the antibiotic. This will allow the normal oral flora to re establish and help to reduce the incidence of bacterial resistance (Wilson et al., 2007; Dajani et al., 1997).



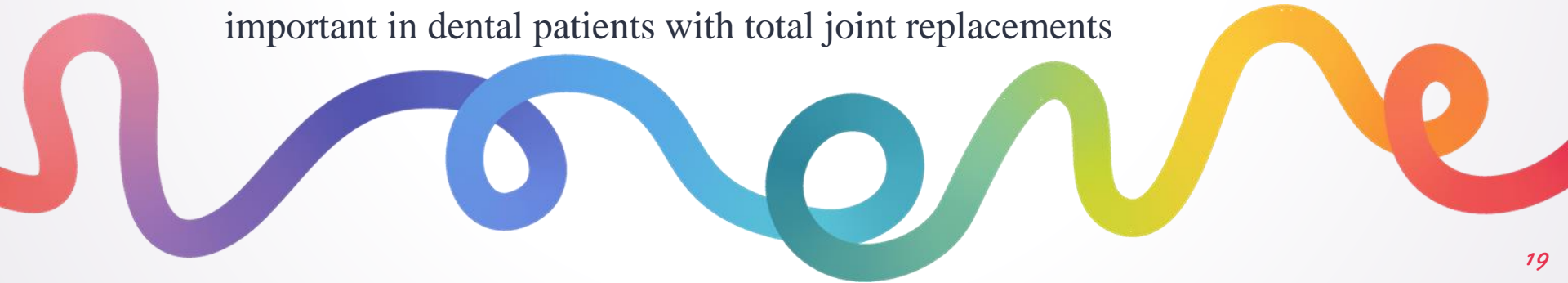
Is it advisable to see a patient taking antibiotic prophylaxis more than once a week or even once a week?

- No. Since repeated use of antibiotics can lead to the emergence of antibiotic-resistant microorganisms in the oral cavity, it is recommended that there be an interval of at least 7 days between dental treatment appointments. There needs to be adequate time for the patient's normal oral flora to be re-established and prevent the development of resistant strains.



## II. Antibiotic prophylaxis for total joint replacement

- What is the concern about antibiotic prophylaxis for dental patients with total joint replacement?
- A. A problem arises in patients with total joint replacements because if an infection develops the bacteria cannot be easily eliminated from a joint replacement implant.
- Bacteremias can cause hematogenous seeding of a joint implant soon after the surgery and for years afterward. This is why antibiotic prophylaxis is very important in dental patients with total joint replacements



## What are the current guidelines for antibiotic prophylaxis for dental patients with total joint replacements?

- A. In 2009, the American Academy of Orthopedic Surgery (AAOS) safety committee recommended that dentists consider antibiotic prophylaxis for all patients with total joint (e.g., knee, hip) replacement before any dental procedure.
- **But now:**
- Patients with orthopedic implants should maintain good dental hygiene and oral infections in patients with orthopedic implants should be treated promptly. **Dental procedures are not associated with an increased risk of orthopedic hardware infection, and use of routine antibiotic prophylaxis prior to dental procedures does not alter the risk of subsequent orthopedic hardware infection**



## What are the current guidelines for antibiotic prophylaxis for dental patients with total joint replacements?

- The new guideline also takes into consideration that patients who have previous medical conditions or complications associated with their joint replacement surgery may have specific needs calling for premedication.
- In medically compromised patients who are undergoing dental procedures that include gingival manipulation or mucosal inclusion, prophylactic antibiotics should be considered only after consultation with the patient and orthopedic surgeon.
- For patients with serious health conditions, such as immunocompromising diseases, it may be appropriate for the orthopedic surgeon to recommend an antibiotic regimen when medically indicated.



## Patients at Potential Increased Risk of Experiencing Hematogenous Total Joint Infection

Patient Type	Condition Placing Patient at Risk
All patients during the first 2 y following joint replacement	⊘ Not applicable
Immunocompromised or immunosuppressed patients	⊘ Inflammatory arthropathies such as rheumatoid arthritis, systemic lupus erythematosus ⊘ Drug- or radiation-induced immunosuppression
Patients with comorbidities <sup>a</sup>	⊘ Previous prosthetic joint infections ⊘ Malnourishment ⊘ Hemophilia ⊘ HIV infection ⊘ Type 1 diabetes ⊘ Malignancy
<sup>a</sup> 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 infections.	

**Table 7.6 Suggested antibiotic prophylaxis regimen in dental patients with total joint replacement.**

<b>Type of patient</b>	<b>Recommended</b>	
	<b>drug</b>	<b>Drug dosage</b>
Oral: Patients not allergic to penicillin	Cephalexin, cephradine or amoxicillin	2 grams orally (po) 1 hour prior to dental procedure
Parenteral: Patients are not allergic to penicillin but cannot take or tolerate oral medications	Cefazolin or ampicillin	Cefazolin 1 gram or ampicillin 2 grams intramuscularly (IM) or intravenously 1 hour prior to the dental procedure
Oral: Patients who are allergic to penicillin	Clindamycin	600 mg orally (po) 1 hours prior to the dental procedure
Parenteral: Patients who are allergic to penicillin but cannot	Clindamycin	600 mg intravenously (IV) 1 hour prior to the dental procedure



## Miscellaneous Indications

Antibiotic prophylaxis in endodontics  
according to  
the European Society of  
Endontology position statement:  
the use of antibiotics in endodontics

Patient Group	Indications
Immunocompromised patients (Uncontrolled diabetes; dialysis; Leukaemia; end-stage renal disease; HIV/AIDS; patients on chemotherapy, steroids or immunosuppressives following transplant medications; or with inherited genetic defects)	Patients undergoing nonsurgical root canal treatment and, especially, endodontic surgery. The clinician should consider: <ul style="list-style-type: none"><li>• The state of the infection</li><li>• Complications related to the infection</li><li>• Reaction to drugs.</li></ul> If the operator is in doubt, discussion with the physician should be sought prior to treatment.
Patients who are liable to develop infective endocarditis including patients with congenital heart defects, a prosthetic valve or a history of infective endocarditis	Nonsurgical and surgical root canal treatment
Joint replacement	Nonsurgical and surgical root canal treatment During the first 3 months after joint operations
Patients receiving high-dose irradiation Patients on intravenous bisphosphonate treatment	Nonsurgical and surgical root canal treatment  Surgical root canal treatment



*Thanks!*

*Any questions?*

