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ANTIBIOTICS PROPHYLAXIS A BOON TO DENTISTRY: BRIEF REVIEW

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ABSTRACT
Antibiotic prophylaxis refers to the prevention of infection complications using antimicrobial therapy (most commonly antibiotics).Antibiotics are frequently used in dental practice. Patients should be selected for prophylaxis if the medical condition or the surgical procedure is associated with a considerable risk of infection Clinical and bacteriological epidemiological factors determine the indications of antibiotics in dentistry. Antibiotics are used in addition to appropriate treatment to aid the host defences in the elimination of remaining bacteria. It is indicated when there is evidence of clinical sign involvement and spread of infection. Antibiotics are prescribed in dental practice for treating odontogenic infections, non-odontogenic infections, as prophylaxis against focal and local infection. Special care needs to be addressed to patients with organ transplants, poorly controlled diabetes and pregnancy. Antibiotics should be used only as an adjunct to dental treatment and never alone as the first line of care. The present paper reviews antibiotics prophylaxis in dental practice.

KEYWORDS: Antibiotics, Dentistry, Prophylaxis, Therapy

INTRODUCTION
Antimicrobials are the most commonly used of all drugs. The inevitable consequence of the widespread use of antibiotics has been the emergence of antibiotic resistant pathogens, fueling the ever increasing need for new drugs and contributing to the rising cost of medical care. If the gains in the treatment of infectious disease are to be preserved then, physician must be wiser and more selective in use of antimicrobial agents.[1] Antibiotic interventions are frequently needed for the vast array of head, neck and oral diseases encountered in oral medicine the categories for the antimicrobial interventions are therapeutic uses (in Dentoalveolar infections ,in endodontic emergencies ,in implants ,in periodontal surgeries and many)prophylactic uses (endocarditis, joint replacements ,in-dwelling catheters, neurosurgical shunts and other implant, dental procedures and antibiotic prophylaxis**,** prevention of local infection in surgical or operative sites in the mouth), antibiotics in special cases.[2]

Inappropriate use of antibiotics by clinicians leads to development of antibiotic resistance. For the most part, antibiotics are prescribed in dental practice for prophylactic and therapeutic reasons. Prophylactic antibiotics are prescribed to prevent diseases caused by members of the oral flora introduced to distant sites in a host at risk or introduced to a local compromised site in a host at risk. In most cases, prophylaxis is used for prevention of endocarditis. Therapeutic antibiotics are prescribed, in most cases, to treat diseases of hard and soft tissues in the oral cavity after local debridement has failed. Antibiotics used for prophylaxis must:(1) be active against the major pathogens; and (2) achieve a tissue loading dose before the bacteria are introduced. Antibiotics used for therapy are required in cases where the infection is already present and thus the agent must reach the site of infection at a high enough level for a long enough time to produce the desired effect. For an exogenous agent the goal is to eliminate the agent from the site of infection. In the case of an endogenous agent the antibiotic must suppress the organism at the site of infection. Recent evidence underscores the important role of antibiotics in the treatment and prevention of diseases initiated in the oral cavity that have the potential to spread to distant organs in the body.

CLINICIAL SITUATIONS CONSIDERED FOR ANTIBIOTIC PROPHYLAXIS
Dental procedures and Antibiotic prophylaxis
Dental procedures which may produce significant bacteremias include all procedures where significant oral bleeding and/or exposure to potentially contaminated tissue is anticipated.[3]

Antibiotic Prophylaxis In Cardiac Conditions
Prophylaxis in immunocompromised patient
Patients with a variety of immunocompromising conditions should receive antibiotic prophylaxis ,such patients would include, those with a suppressed leukocyte count (such as cancer chemotherapy, AIDS, blood dyscrasias, transplant recipients) where the white blood cell count (WBC) is less than 3500 cells/mm3or the absolute neutrophil count (ANC) is less than 500 cells/mm3.

Consideration for antibiotic prophylaxis should be given for other patients with an impaired immune system or those with delayed healing, such as those with, but not limited to, previous radiation therapy where planned extractions or other bony surgery is in the radiation field, uncontrolled diabetes, systemic lupus erythematosus and infection drug users.

