

Antibiotics in dental practice



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Antibiotics in dental practice are used for treatment of local dental infections and for prophylaxis against distant infections. This article will discuss about various uses of antibiotics in dental practice.

Treatment of Local Dental Infections

Various dental infections need antibiotics. These include caries tooth, mandibular infections, gingivitis, etc. Serotypes of *Streptococcus mutans* (*crictus*, *rattus*, *ferus*, *sobrinus*) are primarily responsible for causing oral disease (Peng, 2007). Other pathogens include anaerobes like *peptostreptococci*, *bacteroides* and *prevotella* organisms, and *Fusobacterium nucleatum* and aerobes, mostly alpha-hemolytic streptococci (Peng, 2007). Hence most of the antibiotics used in dental infections are mainly aimed against these organisms.

The antibiotics that are used in treating dental infections can be classified into:

1. **Narrow spectrum antibiotics:** These are specific for the pathogen. They have fewer disturbances of non-pathogenic bacteria and fewer side effects. They have rapid response for sensitive organisms. Examples of narrow-spectrum antibiotics are Penicillin VK, Penicillin G, metrogyl and erythromycin. Penicillin VK acts by inhibiting biosynthesis of cell wall mucopeptide. It is effective during active replication. It is important to give adequate dosing of the drug, because low doses cause only bacteriostatic effects. The adult dose of the drug is 250 to 500 mg orally every 6 hours.

It is contraindicated in hypersensitivity. It is used in caution in renal impairment. Its efficacy is enhanced by probenecid, which increases

effectiveness by decreasing clearance. It should not be administered concurrently with tetracyclines, because the combination can be only bacteriostatic (Peng, 2007). Erythromycin is the drug of choice in those who are allergic to penicillin. It acts by inhibiting RNA-dependent protein synthesis by stimulating dissociation of peptidyl tRNA from ribosomes. The dose is 250 to 500 mg orally every 6 hours.

It is contraindicated in hypersensitivity and hepatic impairment. It can cause adverse effects like nausea, vomiting, malaise, abdominal colic, or fever. Metrogyl is active against various anaerobic bacteria and protozoa. It is given 400 mg oral 4-6 times a day or 500 mg IV 4 times a day. Its dose must be adjusted in liver disease (Peng, 2007).

2. Broad spectrum antibiotics: These affect both gram negative and gram positive bacteria and hence are useful in mixed infections. They give up some effectiveness for gram positive to gain effectiveness for gram negative. Examples of broad spectrum antibiotics are augmentin, unasyn, timentin and clindamycin. Augmentin is nothing but a combination of amoxicillin and clavulanic acid.

The combination extends the antibiotic spectrum of this penicillin to include bacteria normally resistant to beta-lactam antibiotics. It is given 125 to 500 mg every 8 hours. It is given minimum of 10 days to eliminate organism and prevent sequelae. Unasyn is a combination of ampicillin and sulbactam. The combination utilizes a gives better anaerobic coverage. It is contraindicated in hypersensitivity. Timentin is a combination of ticarcillin and clavulanate. It is recommended in deep space infections. It inhibits biosynthesis of cell wall mucopeptide and is effective during stages of active growth.

It provides coverage against gram-positive, gram-negative, and anaerobic organisms. It is contraindicated in hypersensitivity and severe systemic or organ bacterial infection like pneumonia, meningitis, etc. Liver function abnormalities by measuring AST and ALT levels must be monitored during therapy. Clindamycin is a lincosamide useful in treating infections due to staphylococcus. It is effective against aerobic and anaerobic streptococci also, except enterococci. It acts by inhibiting bacterial protein synthesis. The dose is 600 to 900 mg IV divided and given every 6 to 8 hours. It is contraindicated in hypersensitivity and severe liver disease (Peng, 2007).

Antibiotic Prophylaxis in Dental Practice

In dental practice, antibiotic prophylaxis is empirically used for dental procedures, especially those that cause bleeding in the mouth. This practice is driven by the fact that focal infection or subclinical infectious foci in the oral region may result in systematic or distant loci infections following procedures. Infact, there have been many studies attributing infective endocarditis to dental surgical procedures.

Proponents of 'focus infection' theory argue that infective endocarditis "arises from the colonization of a preexisting lesion, usually composed of fibrin and platelets, which develops from the disruption of the endothelial lining via abnormal development, disease or presence of foreign bodies and turbulent blood flow" (Tong & Rothwell, 2000). The American Heart Association (2007) has recommended against the use of routine antibiotic prophylaxis for infectious endocarditis.

This is because the risk of such drugs can outweigh the potential benefits, which are small in the general population. Currently, antibiotic prophylaxis <https://assignbuster.com/antibiotics-in-dental-practice/>

during dental procedures is recommended if the patient has one of the following conditions (Wilson et al, 2007):

1. Prosthetic cardiac valve
2. Previous infective endocarditis
3. Congenital heart disease (CHD)
4. Unrepaired cyanotic CHD, including palliative shunts and conduits
5. Completely repaired congenital heart defect with prosthetic material or device, whether placed by surgery or by catheter intervention, during the first 6 months after the procedure
6. Repaired CHD with residual defects at the site or adjacent to the site of a prosthetic patch or prosthetic device (which inhibit endothelialization)
7. Cardiac transplantation recipients who develop cardiac valvulopathy

Adherence to prophylaxis in these conditions reduces the risk of bacterial endocarditis to 3-6% (Wilson et al, 2007). The antibiotic prophylaxis recommendations for dental procedures are (Wilson et al, 2007):

1. Adults:

a) 30 minutes before procedure- ampicillin 2 g IV plus gentamycin 1.5 mg/kg (not to exceed 120 mg).

6 hours after procedure- ampicillin 1 g IV

b) amoxicillin 1 g PO 1 hour before procedure

If allergic to penicillin, vancomycin 1 g IV over 1-2 hours plus gentamycin 1.5 mg/kg (not to exceed 120 mg) must be given. The infusion must be completed within 30 minutes before the procedure.

2. Pediatric patients: amoxicillin 50 mg/kg PO 1 hour before procedure.

Role of Local Antibiotics in Dental Practice

Antibiotics are also useful locally in dental procedures. This is known as antibiotic therapy and the drugs are directly placed into the affected parts of the mouth. Both antiseptics and antibiotics are used for this therapy. These drugs either kill or inhibit the growth of bacteria that cause periodontal (gum) disease. Local antibiotics are also given in necrotizing ulcerative gingivitis and severe or resistant forms of periodontitis (Colgate, 2008). Antibiotics are usually given to supplement the beneficial effects of scaling and root planning. The drugs are delivered in the form of gel, chip or powder. The most commonly used antibiotics are doxycycline and minocycline. The most commonly used antiseptic is chlorhexidine. Local antibiotics are also used in periimplantitis. Esposito et al (2007) did a meta analysis on the most effective treatments to arrest periimplantitis. In one of their studies they found that " the use of locally applied antibiotics in addition to the deep manual cleaning of the diseased implants decreased the depth of the pockets around the implants of an additional 0.6mm in patients affected by severe forms of periimplantitis"

Conclusion

Antibiotics are commonly used in dental practice either to treat local infections or as prophylaxis to more serious infections elsewhere in the body

which can arise due to escape of foci of bacteria in the mouth during procedures. Currently it is recommended to use prophylaxis only in those at risk of metastatic infections. Antibiotics are given either orally, intravenous or locally. Both broad spectrum and narrow spectrum antibiotics are useful in dentistry.