

# Guideline on Use of Antibiotic Therapy for Pediatric Dental Patients

## Originating Council

Council on Clinical Affairs

## Review Council

Council on Clinical Affairs

## Adopted

2001

## Revised

2005, 2009, 2014

## Purpose

The American Academy of Pediatric Dentistry (AAPD) recognizes the increasing prevalence of antibiotic-resistant microorganisms. This guideline is intended to provide guidance in the proper and judicious use of antibiotic therapy in the treatment of oral conditions.<sup>1</sup>

## Methods

This guideline is an update of the previous document adopted in 2001 and last revised in 2009. The revision was based upon a new systematic literature search of the PubMed® electronic database using the following parameters: Terms: antibiotic therapy, antibacterial agents, antimicrobial agents, dental trauma, oral wound management, orofacial infections, periodontal disease, viral disease, and oral contraception; Fields: all; Limits: within the last 10 years, humans, English, clinical trials, birth through age 18. One hundred sixty-five articles matched these criteria. Papers for review were chosen from this search and from hand searching. When data did not appear sufficient or were inconclusive, recommendations were based upon expert and/or consensus opinion by experienced researchers and clinicians.

## Background

Antibiotics are beneficial in patient care when prescribed and administered correctly for bacterial infections. However, the widespread use of antibiotics has permitted common bacteria to develop resistance to drugs that once controlled them.<sup>1-3</sup> Drug resistance is prevalent throughout the world.<sup>3</sup> Some microorganisms may develop resistance to a single antimicrobial agent, while others develop multidrug-resistant strains.<sup>2,3</sup> To diminish the rate at which resistance is increasing, health care providers must be prudent in the use of antibiotics.<sup>1</sup>

## Recommendations

Conservative use of antibiotics is indicated to minimize the risk of developing resistance to current antibiotic regimens.<sup>2,3</sup> Practitioners should adhere to the following general principles when prescribing antibiotics for the pediatric population.

### Oral wound management

Factors related to host risk (eg, age, systemic illness, malnutrition) and type of wound (eg, laceration, puncture) must be evaluated when determining the risk for infection and subsequent need for antibiotics. Wounds can be classified as clean, potentially contaminated, or contaminated/dirty. Facial lacerations may require topical antibiotic agents.<sup>4</sup> Intraoral lacerations that appear to have been contaminated by extrinsic bacteria, open fractures, and joint injury have an increased risk of infection and should be covered with antibiotics.<sup>4</sup> If it is determined that antibiotics would be beneficial to the healing process, the timing of the administration of antibiotics is critical to supplement the natural host resistance in bacterial killing. The drug should be administered as soon as possible for the best result. The most effective route of drug administration (intravenous vs. intramuscular vs. oral) must be considered. The clinical effectiveness of the drug must be monitored. The minimal duration of drug therapy should be five days beyond the point of substantial improvement or resolution of signs and symptoms; this is usually a five- to seven-day course of treatment dependent upon the specific drug selected.<sup>5-7</sup> In light of the growing problem of drug resistance, the clinician should consider altering or discontinuing antibiotics following determination of either ineffectiveness or cure prior to completion of a full course of therapy.<sup>8</sup> If the infection is not responsive to the initial drug selection, a culture and susceptibility testing of isolates from the infective site may be indicated.

## Special conditions

### *Pulpitis/apical periodontitis/draining sinus tract/localized intra-oral swelling*

Bacteria can gain access to the pulpal tissue through caries, exposed pulp or dentinal tubules, cracks into the dentin, and defective restorations. If a child presents with acute symptoms of pulpitis, treatment (ie, pulpotomy, pulpectomy, or extraction) should be rendered. Antibiotic therapy usually is not indicated if the dental infection is contained within the pulpal tissue or the immediate surrounding tissue. In this case, the child will have no systemic signs of an infection (ie, no fever and no facial swelling).<sup>9,10</sup>

Consideration for use of antibiotics should be given in cases of advanced non-odontogenic bacterial infections such as staphylococcal mucositis, tuberculosis, gonococcal stomatitis, and oral syphilis. If suspected, it is best to refer patients for culture, biopsy, or other laboratory tests for documentation and definitive treatment.

