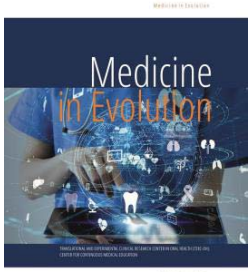
Antibiotic therapy in pedodontic practice-antibiotic administration guide



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Abstract

Aim and objects: The main idea of this article is to establish a guideline for the administration of antibiotics.

Methods: In our methodology we used studies on antibiotic therapy in pedodontic practice and compared the guidelines found with their use nowadays. The selection criterion was by the keywords used "antibiotics, pedodontic therapy, guide to the use of antibiotics",

Results: The type of condition and the need to administer antibiotics as well as the daily administration dosage were presented.

Conclusions: Appropriate and correct use of antibiotics is essential to ensure effective and safe treatment. Practices that may increase microbial resistance should be avoided. To improve standards of treatment, dentists need to be up-to-date in their knowledge of pharmacology.

Keywords: antibiotics, pedodontic therapy, antibiotic use guide

INTRODUCTION

The discovery of antibiotics revolutionized contemporary medicine in 1928, Alexander Fleming identified penicillin, the first chemical compound with antibiotic properties.

Research has continued, and there are now a whole series of antibiotics, classified according to different criteria. However, the administration of antibiotics has been a problem since ancient times. From the beginning until today, there has been an impressive increase in the the use of antibiotics. However, antibiotics have a limit in use, many patients are not aware of. (2)

The choice of the child's medication requires even more caution, which is determined by the dentist, so a guide to the administration of antibiotics must be present in the office of any paediatric dentist, facilitating the decision whether or not to prescribe antibiotics to a child, depending on the pathology. (3) (4)

In dentistry, antibiotics are administered for prophylactic and therapeutic reasons, playing an adjuvant role in preventing the spread of dental and oro-facial infections. (2) (5) The antibiotic's effect is short-term and not permanent. (6)

The use of antibiotics in paediatric practice requires certain conditions of administration and is based on certain selection criteria depending on the individual child. The conditions of antibiotic administration and dosage are the criteria underlying the guidelines developed by various studies around the world. (3) (7)

At the same time, the adverse effects of antibiotics should not be forgotten, which is a very delicate and important subject to address, especially when dealing with a child, who is different in many ways from an adult. In pedodontics, we can discuss from the newborn stage up to the age of 15-16 years, and the area of approach includes mainly temporary teeth, as well as young permanent teeth. (8) (9)

It has been reported in studies that the unjustified use of antibiotics in children, especially in the control of ENT disorders and dental infections, can lead to increased. This problem stems from the inappropriate use of antibiotics by both physicians and parents. (2) (10)

Antibiotic resistance is an inevitable consequence of antibiotic misuse and is the ability of a type of germ to survive, multiply and grow in the body presence of an antibiotic, even under the conditions of a maximum drug concentration. (4)

Bacteria causing dental infections are generally saprophytic. The microbiology in this respect is varied, with multiple microorganisms with different characteristics involved. (4) (11)

According to Dr Toma J. Pallasch, the inappropriate use of antibiotics in dentistry involves in particular recommending them in the "wrong situations" or for too long, which includes giving antibiotics after a complete and correct dental procedure to a generally healthy patient to "prevent" an infection, which in all likelihood will not occur. (5) (12) (13)

The conditions of antibiotic administration and the criteria for antibiotic selection in the child must be considered. Appropriate use of antibiotics depends on correct nomination of the diagnosis of the present oral disease and proper knowledge about the general condition of the patient and knowledge of antibiotic therapy. (14) (15)

Aim and objectives

The main idea of this article is to create an antibiotic administration guide which will include, depending on the pathology, what kind of antibiotic is to be administered, the dose and the time interval required. Updating and modernising guidelines of any kind makes the

dentist's work easier. With new and updated information at hand, we are able to offer the best possible treatment appropriate to the little patient.

MATERIAL AND METHODS

In our methodology we used studies on antibiotic therapy in paediatric dentistry and compared the guidelines found with their use nowadays.

The selection criterion was by the keywords used "antibiotics, paediatric therapy, guidelines for the use of antibiotics" on the medical websites Pubmed, Free Medical Journals, Oxford Academic, Cochrane Library.

Another criterion was the publication period, selecting a 16-year interval,2005-2021. There is a wide variation in dosages for all prescribed antibiotics and different dosing periods, which do not correspond to modern day recommendations.

With the information collected from each study, we have managed to produce a comprehensive guide and provide new and improved information.

The studies included were non-clinical or clinical studies, surveys cross-sectional surveys, case reports.

The exclusion and inclusion criteria for the studies are presented in Tables 1 and 2.

Table 1. The inclusion

Children or teenagers up to 18 years old
Antibiotic therapy in medicine dental medicine
Antibiotic therapy guidelines
Articles on resistance to antibiotics and adverse effects

Table 2. The exclusion

Studies on adults
Studies unrelated to pedodontics
Articles older than 10 years

15 articles with useful information have been selected to produce a complete and up todate guide to antibiotic administration in children.

