



## Evaluation of Antibiotic Therapy in Dentistry

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### Abstract

In Dentistry, the antibiotics are indicated for established infection and in prophylaxis or to prevent infections. The aim of this study is to make a consideration about the utilization of the antimicrobial agents in Dentistry with the purpose to check the correct use of this medicine by Dentists. For all that, it was made a transversal study, descriptive, through the application to questions to 33 of dentists in several specialties, some that work in private offices, another in public office and finally professionals work in Dentistry school at Pontifical Catholic University of Minas Gerais in the city of Belo Horizonte-MG. It is of utmost importance what the dentist surgeon know and stay updated regarding the use of these drugs either in therapeutic or prophylactic use.

**Keywords:** *Antibiotic; Pharmacology Dentistry; Prophylaxis*

### Introduction

Antibiotics or antimicrobials are chemical substances produced by living microorganisms or by semi-synthetic processes, with the ability to inhibit the growth of other microorganisms and, eventually, to destroy them [1].

For the Federal Council of Dentistry (CFO) [2], the most important thing to prescribe these drugs is the knowledge of medications, their therapeutic effects, mechanisms of action and adverse reactions. Ethics and responsibility are also fundamental. Thus, the antibiotic should be administered following prescription principles based on the best available scientific evidence.

Therefore, we sought to evaluate the prescription of this drug among dentists of various specialties in order to verify the correct or incorrect use of this drug by these professionals.

### Literature Review

Antibiotics are defined as chemical substances that interact with microorganisms that cause infections. They act as a defense, preventing the metabolism and reproduction of these microorga-

nisms. Antibiotic therapy also serves to reduce the incidence of infection in the post-operative period. In dentistry, antibiotics are indicated for the treatment of established infections and prophylaxis or prevention of infections [3].

According to Costa (2011) [4], when it comes to antibiotic prophylaxis, the common use is in patients who do not show signs and symptoms of infection, being used to prevention of infection in patients at risk.

Antibiotics can be classified in several ways, regarding the mechanism of action, as bactericidal or bacteriostatic and broad, narrow or increased spectrum [5]. Amoxicillin, for example, by inhibiting the production of a primordial structure of the bacterial cell (cell wall), ends up causing its lysis, therefore, it has a bactericidal effect [6].

Bactericidal drugs cause death and destruction of the bacteria, and bacteriostatics inhibit replication without killing the microorganism. Bactericidal agents are preferred in case of severe infection for prophylaxis in immunosuppressed patients.

For prophylactic use, amoxicillin (single dose, 2g 01 hour before the procedure) should be the antibiotic of first choice. In cases of patients allergic to penicillin, the antibiotic of first choice is Clindamycin for prophylaxis (single dose, 600mg 01 hour before the procedure). This protocol is recommended, for example, by the AHA (American Heart Association), 2007, in the prevention of infective endocarditis and is the protocol used in most countries. Amoxicillin is recommended because it is better absorbed in the gastrointestinal tract and provides higher and longer lasting serum levels and effectiveness against the microorganisms causing the infection.

The timing for initiating antibiotic therapy in established infections should be guided by the clinical case. Antibiotic therapy initiated at the appropriate time can suppress bacterial growth and prevent worsening of the infection, which is essential for patient management and to achieve a cure for the infection [7].

In the case of the treatment of infections already established, it should be emphasized that treatment with antimicrobials is an adjunct to clinical procedures, since the removal of the cause of the infection, drainage, debridement of necrotic tissues, when indicated, should be prioritized [8]. The professional should always proceed to remove the cause as soon as possible.

In a study conducted by ANVISA [9], 15% of the Brazilian population consumes 90% of pharmaceutical production, 50% of all prescribed drugs are dispensed or used inappropriately, that is, the protocol these professionals are based on must be analyzed, because the erroneous use of these drugs and other medicines can have several implications. The indication of antimicrobials should occur only if there are systemic manifestations, such as trismus, fever and ganglionic infarction. Regarding the indiscriminate use of antibiotics, it promotes the selection of resistant microorganisms, therefore, it is extremely important that the DC be aware of the correct use of medicines in order to reduce the consequences of incorrect use [10].

### Materials and Methods

A cross-sectional, descriptive study was carried out through the application of a questionnaire to 33 dentists from different areas who work in private offices, Health Centers in the city of Belo Ho-

rizonte and with professionals who work in the clinics of the Faculty of Dentistry of the Pontifical University Catholic of Minas Gerais. The data were collected, analyzed and discussed.

