

A Review of Antibiotics in Dentistry and Oral Maxillofacial Surgery

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Abstract

The exceeding number of prescribed antibiotics by dentists and oral surgeons with little or no evidence supporting its use in many dental applications, although the dangers of the misuse of antibiotics, in particular, the emergence of resistance, have been known for decades, increased public awareness to the consequences of misuse of antibiotics is still necessary. This review answers some of the important questions regarding the types, uses, side effects and recommendations concerning the use of antibiotics in dental practice.

Keywords: *Antibiotics; Dentistry; Oral Surgeons*

The number of prescriptions for antibiotics written by general dentists exceeds 2 per day and by oral surgeons, 10 per day, according to a 1992 report in Medical Advertising News.

The little or no evidence supporting antibiotics use in many dental applications, and the presence of some data from clinical trials contraindicating their use, makes the decision to prescribe empirical [1].

Although the dangers of the misuse of antibiotics, in particular, the emergence of resistance, have been known for decades, increased public awareness to the consequences of misuse of antibiotics is still necessary.

Antibiotics are prescribed for oral conditions related to many specialties, particularly oral surgery. The antibiotic prescribed most frequently is penicillin or an analog like amoxicillin especially. Most dentists are familiar with penicillin's low toxicity, dosages and relatively low cost [2].

One has to differentiate between prophylactic and empirical antibiotics

Antimicrobial prophylaxis is used to reduce the incidence of postoperative wound infections. Patients undergoing procedures associated with high infection rates, implantation of prosthetic material, and procedures where consequences of infection are serious should receive perioperative antibiotics [3,4].

The antibiotic should cover the most likely contaminating organisms and be present in the tissues when the initial incision is made. Maintaining the therapeutic concentrations throughout the procedure is required [5,6].

Treatment (Empirical) is indicated for procedures associated with obvious preexisting infection unlike prophylaxis. (i.e. necrotic tissue, pus, or abscess) [7].

Approximately 15% of nosocomial infections result from surgical site infections (SSI's) that are usually associated with prolonged hospital stays and increased costs. Infection develops when endogenous flora is translocated to a normally sterile site [8]. Seeding of infection in patients especially those with prosthesis or other implants can develop to the operative site from a distant site of infection.

Factors such as host defenses, perioperative care, bacterial inoculum and virulence, and intraoperative management can influence the development of SSI's.

Unfortunately, an increasing number of resistant pathogens such as methicillin-resistant *Staphylococcus aureus* (MRSA) and *Candida* species, are commonly implicated in surgical wound infections [9].

In order for us to have a great understanding of why antibiotics should be treated with caution, we'll need to answer few questions first.

The first question is

What are antibiotics and what are their uses?

Antibiotics, also known as anti-bacterials, are types of medications that destroy or slow down the growth of bacteria used to treat infections caused by bacteria.

Bacteria are classified as prokaryotes (single-celled microscopic organisms with simple internal structure), that have a complex relationship to humans, where some can be helpful, others may cause illness.

Where do I get bacteria from?

Bacteria are present normally in our mouths, and can enter our bloodstream (bacteremia) during a number of dental treatments and even daily routines, such as brushing or flossing.

Is bacteremia dangerous for me?

In most cases, it isn't a problem. Any harm that can be caused by bacteria, can be prevented in a healthy individual with a healthy immune system. However, in some individuals there is a concern, however, that bacteremia can cause an infection elsewhere in the body.

Who are the individuals at risk?

Antibiotic prophylaxis for a small number of people who have specific heart conditions is recommended. In 2008, the American Heart Association released guidelines identifying people who might need antibiotic prophylaxis prior to dental care (High Risk). According to these guidelines, antibiotic prophylaxis should be considered for people with:

- Artificial heart valves
- A history of an infection of the lining of the heart or heart valves known as infective endocarditis
- A heart transplant in which a problem develops with one of the valves inside the heart
- Heart conditions that are present from birth, such as:

- Unrepaired cyanotic congenital heart disease, including people with palliative shunts and conduit
- Defects repaired with a prosthetic material or device, whether placed by surgery or catheter intervention, during the first six months after repair
- Cases in which a heart defect has been repaired, but a residual defect remains at the site or adjacent to the site of the prosthetic patch or prosthetic device used for the repair [10].

Antibiotic prophylaxis guidelines also have been developed for people who have orthopedic implants, like artificial joints. In the past, antibiotics were recommended for use within the first two years of an artificial joint placement and for select patients with orthopedic implants after that time. In 2012, however, these recommendations were updated by the American Dental Association and the American Association of Orthopedic Surgeons [11-13].