The information in each study was chosen according to drug therapy, dose and pathology.

RESULTS

Table 3. Guide to antibiotic administration in paediatric dental therapy

Condition	Antibiotic	Daily Dose	Time interval	Commercial Name
Acute Pulpitis	Does not require	-	-	-
Cronic Pulpitis	Does not require	-	-	-
Cellulite	Amoxcillin	Children>3months and <40kg-20-40 mg/kg/day Children> 40 kg-250-500 mg Childre <40kg: 20-45mg/kg/day	-8 hour -8 hour	Amoxicilina MIP Pharma 500 mg tablet Augmentin

	Amoxcillin+ clavulanic acid For allergy sufferers to penicillin Metronidazole Azithromycin Clarithromycin Erythromycin	Children >40 kg: 250-500 mg/kg/day 30/mg/kg/day Children>6months to 16years-5-12mg/kg/day 7.5 mg/kg Children with age between 6-12 years: 30-50mg/kg/day	-12 hour -8 hour 6 hour 12 hour 12 hour 6h/8h	875/125 mg Metronidazole Arena 250 mg Azithromycin Sandoz 500mg Clarithromycin 200-250 mg Erythromycin Sandoz 200mg
Ulcerative gingivitis necrotic	Amoxicillin Metronidazole For those allergic to penicillin- Erythromycin Azyithromycin	50 mg/kg/day 30 mg/kg/day Children aged 6-12 years: 30-50mg/kg/day 10 mg/kg/day	8 hours 8 hours 6/8hours 6-8 hours	Amoxicillin MIP Pharma 500 mg50 Metronidazole Arena 250mg Erythromycin Sandoz 200mg Azythromycin Sandoz 500mg
Virus infections herpes (gingivostomatitis herpes)	Does not require antibiotic administration- Only antivirals are given	-	-	-
Eruption and Exfoliation of teeth	Does not require	-	-	-
ProphylaxisAntibiotics	Amoxcillin Allergy to.penicillin	Dose recommended is 1500 mg with a hour before a intervention dental surgery and 750 mg every 6 hours after surgery Children over 6 years old and adolescents up to under the age of 14 years-Clindamycin 15 mg/kg with one hour before intervention		Amoxicilin MIP Pharma 500 mg tablets Clindamycin- MIP 150 mg/ml
Abces	Amoxicillin	*Children>3months and <40 kg-20-40mg/kg/day *Children > 40 kg-250-500 mg	8 hours 8 hours	Amoxicillin MIP Pharma 500 mg tablet

	Metronidazole Amoxicillin and Clavulanic acid For.those allergic to Penicillin-Erythromycin	Children 30/mg/kg/day Children with weight<40 kg:20-45 mg/kg/day Children with weight >40 kg: 250-500 mg/kg/day Children aged between 6-12 years: 30-50 mg/kg daily	8 hours 12 hours 8 hours 6 hours	Metronidazole Arena 250 mg Augmentin 875/125 mg Erythromycin Sandoz 200 mg
Concussion	Does not require	-	-	-
Subluxation	Does not require	-	-	-
Dislocation	Does not require	-	-	-
Intrusion	Does not require	-	-	-
Extrusion	Does not require	-	-	-
Avulsion and Replantation	Amoxicillin	Children>3 months and<40 kg-20-40 mg/kg/day Children > 40 kg-250-500 mg	8 hours 8 hours	Amoxicilin MIP Pharma 500 mg tablet
Plaque gingivitis	Does not require	-	-	-
Periodontal disease associated with systemic diseases	It is preferable to consult your doctor treating the disease in concerned.	-	-	-

DISCUSSIONS

The realization of this guide comes to the aid of doctors, to facilitate the choice of antibiotics, depending on the specific pathology of each patient. We also considere children allergic to penicillin, offering other options that are not lethal.

Each type of condition requires a certain type of antibiotics in order to be treated. In some cases, there are certain patients who have developed over time an increased resistance to a certain type of antibiotic, therefore it is necessary to know exactly which type of antibiotic should be administered in each type of the condition.

So, as a dentist, a lot of caution is needed, depending on the anamnesis and the patient's history. There are also patients who do not know their allergic terrain to certain antibiotics, thus coming into contact with the respective medicine to produce an allergic reaction that can be from mild to the most serious forms, that is why it is indicated for patients who have had in the history of allergic episodes to any type of medicine or even to other antibiotics, an allergy test should be performed to exclude the possibility of this incident.

The dentist must perform a thorough history and ask as many questions as possible related to the use of antibiotics. Unfortunately, many parents administer their own treatment to their children, without knowing the risks of using antibiotics, therefore we recommend that before administering any type of treatment, patients should see a dentist, who has full knowledge in administering the correct treatment.

CONCLUSIONS

Appropriate and correct use of antibiotics is essential to ensure treatment effective and safe treatment. Practices that may increase microbial resistance should be avoided.

To improve standards of treatment, dentists need to be up to date in their knowledge of pharmacology in dentistry, as well as in continuing education, with ongoing evaluation of dental practices, a better understanding of the pathogenesis of these infections, including host immune response to bacteraemia.