In graph form, a comparative study was made with the data obtained among the sectors in which the DC works: SUS, Private and at the University.

The questionnaire contained the following questions: What are your choice criteria for antibiotic selection?; How do you try to avoid bacterial resistance?; When do you indicate antibiotic prophylaxis?; Which drug would be the most correct to use for antibiotic prophylaxis in patients not allergic to penicillin?; How do you use this prophylactic antibiotic?; What prophylactic antibiotic do you use in case of penicillin allergy?; How do you use this prophylactic antibiotic?; What is the duration of antibiotic therapy in dentistry?; Patient arrives at the office with an abscess with a floating point, no fever, no ganglionic infarction, no prostration and he is immunocompetent. What is your clinical conduct in this case?

### Results

The selection criteria for antibiotic selection by research professionals are shown in table 1.

Criteria	PUC	SUS	Particular	Total
Short spectrum	2	6	6	14
Broad spectrum	9	2	4	15
Oral administration	10	8	10	28
Few side effects	5	6	9	20
Bactericide	4	6	6	16
Bacteriostatic	1	1	3	5
Low cost	6	7	6	19

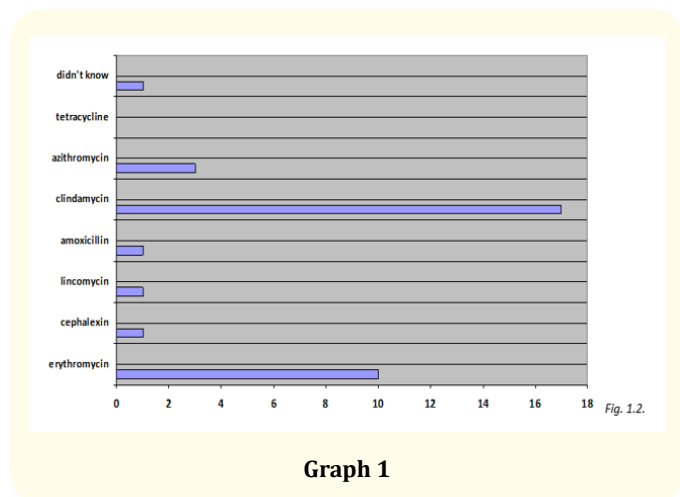
Table 1

When asked about the way they try to avoid bacterial resistance, 28 professionals said they used the appropriate dose, 30 said they used the proper dosage, 22 respecting the administration time, 8 use small spectrum antibiotics and 3 professionals perform culture and antibiogram.

The most frequent reason chosen by professionals was the indication for patients with cardiac valve prosthesis.

In relation to the medicines used for antibiotic prophylaxis, only 3 were selected, amoxicillin, chosen by 31 professional dentists, erythromycin, chosen by one professional, and azithromycin, also chosen by 1. The way in which you use this prophylactic antibiotic was selected preoperatively by 21 of the 33 interviewees and by 12 of them preoperatively and postoperatively.

The antibiotic used in the case of penicillin allergy according to the research results is shown in the following graph 1.



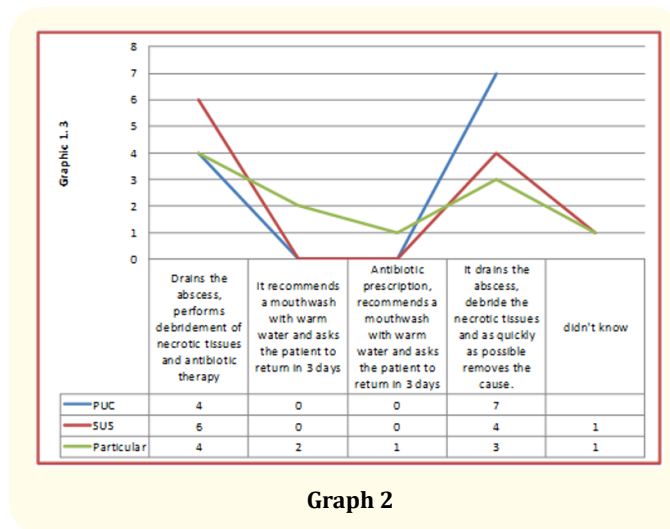
Graph 1

When asked about the way they use this antibiotic, 24 dentists chose Amoxicillin 2g - 01 hour before the procedure; 5 per amoxicillin 500 mg every 6 hours, 3 days before and the same dosage for another 7 days; 2 professionals chose erythromycin 1g, 01 hour before the procedure and 500 mg, 6 hours after; 1 professional marked C efalexin 1g, 01 hour before and another 500 mg every 6 hours for 7 days and finally, 1 professional opted for Erythromycin, 500 mg, every 8 hours for 3 days before and another 500 mg every 8 days within 8 hours for another 5 days after the procedure.