Patients with prosthetic joints
American Academy of Orthopaedic Surgeons and the American Dental Association have recommended the use of prophylactic antibiotics only for patients with total joint replacement (not for patients with only pins, screws, and/or plates), compromised immune system, Type I diabetes mellitus, recent (within two years) joint replacement, previous prosthetic joint infection, malnourishment or hemophilia. Consultation with the patient's orthopedic surgeon may be required.

In-dwelling catheters, neurosurgical shunts and other implants.
In-dwelling catheters generally do not warrant antibiotic prophylaxis unless the catheter is near the right side of the heart. In cardiac patients with newly placed stents, the initial two weeks after placement is the time of highest risk of infection of the stent. Once an epithelial layer develops, the risks of infection are minimal for patients in whom catheters are placed to facilitate the administration of systemic medications such as antiviral or chemotherapeutic agents for extended periods, the antibiotic prophylaxis is administered because of the suppressed immune system rather than the catheter itself.

Patients with renal disease who are undergoing hemodialysis constitute another group that warrants some form of antibiotic coverage for dental procedures because of the presence of an arteriovenous shunt for dialysis. These shunts may be made from native (autogenous) tissue or from a silastic tube that is implanted. Regardless of type, the shunts are particularly vulnerable to infection, which could be devastating for the patient receiving hemodialysis. Patients receiving continuous peritoneal dialysis, however, do not require antibiotic prophylaxis.

The patient with hydrocephaly poses a different problem because of the placement of shunts. Patients with hydrocephaly receive shunts to aid in the drainage of cerebrospinal fluid, or CSF. The VA shunt allows drainage of CSF from the lateral ventricles to the venous circulation, whereas VP shunts drain CSF directly into the abdominal cavity.

VP shunts are currently more common than VA shunts. The overall infection rate ranges from 5 to 30 percent, with a mortality rate of up to 40 percent. Shunt infections usually will present in the initial two-week postoperative period. The literature suggests that VP shunts carry no higher risk of infection after dental treatment than that before dental treatment, whereas VA shunts are more prone to infection. Therefore, patients with VA shunts should be considered for antibiotic prophylaxis.For other types of implants and devices, such as penile implants, implanted defibrillators and cardiac pacemakers, there is no evidence supporting the routine use of antibiotic coverage for dental procedures.

Prevention of local infection in surgical or operative sites in the mouth
Surgical procedures in the mouth generally fall into the clean-contaminated category of surgical classification (that is, native organisms are present); this includes routine exodontics, third-molar surgery and orthognathic surgery.[4]

Therapeutic uses of antibiotics in dentistry
Clinical Implications
Antibiotics are typically prescribed in dental practice for some of the following purposes: (a) as treatment for acute odontogenic infections; (b) as treatment for non-odontogenic infections; (c) as prophylaxis against focal infection in patients at risk (endocarditis and joint prostheses); and (d) as prophylaxis against local infection and systemic spread in oral surgery.[3]

PRINCIPLES OF ANTIBIOTIC THERAPY IN DENTAL INFECTIONS
The target: microorganism.
Bioavailability and drug interactions.
The basic mechanism of host defenses.

Antibiotic therapy in managing odontogenic infection of pulpal and periodontal origin
The objective of antibacterial treatment is to control (reduce or eliminate) the infective bacterial load. To achieve this, in the case of odontogenic infection, therapeutic action combines mechanical debridement, and/or surgery, and/or systemic antibiotic therapy, where appropriate.[5]

Epidemiology
Odontogenic infection is the most prevalent disease worldwide and it is the principal reason for seeking dental care. The commonest emergency odontogenic infections are periapical abscess (25%), pericoronitis (11%) and periodontal abscess (7%). Its significance in health problems is also reflected by the fact that 12% of antibiotics are prescribed for odontological reasons. [3]

Treatment of Odontogenic Infection

The relevance of antimicrobials in the management of odontogenic infection lies in their clinical utility when administered systemically. Systemic antibiotic therapy prevents the infection from spreading and it acts in places that mechanical treatment cannot reach. It therefore act more specifically on odonto pathogens than debridement does. It is indicated for therapeutic purposes in fast-progressing and recurrent periodontitis, and in all odontogenic infections with rapidly evolving signs and symptoms (24-48 hours), trismus, oedema, and/or systemic manifestations such as malaise, fever, tachypnoea, dyspnoea, cellulites, lymphadenopathy and hypotension. Shown in table-1.