The production of this guide is intended to help clinicians, to facilitate the choice of antibiotics, in specific pathology of each patient. We have also considered children allergic to antibiotics, penicillin allergic children, offering other non-lethal options. So, as a dentist you need to have great caution, depending on the patient's history and medical history.

REFERENCES

1. Wikipedia. Antibiotics.Available from: https://en.wikipedia.org/wiki/Antibiotics.
2. B. Aidasani, M. Solanki, S. Khetarpal, S. Ravi Pratap. Antibiotics: their use and misuse in paediatric dentistry. A systematic review. European Journal of Paediatric Dentistry vol. 20/2-2019.
3. Dhirja Goel, Gaurav Kumar Goel, Seema Chaudhary, and Deshraj Jain. Antibiotic prescriptions in pediatric dentistry: A review. J Family Med Prim Care. 2020 Feb; 9(2): 473–480.
4. Chevereşan A, Maliţa I, Cinca R. Curs de farmacologie pentru medicina dentară. Timişoara (România): Editura Mirton 2009.p.101-126,135-139.
5. Dr. Trophimus Gnanabagyan Jayakaran, Dr. Vishnu Rekha C, Dr. Sankar Annamalai and Dr. Parisa Norouzi Baghkomeh. Antibiotics and its use in pediatric dentistry: A review. International Journal of Applied Dental Sciences 2018; 4(2): 310-314
6. American Academy on Paediatric Dentistry Clinical Affairs Committee, American Academy on Paediatric Dentistry Council on Clinical Affairs 2008. Guideline on antibiotic prophylaxis for dental patients at risk for infection. Pediatr Dent 2008; 30(7 Suppl):215
7. Cherry WR, Lee JY, Shugars DA, White RP, Vann WF. Antibiotic use for treating dental infections in children: A survey of dentists' prescribing practices. J Am Dent Assoc 2012; 143(1):31-38.
8. Cope AL, Chestnutt IG. Inappropriate prescribing of antibiotics in primary dental care: reasons and resolutions. Prim Dent J 2014; 3(4):33-37.
9. Council O, Guideline on use of antibiotic therapy for paediatric dental patients. AAPD 2014; 37(6):289-92.
10. Dar-Odeh NS, Abu-Hammad O, Al-Omiri MK, Khraisat AS, ShehabiAA.Antibiotic prescribing practices by dentists: a review. Ther Clin Risk Manag 2010; 6: 301.
11. Dar-Odeh NS, Al-Abdalla M, Al-Shayyab MH, Obeidat H, Obeidat L, Kar MA, Abu- Hammad OA. Prescribing Antibiotics for pediatric dental patients in Jordan; knowledge and attitudes of dentists. Int Arab J Antimicrob Agents 2013; 3(3).
12. Konde S, Jairam LS, Peethambar P, Noojady SR, Kumar NC. Antibiotic overusage and resistance: A cross-sectional survey among pediatric dentists. J Indian Soc Pedod Prev Dent 2016;34(2):145.
13. Koyuncuoglu CZ, Aydin M, Kirmizi NI, Aydin V, Aksoy M, Isli F, Akici A. Rational use of medicine in dentistry: do dentists prescribe antibiotics in appropriate indications? Eur J Clinical Pharmacol 2017;73(8): 1027-1032.
14. Scottish Dental Clinical Effectiveness Programme. Drug Prescribing for Dentistry Dental Clinical Guidance. 3rd Edition. 2016.
15. Wong YC, Mohan M, Pau A. Dental students' compliance with antibiotic prescribing guidelines for dental infections in children. J Indian Soc Pedod Prev Dent 2016; 34(4): 348.
16. Katharine Smart, Jean-Francois Lemay, James D Kellner. Antibiotic choices by paediatric residents and recently graduated paediatricians for typical infectious diseaseproblems in children. Paediatr Child Health. 2006: 11:647-649.17. Caviglia I, Techera A, García G.

Antimicrobial therapies for odontogenic infections in children and adolescents. Literature review and clinical recomendations. J Oral Res. 2014;3(1):50-56.
17. Planells-del Pozo P, Barra-Soto MJ, Santa Eulalia-Troisfontaines E. Antibiotic prophylaxis in Pediatric odontology - An update. Med Oral Pathol Oral Cir Bucal. 2006; 11:352-7.
18. American Academy of Pediatric Dentistry. Guideline on use of antibiotic therapy for pediatric dental patients. Chicago (IL): American Academy of Pediatric Dentistry, 2014, 287-292.
19. American Academy of Pediatric Dentistry. Useful Medications for Oral Conditions. Chicago, American Academy of Pediatric Dentistry; 2019.
20. American Academy of Pediatric Dentistry. Use of antibiotic therapy for pediatric dental patients. Pediatr Dent. 2014; 36:284–6.
21. Steven Schwartz, DDS. Commonly Prescribed Medications in Pediatric Dentistry Crest® Oral-B® at dentalcare.com Continuing Education Course, Revised January 8, 2016