RESEARCH PAPER

Necessity of Antibiotics following Extraction of Tooth - A Randomized Control Trial

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ABSTRACT

Background: Antibiotics are commonly prescribed to prevent or treat infection, which can occur after the removal of a tooth. However, recent studies and evolving guidelines have shed new light on this issue, highlighting the importance of judicious antibiotic use to prevent the development of antibiotic resistance. This has prompted a reevaluation of the routine prescription of antibiotics after tooth extraction, with a growing emphasis on individualized treatment plans based on patient-specific factors.

Aim: This study aims to assess the necessity of antibiotics after tooth extraction, highlighting the importance of individualized treatment plans and responsible antibiotic use.

Methodology: A prospective, randomized evaluation study with 20 patients was conducted. These 20 patients were segregated into 2 groups, Group A and Group B where Group A were patients who were prescribed antibiotics and Group B were those patients to whom antibiotics were not prescribed. The antibiotic prescribed in our study was Amoxicillin 500mg. The study included everyone who was at least 18 years old and in good health, regardless of gender. The patients were assessed on the first, third, and seventh postoperative days. Statistical analysis was performed on the data using SPSS 23.0.

Results: In our study, inter incisal distance of both group patients were measured for evaluating mouth opening and by comparing both groups, we can come to a conclusion that Group B (without antibiotics) have less inter incisal distance than that of Group A (with antibiotics).

Conclusion: Results underscore the importance of individualized treatment plans and responsible antibiotic use in post-extraction care to optimize patient outcomes and address the global concern of antibiotic resistance. Further research with larger sample sizes is essential to validate and strengthen these findings. A larger sample size would enable a more robust statistical analysis and provide a better understanding of the impact of antibiotics after tooth extraction. Customized approaches to antibiotic use in post-extraction care can help optimize patient outcomes and minimize unnecessary antibiotic exposure.

Keywords: Antibiotics, Infection, Extraction, Prescription

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Introduction:

Tooth extraction is a dental procedure that involves the removal of a tooth from its socket in the jawbone[1]. While it may seem counterintuitive to associate tooth extraction with oral health, there are instances where it becomes necessary to maintain overall dental well-being. One common reason for tooth extraction is severe tooth decay or damage that cannot be repaired through other dental treatments such as fillings or root canals. In such cases, extracting the affected tooth can prevent the spread of infection to nearby teeth and the surrounding tissues, safeguarding the overall oral health[2].

Another scenario where tooth extraction plays a crucial role is in orthodontic treatments. Sometimes, teeth need to be extracted to create enough space for proper alignment when braces or other orthodontic appliances are used. This strategic extraction helps ensure that teeth are properly aligned, facilitating better oral hygiene and reducing the risk of future dental complications[3]. Furthermore, wisdom tooth extraction is a prevalent practice. Wisdom teeth, also known as third molars, often emerge in a misaligned manner or fail to erupt fully[4]. This can lead to various problems such as impaction, crowding, and increased susceptibility to tooth decay and gum disease[5]. By removing these problematic wisdom teeth, oral health can be preserved or improved. It is essential to note that tooth extraction is a procedure that should be performed by a qualified dental professional. They will provide appropriate guidance on post-operative care, including instructions on maintaining oral hygiene, managing discomfort, and potentially prescribing antibiotics when necessary. Overall, while tooth extraction may seem contradictory to oral health at first glance, it is a valuable tool in preserving and improving overall dental well-being[6]. By addressing issues such as severe decay, orthodontic alignment, and problematic wisdom teeth, tooth extraction contributes to maintaining a healthy and functional smile[7].

Tooth extraction, although a common dental procedure, requires careful consideration of post-operative care to ensure optimal healing and minimize the risk of complications. One aspect that often arises in the discussion is the necessity of antibiotics after tooth extraction[8]. Antibiotics have long played a vital role in preventing and treating infections, but their routine use after extractions has been a subject of debate in recent years[9]. The use of antibiotics in dental extraction has been a topic of discussion and consideration among dental professionals[10]. While antibiotics can play a crucial role in preventing and treating infections, their routine use after dental extractions is not always necessary or recommended[11].

Dental extractions are generally safe procedures, and the risk of postoperative infection is relatively low. Antibiotics are typically prescribed when there is a higher risk of infection due to factors such as a compromised immune system, a history of previous infections, or the presence of pre-existing oral infections[12]. However, it is important to note that the overuse or misuse of antibiotics can have negative consequences. Widespread and unnecessary antibiotic use can contribute to the development of antibiotic resistance, rendering these medications less effective in treating infections over time[4]. Therefore, it is essential to carefully consider the need for antibiotics on a case-by-case basis, weighing the potential benefits against the risks[13].