TREATMENT OF NON-ODONTOGENIC INFECTIONS

Non-odontogenic infections include specific infections of the oral cavity (tuberculosis, syphilis, leprosy), and nonspecific infections of the mucosal membranes, muscles and fascias, salivary glands and bone. Bone infections are included here on the grounds that many of them may be of dental origin.

The treatment of specific infections caused by mycobacteria requires the use of antibiotics for long periods of time (from 6 months to 2 years), and includes the administration of dapsone (a sulfamide analog), clofazimine (a dye with bactericidal action) and rifampicin for leprosy, and associations of ethambutol, isoniazid, rifampicin, pyrazinamide and streptomycin for tuberculosis . The treatment of syphilis, caused by Treponema pallidum, is based on the use of penicillin G benzatine. Administration comprises 2.4 million IU in a single intramuscular dose in the primary period, three doses of 2.4 million IU via the intramuscular route, spaced one week apart, in the secondary period. In the tertiary period a first treatment is provided with intravenous penicillin G, followed by penicillin G benzamine via the intramuscular route once a week during 3 weeks, involving a dose of 2.4 million IU each.[5]

Treatment with antibiotics of some common non-odontogenic are like sinusitis with amoxicillin or clarithromycin or amoxicillin with clavunate is drug of choice .Pharyngitis and tonsillitis with oral penicillin V or erythromycin. Sailandinitis with Penicillinase resistant anti staphylococcal antibiotic.

PRECAUTIONS WITH ANTIBIOTIC USE (special cases)

Pregnancy

The legal and ethical impossibility of conducting clinical trials in humans to evaluate the risks of antibiotic treatment during pregnancy has given rise to uncertainties as to the use of such drugs in these patients. The United States Food and Drug Administration (FDA) has established four levels of drug risk during pregnancy: (A) without demonstrated risk; (B) without effects in animals, though with undemonstrated innocuousness in humans; (C) no studies conducted in either animals or humans, or teratogenic effects recorded in animals without due evaluation in humans; and (D) teratogenic effects upon the fetus – use of the drug being conditioned to the obtainment of benefit that outweighs the risks. A final group (X) in turn contemplates teratogenic effects that outweigh any possible benefit derived from the drug.

No antibiotic corresponds to group A. On the other hand, group B (i.e., warranting caution with treatment during pregnancy) contains the following antibiotics: azithromycin, cephalosporins, erythromycin, metronidazole and penicillins with or without beta-lactamase inhibitors. Group C in turn includes clarithromycin, the fluorquinolones and the sulfa drugs (including dapsone). Finally, group D contains the aminoglycosides and tetracyclines.

Kidney failure

Many antibiotics are actively eliminated through the kidneys. The presence of impaired renal function requires reduction of the drug dose in order to avoid excessively elevated plasma drug concentrations that could lead to toxicity. Dose adjustment can be carried out by reducing the amount administered in each dose or by increasing the interval between doses (without modifying the amount of drug). Neither approach has been shown to be superior.

Liver failure

Some antibiotics are metabolized in the liver, followed by elimination in bile. In patients with liver failure, the use of such antibiotics should be restricted in order to avoid toxicity secondary to overdose. Erythromycin, clindamycin, metronidazole and anti-tuberculosis drugs are antibiotics requiring dose adjustments when administered to patients with liver failure. Regardless of the above considerations, some antibiotics are potentially hepatotoxic. As a result, and whenever possible, they should be avoided in patients with some active liver disorder. Specifically, tetracyclines and anti-tuberculosis drugs should be avoided.[6]

Uses of antibiotics in children

Children are at greater risk than adults for medication errors because childhood is period of maturation. Pharmacokinetic and pharmacodyanamic components of drug response changes from birth onwards because of organ maturation, changes in body composition and enzymology. A series of differential characteristics should be explained in relation to antibiotic treatment in children.

Young children tend to lack medical antecedents suggesting the possibility of drug allergies or adverse reactions. The greater proportion of water in the tissues of children, and their increased bone sponginess, facilitate faster diffusion of infection. On the other hand,

such patients require adequate dose adjustment of the prescribed medication.

The deficient oral hygiene found in most children, and the consumption of sugar-rich foods, contribute to increase the presence of germs in the mouth – thereby increasing the risk of bacteremia following oral treatments.

