

Managing Antibiotic Prescribing in Dentistry: Patient Safety and Strategies for Reducing Antibiotic Resistance

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ABSTRACT

Antibiotics have revolutionized the management of infections and are indispensable in modern healthcare, including dentistry. They are essential in preventing infections, managing complications, and promoting overall health in dental patients. However, their misuse, particularly in dental practice, has raised significant concerns due to the risks associated with antibiotic resistance, allergic reactions, and the emergence of superinfections. This review highlights the impact of antibiotic overuse in dentistry, focusing on the consequences of antibiotic resistance, patient safety, and healthcare costs. It also examines the role of dentists in promoting responsible antibiotic use through education, infection control practices, and antibiotic stewardship. The paper advocates a more prudent approach to antibiotic prescribing in dentistry, intending to minimize risks while ensuring optimal patient outcomes. It emphasizes the importance of adhering to evidence-based guidelines and raising awareness among dentists and patients about the dangers of antibiotic overuse and misuse.

Keywords: Dentistry, Antibiotics, Antibiotic management, Patient safety.

Introduction:

Antibiotics are one of the most important medical developments of the 20th century. Antibiotics play a crucial role in reducing infectious diseases that challenge health systems and are the number one cause of death worldwide [1,2].

In dentistry, antibiotics are commonly used to manage infections, prevent complications, and promote patient health [3]. However, the misuse of antibiotics by dentists can lead to complications and risks that affect patient health [3,4]. These risks include allergic reactions, toxicity, superinfections caused by resistant bacteria, and the transfer of resistance genes to other pathogens [5].

According to the World Health Organization, the overuse of antibiotics leading to what is known as antibiotic resistance is one of the most threatening public health issues, contributing to the emergence of multidrug-resistant bacterial strains, which increase treatment complications, costs, longer hospital stays, or death [6]. Dentists often prescribe antibiotics to patients as a preventive measure before dental procedures, or in cases of abscesses and periodontitis [4,7]. However, the inappropriate use of antibiotics can increase antibiotic resistance [8]. Studies indicate that antibiotic misuse in dental practice is often due to inadequate knowledge of dentists and lack of awareness regarding the potential long-term consequences of overprescribing antibiotics [9,10].

The consequences of antibiotic resistance extend beyond patient health, affecting healthcare systems such as increased duration of treatment, longer hospital stays, and increased healthcare costs [11]. Therefore, healthcare providers and dentists must carefully assess the need for antibiotics before prescribing them to patients and educate patients about the risks of overuse and misuse of antibiotics [7].

While antibiotics are important in dentistry, their risks must be considered, and awareness must be raised among dentists and patients about the risks of antibiotics to achieve a balance between antibiotic efficacy, patient safety, and improving public health [12].

Therefore, this review aims to study the impact of antibiotic use in dentistry on patients' health and provide insights that contribute to improving dental practices and reducing health risks associated with antibiotic resistance.

Antimicrobial Resistance and Its Impact on Dentistry

Antimicrobial resistance occurs when microorganisms, such as bacteria, viruses, fungi, and parasites, evolve to resist the drugs designed to treat the infections they cause [13]. This results in the emergence of superbugs that cannot be treated with existing antibiotics [13,14]. Antibiotic resistance, in particular, is a major concern in dentistry, where dentists commonly prescribe antibiotics. Antibiotic resistance primarily develops when antibiotics are overused or misused, allowing resistant bacteria to survive and reproduce through the process of natural selection. This affects not only harmful bacteria but also beneficial bacteria in the body, disrupting the microbiome and leading to broader health problems [3,15].

Indications for the Use of Antibiotics in Dentistry

Antibiotics are often used in dentistry to prevent local and focal infections, as well as to treat dental and non-dental infections. However, antibiotics are not recommended for the treatment of all dental infections [9]. In addition, they are not a substitute for

removing the source of infection. In the event of infection, periodontal cleaning and disinfection and pulp therapy followed by systemic antibiotic therapy are recommended [4]. Furthermore, Dentist practitioners should also keep in mind that antibiotic prophylaxis is recommended in a few specific cases [7].

Antibiotic Use in Dental Management and Patient Safety

In patients with oral health problems, timely antibiotic administration is essential to prevent complications and health risks such as sepsis and spread of infection to vital structures. In such cases, infections can rapidly progress to serious health complications [16]. Therefore, antibiotics should be prescribed as an appropriate and effective therapeutic intervention. However, antibiotic-resistant infections pose a significant risk to patient safety, complicating treatment options and increasing the likelihood of adverse outcomes [17].

In some cases, dentists manage oral and dental diseases without resorting to prescribing antibiotics, through dental interventions that aim to eliminate infection and pain [18]. However, some cases require prescribing antibiotics before any dental procedures as a preventive measure to reduce any complications that may arise due to dental interventions [19]. Therefore, the dentist must accurately diagnose the disease to determine the need for antibiotics and manage oral and dental diseases efficiently and with the least pharmacological interventions that depend on antibiotics. Improving antibiotic prescribing in dentistry is essential to improving patient safety by reducing the risk of adverse events [20].