Dental professionals follow guidelines and best practices to determine when antibiotics are necessary after dental extractions. These guidelines consider various factors such as the patient's overall health, the complexity of the extraction, and the presence of any underlying infections[14]. The decision to prescribe antibiotics is made judiciously, ensuring that they are used only when they will provide the most significant benefit[15]. It is important for patients to communicate openly with their dental professionals about their medical history, any allergies or sensitivities to antibiotics, and any concerns or questions they may have regarding antibiotic usage[16]. This collaborative approach ensures that antibiotics are used appropriately, promoting effective infection management while minimizing the risks associated with unnecessary antibiotic use.

This article delves into the topic, exploring the reasons behind prescribing antibiotics, the potential risks associated with their overuse, and the current guidelines that aid in making informed decisions about antibiotic usage by comparing with 2 different groups. By understanding the necessity of antibiotics after tooth extraction, both patients and dental

professionals can navigate this aspect of post-operative care with knowledge and confidence.

MATERIALS AND METHODS:

A prospective, randomized evaluation study with 20 patients was conducted. Before the trial began, the institutional review board granted ethical approval. Patients who reported to the Department of Oral and Maxillofacial Surgery in Saveetha Dental College and Hospital and were recommended for extraction made up the study group. Our research looked at whether prophylactic antibiotics should be given following a local anesthetic-induced extraction. These 20 patients were segregated in 2 groups, Group A and Group B where Group A were patients who were prescribed antibiotics and Group B were those patients to whom antibiotics were not prescribed. The antibiotic prescribed in our study was Amoxicillin 500mg. The study included everyone who was at least 18 years old and in good health, regardless of gender. Only participants in the study who gave their written informed consent were taken into consideration. The follow-up necessary for the study was explained to them. Before the surgery began, baseline mouth opening measures were taken. Patients with serious medical conditions, women who are pregnant or nursing, and those with active infection symptoms were excluded from the study. Patients with established diabetes mellitus who were taking medication and had their blood sugar under control were also taken into account for the study.

The patients were assessed on the first, third, and seventh postoperative days. A 100 mm long visual analog scale with a "0" for "no pain" and a "10" for the "most severe pain imaginable" marking evaluated the patient's experience of pain. Any decrease in the interincisal distance's value was noticed after measuring it. It was determined whether there was a fever or not. It was determined whether erythema was present or not. If a patient met either of the two aforementioned requirements in addition to experiencing discomfort after surgery, they were regarded to have an active infection. Rescue antibiotic medication was administered to these patients.

Statistical Analysis:

Statistical analysis was performed on the data using SPSS 23.0. In the current study, descriptive and inferential statistical analysis was performed. Results for categorical data are presented in number, while those for continuous measurements are presented as mean standard deviation (Min-Max). At a certain level of significance of 5%, the significance is evaluated. To determine the significance on a paired proportion basis, the paired proportion test was performed. Strongly significant ($P \leq 0.01$), moderately significant ($0.01 < P \leq 0.05$), and suggestive significance ($0.05<P<0.10$) were highlighted for P value.

Results:

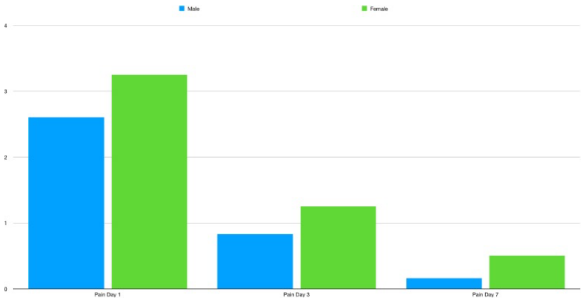
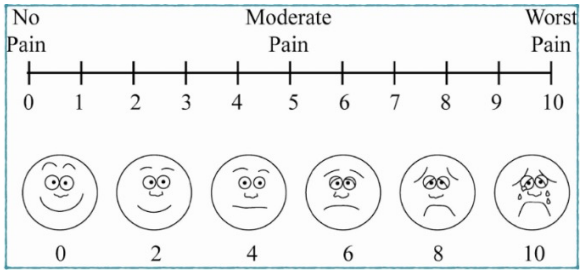


Fig 1: Graph 1 represents Pain VAS scale values of patients who were prescribed antibiotics. Blue denotes Male and Green denotes Female. Females have more pain when compared to males in all Day1, Day 3, Day 7. Pain level values are drastically decreased from Day 1 to Day 7 which shows the healing factor of antibiotics.



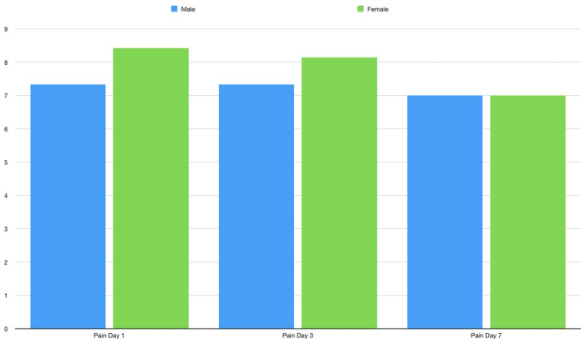


Fig 2: Graph 2 represents Pain VAS scale values of patients who were not prescribed antibiotics. Blue denotes Male and Green denotes Female. Females have slightly higher pain levels when compared to

males in Day1, Day 3, Day 7. Pain level values are decreased very slowly from Day 1 to Day 7 due to very poor wound healing after extraction.