In pediatric and in ear, nose and throat clinical practice, children from a very early age are known to develop infections that affect Waldeyer's lymphatic ring. This must be taken into consideration before prescribing antibiotics in children. In case of doubt, the dental professional should consult the pediatrician or specialist habitually in charge of the care of the child.[7]

WHY IS ANTIBIOTIC PROPHYLAXIS NOT USED FOR EVERY PATIENT?

Antibiotic prophylaxis is not right for everyone and—like any medicine—antibiotics should only be used when the potential benefits outweigh the risks of taking them.For example, consider that infections after dental treatment are not common and that, in some people, antibiotics can have side effects. Side effects associated with taking antibiotics include stomach upset, diarrhea, and allergic reactions, some of which can be life threatening.In addition, using antibiotics too often or incorrectly can allow bacteria to become resistant to those medications. Therefore, it is important to use antibiotic prophylaxis in only those people at greatest risk of developing an infection after dental treatment.

Dentistry and antibiotic resistance

Dentist prescribe between 7% to 11% of all common antibiotics and abuse can be substantial. To avoid developing resistance ,antibiotics should be used only for the management of active infectious disease or to prevent the potential systemic spread of infection in a patient known to be at risk. The guidelines for prophylaxis against bacterial endocarditis, as well as the recommendations for more limited antibiotic use in patients with total joint replacement, have recently been updated.

Orofacial infections must be treated with local drainage whenever possible. Antibiotics should be considered as adjuncts to treatment when there are signs of systemic involvement, such as extraoral, neck or intraoral airway swelling, or fever. Antimicrobials are not the primary treatment for dental infections, except in the case of primary spreading cellulitis. Antibiotics should be used very selectively in periodontal treatment, and ideally only in selected patients where a laboratory has identified the presence of specific target organisms.

The approach of using long durations of antibiotic therapy is now being challenged. It has been suggested that antibiotics should instead be used in sufficiently high doses for short durations. The principle of antibiotic dosing remain same as that by Paul Ehrlich in 1913 "Hit Hard And Hit Fast". Clinical judgment must be applied, but most acute odontogenic or periodontal infections will resolve in three to seven days. Prescribing beyond that duration should only be done selectively. When using antibiotics orally, loading doses should be considered to achieve therapeutic levels more rapidly. In the case of superficial infections, topical antiseptics (e.g. chlorhexidine) or antifungals should be considered instead of systemic antimicrobial agents.

The administration of any drug carries with it risks that must be considered against the potential benefits. Only if we determine that the benefits of a drug outweigh the risks involved for a particular patient should we proceed with its use.[8]

Complications of Antibiotic Therapy

Antibiotics differ from other powerful pharmacological agents in their limited therapeutic range of application; they rarely have any practical beneficial medical properties apart from their specific antimicrobial activity. The clinical use of antibiotics is always accompanied by the risk of complications, which range from minor discomfort to fatal reactions. Antibiotics probably have a greater propensity to cause hypersensitivity reactions than any other class of drugs.

Misuses of antibiotics

Treatment of Non responsive Infections.

A common misuse of these agents is in infections that have been proved by experimental and clinical observation to be nonresponsive to treatment with antimicrobial agents. Most of the diseases caused by viruses are self-limited and do not respond to any of the currently available anti-infective compounds. Thus, antimicrobial therapy of measles, mumps, and at least 90% of infections of the upper respiratory tract and many GI infections is ineffective and, therefore, useless.

Therapy of Fever of Unknown Origin. Fever of undetermined cause may persist for only a few days to a week or for a longer period. Both of these are treated frequently and inappropriately with empirical antimicrobial agents. Fever of short duration, in the absence of localizing signs, probably is associated with undefined viral infections. Antimicrobial therapy is unnecessary, and resolution of fever occurs spontaneously within a week or less. Fever persisting for 2 or more weeks, commonly referred to as fever of unknown origin, has a variety of causes, of which only about one-quarter are infections . Some of these infections (e.g., tuberculosis or disseminated fungal infections) may require treatment with antimicrobial agents that are not used commonly for bacterial infections. Others, such as occult abscesses, may require surgical drainage or prolonged courses of pathogen-specific therapy, as in the case of bacterial endocarditis.

Inappropriately administered antimicrobial therapy may mask an underlying infection, delay the diagnosis, and

by rendering cultures negative, prevent identification of the infectious pathogen. Noninfectious causes, including regional enteritis, lymphoma, renal cell carcinoma, hepatitis, collagen-vascular disorders, and drug fever, do not respond to antimicrobial agents at all. Rather than embarking on a course of empirical antimicrobial therapy for fever of unknown origin, the physician should search for its cause.