According to the duration of antibiotic therapy in dentistry, most respondents (15) scheduled for 7 days, followed by the option until the signs and symptoms disappeared (10 professionals), then the marked option was for 10 days (7 professionals) and with fewer appointments the option for 12 days, marked by only 1 of the 33 respondents.

Finally, among the most prominent results, there is the question that refers to the professional's clinical conduct when faced

with an abscess with a floating point, without fever, lymph node infarction, without prostration and immunocompetent. The results were show in graph 2.



Graph 2

### Discussion

In the first question, it was observed that only 16 professionals, out of 33, chose to mark bactericide as a criterion for choosing an antibiotic and, it is known, that this is an extremely important factor in some situations (immunocompromised and in case of prophylaxis), for it is this characteristic that causes the bacteria to die. In addition, it was observed that 15 professionals claim to use broad-spectrum antibiotics and 14 short-spectrum antibiotics, and the most suitable is the short-spectrum one, as it works by disfavoring bacterial resistance, since they do not act on all bacteria in the oral microbiota, only those related to infection.

According to AHA protocol, 2007 [10], the prophylactic forms of infective endocarditis indicate that antibiotic prophylaxis should be instituted only to patients with heart conditions considered high risk. In this research, it was found that some professionals do not correctly indicate this drug in the prophylactic form, since three indicated for controlled diabetics, five for hypertensive patients, one for endodontic treatment and three for any invasive surgical procedure.

In dentistry, the prophylactic antibiotic of first choice is amoxicillin [11,14,15] a result that was predominant in the survey.

Most professionals (21) affirm that they use antibiotic therapy only preoperatively and 12 professionals preoperatively and postoperatively. According to Aranega, *et al.* [12], the prophylactic use of antibiotics is to prevent symptoms and complications subsequent to treatment and should be administered before it, that is, only in preoperatively. As well as the AHA 2007 protocol, which recommends the use of Amoxicillin 2 mg 01 hour before the procedure (single dose), not requiring postoperative dosage. The extent of unnecessary use of prophylactic antibiotics contributes to ADR (adverse drug reactions, such as allergies and bacterial resistance).

In the question about penicillin allergy, the most selected antibiotic was clindamycin with 17 votes, followed by erythromycin with 10. Inexplicably, it was found that a professional chose to administer amoxicillin in this case, showing unawareness of the group it belongs, since amoxicillin belongs to the penicillin group. Giving it to allergy sufferers can lead to anaphylactic shock.

When asked about the way they prescribe prophylactic antibiotics, 24 said they used amoxicillin 2g, 1 hour before the procedure, as stipulated in the protocol used, which is the AHA 2007, and 5 stated that they used amoxicillin 500 mg every 6 hours, 3 days before and the same posology for another 7 days, which is not recommended in this protocol [14-16].

Comparing the interviews carried out in the Unified Health System (SUS) in the city of Belo Horizonte, in private offices in the same city and in the Pontifical Catholic University (PUC) of Minas Gerais in relation to the clinical management of an abscess with a floating point in a patient immunocompetent, only 4 professionals from SUS, 7 from PUC and 3 from private offices claim to drain the abscess and do not prescribe antibiotic therapy. In contrast, 6 SUS professionals, 4 from PUC, 4 from private offices, use antibiotic therapy even after draining the abscess and performing debridement of necrotic tissues, and evidence suggests that it has no benefit and does not support the use of antibiotics after drainage [14].

## Conclusion

Based on this study, it was possible to conclude that the knowledge of dental surgeons is still low regarding the prescription of

prophylactic antibiotics. It is the lack of professional knowledge that leads to the indiscriminate use of the drug, which can lead to serious consequences, such as allergic reactions to the use of drugs, development of superinfections and bacterial resistance.

Appropriate use of antibiotic agents involves obtaining an accurate diagnosis, determining the need for the duration of therapy, using the shortest spectrum and shortest duration of therapy, in order to correctly prescribe whenever necessary.

It is important that professionals keep up to date to the protocols stipulated by the AHA, of infective endocarditis and be attentive to the correct use of the medication, in order to reduce the consequences resulting from incorrect use.

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