### *Acute facial swelling of dental origin*

A child presenting with a facial swelling or facial cellulitis secondary to an odontogenic infection should receive prompt dental attention. In most situations, immediate surgical intervention is appropriate and contributes to a more rapid cure.<sup>12</sup> The clinician should consider age, the ability to obtain adequate anesthesia (local vs. general), the severity of the infection, the medical status, and any social issues of the child.<sup>11,12</sup> Signs of systemic involvement (ie, fever, asymmetry, facial swelling) warrant emergency treatment. Intravenous antibiotic therapy and/or referral for medical management may be indicated.<sup>9-11</sup> Penicillin remains the empirical choice for odontogenic infections; however, consideration of additional adjunctive antimicrobial therapy (ie, metronidazole) can be given where there is anaerobic bacterial involvement.<sup>8</sup>

### *Dental trauma*

Systemic antibiotics have been recommended as adjunctive therapy for avulsed permanent incisors with an open or closed apex.<sup>14-17</sup> Tetracycline (doxycycline twice daily for seven days) is the drug of choice, but consideration of the child's age must be exercised in the systemic use of tetracycline due to the risk of discoloration in the developing permanent dentition.<sup>13,14</sup> Penicillin V or amoxicillin can be given as an alternative.<sup>14,15,17</sup> The use of topical antibiotics to induce pulpal revascularization in immature non-vital traumatized teeth has shown some potential.<sup>14,15,17,18</sup> However, further randomized clinical trials are needed.<sup>19-21</sup> For luxation injuries in the primary dentition, antibiotics generally are not indicated.<sup>22,23</sup> Antibiotics can be warranted in cases of concomitant soft tissue injuries (see **Oral wound management**) and when dictated by the patient's medical status.

### *Pediatric periodontal diseases*

Dental plaque-induced gingivitis does not require antibiotic therapy. Pediatric patients with aggressive periodontal diseases may require adjunctive antimicrobial therapy in conjunction with localized treatment.<sup>24</sup> In pediatric periodontal diseases associated with systemic disease (eg, severe congenital neutropenia, Papillon-Lefèvre syndrome, leukocyte adhesion deficiency), the immune system is unable to control the growth of periodontal pathogens and, in some cases, treatment may involve antibiotic therapy.<sup>24,25</sup> The use of systemic antibiotics has been recommended as adjunctive treatment to mechanical debridement in patients with aggressive periodontal disease.<sup>24,25</sup> In severe and refractory cases, extraction is indicated.<sup>24,25</sup> Culture and susceptibility testing of isolates from the involved sites are helpful in guiding the drug selection.<sup>24,25</sup>

### *Viral diseases*

Conditions of viral origin such as acute primary herpetic gingivostomatitis should not be treated with antibiotic therapy unless there is strong evidence to indicate that a secondary bacterial infection exists.<sup>26</sup>

### *Salivary gland infections*

Many salivary gland infections, following confirmation of bacterial etiology, will respond favorably to antibiotic therapy. Acute bacterial parotitis has two forms: hospital acquired and community acquired.<sup>27</sup> Both can be treated with antibiotics. Hospital acquired usually requires intravenous antibiotics; oral antibiotics are appropriate for community acquired. Chronic recurrent juvenile parotitis generally occurs prior to puberty. Antibiotic therapy is recommended and has been successful.<sup>27</sup> For both acute bacterial submandibular sialadenitis and chronic recurrent submandibular sialadenitis, antibiotic therapy is included as part of the treatment.<sup>27</sup>

### *Oral contraceptive use*

Whenever an antibiotic is prescribed to a female patient taking oral contraceptives to prevent pregnancy, the patient must be advised to use additional techniques of birth control during antibiotic therapy and for at least one week beyond the last dose, as the antibiotic may render the oral contraceptive ineffective.<sup>28,29</sup> Rifampicin has been documented to decrease the effectiveness of oral contraceptives.<sup>28,29</sup> Other antibiotics, particularly tetracycline and penicillin derivatives, have been shown to cause significant decrease in the plasma concentrations of ethinyl estradiol, causing ovulation in some individuals taking oral contraceptives.<sup>28,29</sup> Caution is advised with the concomitant use of antibiotics and oral contraceptives.<sup>28,29</sup>