Improper Dosage.
Dosing errors, which can be the wrong frequency of administration or the use of either an excessive or a sub therapeutic dose, are common. Although antimicrobial drugs are among the safest and least toxic of drugs used in medical practice, excessive amounts can result in significant toxicities, including seizures (e.g., penicillin), vestibular damage (e.g., aminoglycosides), and renal failure (e.g., aminoglycosides), especially in patients with impaired drug excretion or metabolism. The use of too low a dose may result in treatment failure and is most likely to select for microbial resistance.

Inappropriate Reliance on Chemotherapy Alone.
Infections complicated by abscess formation, the presence of necrotic tissue, or the presence of a foreign body often cannot be cured by antimicrobial therapy alone. Drainage, debridement, and removal of the foreign body are at least as important as the choice of antimicrobial agent. For example, the patient with pneumonia and empyema often fails to be cured even with administration of large doses of an effective drug unless the infected pleural fluid is drained. The patient with S. aureus bacteremia owing to an intravascular device will continue to have fevers and positive blood cultures and is at risk of dying unless the device is removed. As a general rule, when an appreciable quantity of pus, necrotic tissue, or a foreign body is present, the most effective treatment is an antimicrobial agent given in adequate dose plus a properly performed surgicalprocedure.

Lack of Adequate Bacteriological Information.
Antimicrobial therapy administered to hospitalized patients too often is given in the absence of supporting microbiological data. Bacterial cultures and Gram stains of infected material are obtained too infrequently, and the results, when available, often are disregarded in the selection and application of drug therapy.[1]

Table 1. Antibiotics commonly used in application to odontogenic infections.

Drug substance	Administration route	Posology	Side effects
Amoxicillin	po*	500 mg/8 hours 1000 mg/12 hours	Diarrhea, nausea, hypersensitivity reactions
Amoxicillin-clavulanic acid	po or iv **	500-875 mg/8 hours* 2000 mg/12 hours* 1000-2000 mg/8 hours**	Diarrhea, nausea, candidiasis, hypersensitivity reactions
Clindamycin	po or iv	300 mg/8 hours* 600 mg/8 hours**	Pseudomembranous colitis
Azithromycin	po	500 mg/24 hours 3 consecutive days	Gastrointestinal disorders
Ciprofloxacin	po	500 mg/12 hours	Gastrointestinal disorders
Metronidazole	po	500-750 mg/8 hours	Seizures, anesthesia or paresthesia of the limbs, incompatible with alcohol ingestion
Gentamycin	im*** or iv	240 mg/24 hours	Ototoxicity Nephrotoxicity
Penicillin	im or iv	1.2-2.4 million IU/24 h*** Up to 24 million IU/24 hours**	Hypersensitivity reactions, gastric alterations

*po:oral route; **iv:intravenous route; *** im:intramuscular route.

Table 2. DENTAL PROCEDURES FOR WHICH ENDOCARDITIS PROPHYLAXIS IS REASONABLE FOR PATIENTS IN TABLE 1

All dental procedures that involve manipulation of gingival tissue or the periapical region of teeth or perforation of the oral mucosa**

* The following procedures and events do not need prophylaxis: routine anesthetic injections through non-infected tissue, taking dental radiographs, placement of removable prosthodontic or orthodontic appliances, adjustment of orthodontic appliances, placement of orthodontic brackets, shedding of deciduous teeth, and bleeding from trauma to the lips or oral mucosa.

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Table 3. REGIMENS FOR A DENTAL PROCEDURE

Regimen: Single Dose 30 to 60 min Before Procedure			
Situation	**Agent**	**Adults**	**Children**
Oral	Amoxicillin	2 g	50 mg/kg
Unable to take oral medication	Ampicillin OR Cefazolin or ceftriaxone	2 g IM or IV 1 g IM or IV	50 mg/kg IM or IV 50 mg/kg IM or IV
Allergic to penicillins or ampicillin—oral	Cephalexin*† OR Clindamycin OR Azithromycin or clarithromycin	2 g 600 mg 500 mg	50 mg/kg 20 mg/kg 15 mg/kg
Allergic to penicillin or ampicillin and unable to take oral medication	Cefazolin or ceftriaxone† OR Clindamycin	1 g IM or IV 600 mg IM or IV	50 mg/kg IM or IV 20 mg/kg IM or IV

IM indicates intramuscular; **IV**, intravenous.