The new guidelines do not recommend prescribing antibiotics routinely for people with artificial joints. As a result, healthcare providers should rely more on case-by-case [14].

For example, antibiotic prophylaxis might be useful for any of these patients who also have compromised immune systems (due to, for instance, diabetes, rheumatoid arthritis, cancer, chemotherapy, and chronic steroid use), which might increase the risk of orthopedic implant infection [15,16].

Patients with heart condition or an orthopedic implant, should talk to their physician or dentist about whether antibiotic prophylaxis before dental treatment is indicated for them [17].

Why antibiotic guidelines change?

To make sure that the guidelines are based on the best scientific evidence, they are re-evaluated every few years. These reviews have uncovered no scientific evidence that taking antibiotics before dental treatment prevents infections of the heart or orthopedic implants. Therefore, for most people, the known risks of taking antibiotics may outweigh the uncertain benefits.

What are the possible risks that can accompany the use of antibiotics?

There are many possible risks that are related to antibiotic use, such as, upset stomach, allergic reactions, including anaphylactic shock (a severe allergic reaction that can be life threatening). If antibiotics are used too often for things they can't treat, like simple tooth pain, small uncomplicated dental procedures, colds, flu or other viral infections, not only are they of no benefit, they become less effective against the bacteria they are intended to treat [18].

Do I have to finish the whole course of antibiotic as prescribed, or can I stop sooner? Problems can develop if antibiotics are not taken exactly as prescribed. For example, not taking the full course of antibiotics, and taking it for only a few days instead, the antibiotic may wipe out some, but not all, of the bacteria. The surviving bacteria become more resistant to antibiotic therapy and can spread to other people. When bacteria become resistant to first line treatments, the risk of complications and death is increased [19].

The failure of first line antibiotics also means that doctors have to resort to less conventional medications, many of which are costlier and associated with more serious side effects. Other consequences are the increased costs associated with prolonged illnesses, including expenses for additional tests, treatments and hospitalization.

What can I do to safeguard my antibiotic effectiveness?

Improper and repeated use of antibiotics is the primary cause of the increase in the number of drug-resistant bacteria [20].

Here's what you can do to prevent that from happening

Don't expect to take antibiotics every time you're sick

Antibiotics are effective in treating most bacterial infections, but they're not useful against simple tooth ache, temporomandibular joint pain, viral infections, such as herpes, or mouth ulcers.

Don't pressure your doctor for antibiotics

Instead of pressuring your doctor to prescribe you antibiotics, talk to him about ways to relieve your symptoms, such as warm compresses, warm water and salt rinses, diet modification, and the use of topical and systemic analgesics.

Don't take antibiotics without a prescription

Taking antibiotics without doctors' prescription is never a good idea. For one thing, the antibiotic might not be appropriate for your illness. And even if it is, you're not likely to take the appropriate dosage, which can lead to more resistant bacteria [21].

Take your antibiotics exactly as prescribed

Follow your doctor's instructions when taking medication. Don't stop treatment early because you're feeling better. Taking the full course of antibiotics is indicated to kill all of the harmful bacteria. On the other hand, a shortened course of antibiotics, often wipes out only the most vulnerable bacteria while allowing relatively resistant bacteria to survive [22].

Prevent spreading of germs. Good hygiene plays an important role in preventing infection. Brushing your teeth twice a day and cleaning between them once a day, flossing, and using mouth wash, all can help in the killing of germs.

Get regular checkups

Visiting your dentist regularly is a key to keeping your mouth healthy, also to detect and treat any problem before it becomes more serious.

Summary

Dentists want to make their patients well and to prevent unpleasant complications. These desires, together with the belief that many oral problems are infectious, triggers the prescribing of antibiotics.

Antibiotics should not be prescribed to all patients, and it's not the answer to all problems, but in certain circumstances your dentist will prescribe you a dose of antibiotics to be taken before your surgical procedure "prophylactic" to help protect you from developing infections, or in procedures associated with obvious preexisting infection.

Protect yourself and others

Antibiotic resistance is a worldwide health problem. Almost all significant bacterial infections are becoming resistant to commonly used antibiotics. Antibiotics misuse, help create resistant microorganisms that can cause new and hard to treat infections. That's why

deciding to use antibiotics, unlike almost any other medicine you take, have far reaching consequences. Protecting your health and that of your family, friends, neighbors and community by using antibiotics responsibly.

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