Inappropriate or excessive use of antibiotics in dental practice has been associated with increased incidence of *Clostridium difficile* (*C. difficile*) infections, which can lead to *C. difficile*-associated colitis and significant morbidity, particularly in the elderly and patients with medical problems and chronic diseases [21].

Clindamycin, a commonly prescribed antibiotic, has been associated with *C. difficile* infections [22]. Additionally, the increase in allergies, including anaphylaxis, to antibiotics is a growing concern, underscoring the need for careful antibiotic prescribing [23]. Furthermore, the use of broader-spectrum antibiotics results in increased morbidity and health care costs. Studies have shown that penicillin allergy often results in unnecessary prescriptions for stronger antibiotics that carry a higher risk of adverse reactions [24,25].

In summary, the ensuring proper and judicious antibiotic prescribing in dental practice is essential to protecting patient health, reducing risks, and enhancing the overall safety of dental care.

The Role of Dentists in Addressing Antibiotic Resistance

The World Health Organization has developed a comprehensive framework to ensure the continued effectiveness of antibiotics and address antibiotic resistance. This aims to ensure that the ability to treat and prevent infectious diseases continues for as long as possible with effective, safe, quality-assured medicines, used responsibly, and made available to all who need them [26]. The World Dental Federation, an organization representing the global dental community, has also recognized the critical role dentists

play in managing antibiotic resistance [27]. It emphasizes the importance of ensuring appropriate use of antibiotics in dental practice.

Dentists can therefore manage antibiotics by [26,27]:

Raising awareness:

Educating both dentists and patients about the risks of overuse and misuse of antibiotics is essential to reducing the spread of antibiotic resistance. Dentists play a vital role in promoting understanding of when antibiotics are necessary and when alternative treatments should be considered.

Infection prevention and control:

A proactive approach to infection prevention in dentistry is crucial to reducing the need for antibiotics. This includes educating patients about oral health and proper hygiene practices, proper sterilization of equipment, managing cross-contamination risks, and adhering to hygiene protocols to prevent infection.

Antibiotic stewardship:

Antibiotic stewardship refers to the practice of prescribing antibiotics only when necessary and in the most effective manner. This requires dentists to carefully evaluate and diagnose each case, and make informed decisions based on evidence-based guidelines to minimize unnecessary use of antibiotics and reduce the risk of resistance development.

Antibiotic Stewardship in Dentistry

Antibiotic management in dentistry is essential to promote the appropriate use of antibiotics and to ensure that they are prescribed in accordance with established clinical guidelines [28]. While antibiotic management programmes have traditionally been developed in hospital settings, a significant proportion of antibiotic prescribing occurs in primary care and communities, particularly in dentistry [20].

Therefore, effective antibiotic management planning lies in identifying the urgency of antibiotic prescribing and where antibiotics can be dispensed.

In dentistry, a number of antibiotic management interventions have been developed. In general, antibiotic management in dentistry can be achieved through [18]:

1. Developing guidelines on appropriate clinical indications for antibiotic use
2. Educating all members of the dental team, not just clinicians
3. Auditing and providing feedback on antibiotic prescribing practices to ensure accountability
4. Providing patient-facing materials to communicate key messages about antibiotic management in dentistry and the wider community.

The literature suggests that the decision to prescribe antibiotics in dentistry is multifaceted and influenced by a variety of factors [29,30]. While most dentists are aware of antibiotic resistance (ABR), their prescribing decisions often relate to their

confidence in their ability to reduce dental procedures [31]. This suggests that dental infection control interventions should not only focus on reducing antibiotic prescriptions but should also support dentists in improving care for acute dental conditions, such as performing extractions or treating pulp disease.

Assessment and diagnosis of acute dental conditions, including the use of appropriate testing, as well as shared decision-making with patients and counselling, are critical components of managing these conditions without antibiotic default [32]. Access to dental care is another critical factor influencing antibiotic prescribing [18]. In settings where dentistry operates primarily as a business, there may be a tendency to make 'quick fixes' such as prescribing antibiotics to avoid the perceived time and cost of comprehensive treatment [18,32].

Conclusion:

Overuse of antibiotics in dentistry poses significant risks to patient health and the broader healthcare system, primarily through the development of antibiotic resistance and increased treatment complications. Dentists have a critical role to play in mitigating these risks by adhering to evidence-based practices, improving their knowledge of antibiotic stewardship, and promoting patient education regarding responsible antibiotic use. Ensuring that antibiotics are prescribed only when necessary and at appropriate doses can help reduce the spread of resistant strains and contribute to improved patient safety and health outcomes. A comprehensive approach to infection prevention, early diagnosis, and reducing unnecessary antibiotic prescriptions is essential to maintaining the effectiveness of antibiotics in dental care and protecting public health from the growing threat of antibiotic resistance.

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