* Or other first-or second-generation oral cephalosporin in equivalent adult or pediatric dosage.

† Cephalosporins should not be used in an individual with a history of anaphylaxis, angioedema, or urticaria with penicillins or ampicillin.

Table 2 Dental procedures for which antibiotic prophylaxis is recommended

American Heart Association[2]	British Society for Antimicrobial Chemotherapy[3]	British Cardiac Society[5]
Manipulation of gingival, periodontal and periapical tissues; incision of mucosa including: • surgery • periodontal procedures • endodontic instrumentation beyond the apex or apical surgery • subgingival placement of antibiotic fibres or strips • initial placement of orthodontic bands but not brackets • intraligamentary local anesthetic injections • prophylactic cleaning of teeth or implants where bleeding is anticipated Excluding: local anesthetic placement (unless through site of infection)	Dental procedures involving dento-gingival manipulation and endodontics. A risk assessment, which involves the patient, is important and factors like the oral hygiene status of the patient are important considerations for deciding on prophylaxis.	**Examination procedures** • periodontal probing **Investigation procedures** • sialography **Anesthetic procedures** • intraligamental local anesthesia **All surgical procedures** **Restorative procedures**[a] • rubber dam placement • matrix band and wedge placement • gingival retraction cord placement **Periodontal procedures** **Professional cleaning procedures** • polishing teeth with a rubber cup • oral irrigation with water jet • scaling, root planing • antibiotic fibres or strips placed subgingivally[b] **Endodontic procedures** • root canal instrumentation beyond the root apex **Avulsed tooth reimplantation**[c] **Orthodontic procedures** • tooth separation • exposure or exposure and bonding of tooth or teeth

[a]For multiple dental visits, alternating antibiotics are recommended, e.g., amoxicillin–clindamycin–amoxicillin. For young children the sequence would be amoxicillin–azithromycin–amoxicillin. If penicillin or penicillin-like antibiotics are used, at least 1 month must be allowed between visits. Dentists should provide as much treatment as is feasible each visit.

[b]No data, but procedure is similar to gingival retraction cord placement.

[c]The avulsed tooth can be quickly washed and reimplanted immediately by a parent or other responsible person and the antibiotic prophylaxis administered afterward, provided this is within 2 hours of the reimplantation. Antibiotic prophylaxis may be successful if administered shortly after the bacteremic episode.

Table 3 American Heart Association regimens for infective endocarditis prophylaxis[4]

Patient group	Antibiotic	Route	Dose		Timing before procedure
			Adults	Children	
Standard general prophylaxis for patients at risk	Amoxicillin	PO	2 g	50 mg/kg	1 hour
Unable to take oral medication	Ampicillin	IV or IM	2 g	50 mg/kg	Within 30 minutes
Allergic to penicillin/ amoxicillin/ampicillin	Clindamycin	PO	600 mg	20 mg/kg	1 hour
	Cephalexin or cephadroxil[a]	PO	2 g	50 mg/kg	1 hour
	Azithromycin or clarithromycin	PO	500 mg	15 mg/kg	1 hour
Allergic to penicillin/ amoxicillin/ampicillin and unable to take oral medications	Clindamycin	IV	600 mg	20 mg/kg	Within 30 minutes
	Cefazolin	IV	1 g	25 mg/kg	Within 30 minutes

Note: IV = intravenous; PO = oral.
[a]Cephalosporins should not be used with penicillin or ampicillin in those with a history of anaphylaxis, angioedema or urticaria.

Table 4 Recommendations for infective endocarditis prophylaxis regimen by the British Society for Antimicrobial Chemotherapy[3]

Patient group	Antibiotic	Route	Dose according to age of patient; years			Timing of dose before procedure
			> 10	5–10	< 5	
General	Amoxicillin	PO	3 g	1.5 g	750 mg	1 hour
Allergic to penicillin	Clindamycin	PO	600 mg	300 mg	150 mg	1 hour
Allergic to penicillin and unable to swallow capsules	Azithromycin	PO	500 mg	300 mg	200 mg	1 hour
IV regimen expedient	Amoxicillin	IV	1 g	500 mg	250 mg	Just before the procedure or at induction of anesthesia
IV regimen expedient and allergic to penicillin	Clindamycin	IV	300 mg[a]	150 mg[a]	75 mg[a]	Just before the procedure or at induction of anesthesia

Note: IV = intravenous; PO = oral.
[a]Given over at least 10 minutes before the dental procedure.
Preoperative mouth rinse may be used: chlorhexidine gluconate 0.2% (10 mL for 1 minute).