## References

1. Wilson W, Taubert KA, Gevitz M, et al. Prevention of infective endocarditis: Guidelines from the American Heart Association—A Guideline From the American Heart Association Rheumatic Fever, Endocarditis and Kawasaki Disease Committee, Council on Cardiovascular Disease in the Young, and the Council on Clinical Cardiology, Council on Cardiovascular Surgery and Anesthesia Anesthesia, and the Quality of Care and Outcomes Research Interdisciplinary Working Group. *Circulation* 2007; 116(15):1736-54. E-published April 19, 2007. Erratum in: *Circulation* 2007;116(15):e376-e7.
2. CDC. Antibiotic/Antimicrobial Resistance. Available at: "http://www.cdc.gov/drugresistance/". Accessed August 5, 2014.
3. Costelloe C, Metcalfe C, Lovering A, et al. Effect of antibiotic prescribing in primary care on antimicrobial resistance in individual patients: Systematic review and meta-analysis. *BMJ* 2010;340:c2096.
4. Nakamura Y, Daya M. Use of appropriate antimicrobials in wound management. *Emerg Med Clin North Am* 2007;25(1):159-76.
5. Wickersham RM, Novak KK, Schweain SL, et al. Systemic anti-infectives. In: *Drug Facts and Comparisons*. St. Louis, Mo: 2004:1217-336.
6. Kuriyama T, Karasawa T, Nakagawa K, Saiki Y, Yamamoto E, Nakamura S. Bacteriological features and antimicrobial susceptibility in isolates from orofacial odontogenic infections. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 2000;90(5):600-8.
7. Prieto-Prieto J, Calvo A. Microbiological basis of oral infections and sensitivity to antibiotics. *Med Oral Patol Oral Cir Bucal* 2004;9(suppl S):11-8.
8. Flynn T. What are the antibiotics of choice for odontogenic infections, and how long should the treatment course last? *Oral Maxillofac Surg Clin N Am* 2011;23(4):519-36.
9. Maestre Vera Jr. Treatment options in odontogenic infection. *Med Oral Patol Oral Cir Bucal* 2004;9(suppl S):19-31.
10. Keenan JV, Farman AG, Fedorowicz Z, Newton JT. A Cochrane system review finds no evidence to support the use of antibiotics for pain relief in irreversible pulpitis. *J Endod* 2006;32(2):87-92.
11. Thikkurissy S, Rawlins JT, Kumar A, Evans E, Casamasimo PS. Rapid treatment reduces hospitalization for pediatric patients with odontogenic-based cellulitis. *Am J Emerg Med* 2010;28(6):668-672.
12. Johri A, Picuch JF. Should teeth be extracted immediately in the presence of acute infection? *Oral Maxillofac Surg Clin North Am* 2011;23(4):507-11.
13. Rega AJ, Aziz SR, Ziccardi VB. Microbiology and Antibiotic Sensitivities of Head and Neck Space Infections of Odontogenic Origin. *J Oral Maxillofac Surg* 2006;64(9):1377-1380.
14. Andreasen JO, Andreasen FM. Avulsions. In: *Textbook and Color Atlas of Traumatic Injuries to the Teeth*, 4th ed. Copenhagen, Denmark: Blackwell Munksgaard; 2007: 461, 478-88.
15. Dentaltraumaguide.org. The Dental Trauma Guide 2010. Permanent Avulsion Treatment. Available at "http://www.dentaltraumaguide.org/Permanent\_Avulsion\_Treatment.aspx". Accessed October 1, 2013.
16. DiAngelis AJ, Andreasen JO, Ebelseder KA, et al. International Association of Dental Traumatology Guidelines for the management of traumatic dental injuries: 1 – Fractures and luxations of permanent teeth. *Dent Traumatol* 2012;28:2-12.
17. Andersson L, Andreasen JO, Day P, et al. International Association of Dental Traumatology Guidelines for the management of traumatic dental injuries: 2 – Avulsion of permanent teeth. *Dent Traumatol* 2012;28:88-96.
18. McIntyre JD, Lee JY, Tropte M, Vann WF Jr. Management of avulsed permanent incisors: A comprehensive update. *Pediatr Dent* 2007;29(1):56-63.
19. Hargreaves KM, Diogenes A, Teixeira FB. Treatment options: Biological basis of regenerative endodontic procedures. *Pediatr Dent* 2013;35(2):129-40.
20. Thibodeau B, Teixeira F, Yamauchi M, Caplan DJ, Trope M. Pulp revascularization of immature dog teeth with apical periodontitis. *J Endod* 2007;36(6):680-9.
21. Shabahang S. Treatment options: Apexogenesis and apexification. *Pediatr Dent* 2013;35(2):125-8.
22. Malmgren B, Andreasen JO, Flores MT, et al. International Association of Dental Traumatology Guidelines for the management of traumatic dental injuries: III. Injuries in the primary dentition. *Dental Traumatology* 2012; 28:174-82.
23. Dentaltraumaguide.org. The Dental Trauma Guide: Primary Teeth, 2010. Available at "http://www.dentaltraumaguide.org/Primary\_teeth.aspx." Accessed October 1, 2013.
24. American Academy of Periodontology Research, Science and Therapy Committee. Periodontal diseases of children and adolescents. *J Periodontol* 2003;74:1696-704.
25. Schmidt JC, Wlatter C, Rischewski JR, Weiger R. Treatment of periodontitis as a manifestation of neutropenia with or without systemic antibiotics: A systematic review. *Pediatr Dent* 2013;35(2):E54-E63.
26. American Academy of Pediatrics. Herpes simplex. In: *Red Book: 2003 Report of the Committee on Infectious Diseases*. 26th ed. Elk Grove Village, Ill: American Academy of Pediatrics; 2003:344-53.
27. Carlson ER. Diagnosis and management of salivary gland infections. *Oral Maxillofac Surg Clin N Am* 2009;21(3):293-312.
28. DeRossi SS, Hersh EV. Antibiotics and oral contraceptives. *Pediatr Clin North Am* 2002;46(4):653-64.
29. Becker DE. Adverse drug interactions. *Anesth Prog* 2011; 58(1):31-41.