Procedure	**prevalence of bacteremia**
extractions (single)	51%
extractions (multiple)	68-100%
endodontics (intracanal instrumentation)	0-31%
endodontics (extracanal instrumentation)	0-54%
periodontal surgery(flap procedure)	36-88%
periodontal surgery(gingivectomy)	83%
scaling and root planning	8-80%
periodontal prophylaxis	0-40%
tooth brushing	0-26%
dental flossing	20-58%
interproximal cleaning with toothpicks	20-40%
irrigation devices	7-50%
chewing	17-51%

CARDIAC CONDITIONS CONSIDERED FOR PROPHYLAXIS.*

HIGH-RISK CATEGORY	MODERATE-RISK CATEGORY	NEGLIGIBLE RISK: NO ANTIBIOTIC PROPHYLAXIS RECOMMENDED
Prosthetic cardiac valves	Most other congenital cardiac malformations not otherwise indicated	Isolated secundum atrial septal defect
Previous bacterial endocarditis	Acquired valvular dysfunction	Surgical repair of atrial septal defect, ventricular septal defect or patent ductus arteriosus of more than six months' duration
Complex, cyanotic congenital heart disease	Hypertrophic cardiomyopathy	Previous coronary artery bypass graft surgery
Surgically constructed systemic pulmonary shunts	Mitral valve prolapse with regurgitation and/or thickened valve leaflets	Physiological or functional heart murmur
		Previous Kawasaki disease without valvular dysfunction
		Previous rheumatic fever without valvular dysfunction
		Cardiac pacemakers
		Implanted defibrillators

* Adapted with permission of the Journal of the American Medical Association from Dajani and colleagues.[10]

CONCLUSION

Antibiotic therapy is mandatory and essential in medicine and dentistry. Penicillin is the drug of choice in treating dental infections. Patients at high risk include those with infective endocarditis, immunocompromised conditions and dental procedures which may produce bacteremias. Invasive dental procedures if performed in such patients should be preceded with an antibiotic prophylaxis. Consultation with the physicians and specialists is required before any dental treatment is carried out in organ transplant and pregnant patients. Special caution needs to be addressed to the above patients to determine the best outcome of dental procedure and to provide the required dose adjustments and thereby preventing the complications in the dental clinic. And hence it is clear that apart from invasive dental procedures in high risk patients not all dental procedures require the need for antibiotic prophylaxis. Recommendations on antibiotic prescribing are essential to prevent overprescribing of antibiotic. The prescription of antibiotics should beconsidered adjunctive to the dental treatment.The usefulness of antibiotics in routine dentistry is limited & these agents are often misused or overused. Dentists Today are giving drugs on a far greater scale than their medical colleagues. Moreover many dental patients are also taking drugs over the counter.Infections in and around the teeth usually respond far more quickly & reliably to surgical measures. Antibiotics will not disperse pus once it has formed although it may limit further spread of infection. Surgical methods are quick, effective & avoid Side effect that an antibiotic might cause.It is therefore essential that Dental Students acquire a sound knowledge regarding the Basic of antimicrobials, which drug to be used in which condition and the proper Knowledge of the drug being used.

SUMMARY

Administration of any drug carries with it risks that must be considered against the potential benefits. Only if we determine that the benefits of a drug outweigh the risks involved for a particular patient should we proceed with its use. We should reconsider routine or automatic prescribing that does not involve adequate clinical investigation or the pursuit of alternative therapies. The exposure of the general population to antibiotics must be reduced to avoid pressuring bacteria into taking evasive measures that will make otherwise useful antibiotics ineffective. We all have to live with the ability of bacteria to adapt to antibiotics.

Dentistry should strive to achieve 100 percent compliance with antibiotic prophylaxis recommendations and understanding of the appropriate use of antibiotics in dentistry. Conscientious use of antibiotics is imperative for all practitioners, especially when considering the rapid development of antibacterial resistance and the alarming consequences.

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