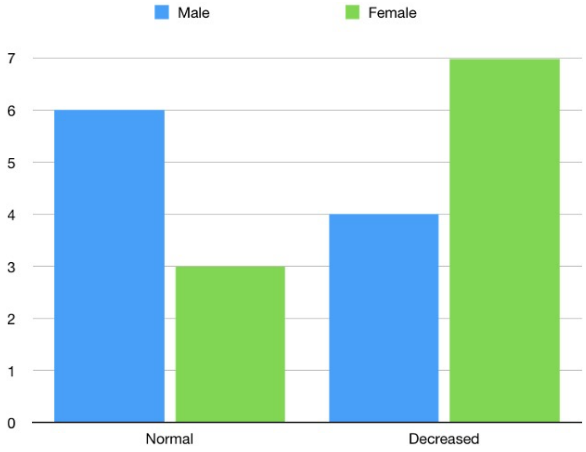


Fig 3: Graph 3 represents difference in mouth opening after extraction in patients by inter incisal distance

Discussion:

Oral extractions, including wisdom tooth removal and other tooth extraction procedures, can be associated with a risk of infection[17]. However, the routine use of antibiotics in all cases is not necessarily recommended. The decision to prescribe antibiotics after an oral extraction depends on several factors, such as the patient's overall health, the complexity of the extraction, and the presence of any underlying infections[8]. Dental professionals carefully evaluate each case to determine the appropriate course of action. In some instances, antibiotics may be prescribed to prevent or treat an infection. For example, if there are signs of an existing infection, such as swelling, pain, or pus, antibiotics may be necessary to control the infection and promote healing[18]. However, it is crucial to exercise caution with the use of antibiotics to avoid unnecessary risks. Overuse or misuse of antibiotics can contribute to the development of antibiotic resistance, making infections more challenging to treat in the future[19]. Therefore, antibiotics should only be prescribed when the potential benefits outweigh the risks.

The goal of the study was to figure out if it was necessary to administer antibiotics following each and every extraction, as is routine in clinical practice. Antibiotic use following extraction is said to lessen the possibility of infection, despite the fact that there have been numerous research and publications on this subject that are contradictory. While numerous research conducted by many experts do not suggest using antibiotics for common third molar procedure[20]. Additional research has demonstrated that normal antibiotic therapy following extraction is not necessary[21]. In contrast to other medical practitioners, dentists have been observed to prescribe more antibiotics on average, and this trend has been accompanied with a lack of awareness about antibiotic prescription[22].

Antibiotic prophylaxis in oral surgery aims to stop infections from developing through the passageway caused by the therapeutic activity[23]. Antibiotics are therefore recommended in situations where there is a high risk of infection, either due to the nature of the operation itself or the patient's local or general health. The best ways to reduce these adverse effects of extraction would seem to be an aseptic approach to the surgical site and meticulous surgical technique to
reduce trauma; numerous researchers have examined antibiotics' impact on these issues. The study's future direction would be to use a larger sample size.

The abuse of antibiotics has several negative effects on the community, including fostering the emergence of resistant species[24]. They may also be connected with adverse medication interactions, as Hersh showed. Self-medication with antibiotics has traditionally been used to treat upper respiratory tract infections. Remarkably, Olmeda et al. discovered that the most frequent causes of self-medication with antibiotics were pharyngeal symptoms, bronchitis, and tooth or gingival discomfort in a study that took place in 19 European nations[25]. This can indicate that the patient is aware of how to administer antibiotics. Dentists have an ethical responsibility to play a part in preventing the spread of such germs by restricting the use of antibiotics and being selective in their prescription. Antibiotics are frequently prescribed by the vast majority of dentists in this area as a preventive treatment to ward off postoperative problems, especially pain and infection[26]. The overwhelming body of data demonstrates that this behavior is unacceptable and a disservice to both the patient and the community as a whole, and it must be stopped. In contrast to antibiotics, using a stronger analgesic to relieve pain is a far better option post

simple extractions. It is essential for patients to communicate openly with their dental professionals about any concerns, allergies, or sensitivities to antibiotics. By sharing relevant information, patients can actively participate in the decision-making process and receive the most appropriate care.

Antibiotic resistance brought on by antibiotic overuse is regarded as a global public health issue and as one of the most serious. Up to 30% of antibiotic prescriptions are reportedly. Approximately 30% of antibiotic prescriptions are unnecessary, according to estimates[27]. According to recent reports, the rise of new, multi-drug resistant bacterial infections from South Asian nations, including India, should be taken seriously[28]. In healthy patients, tooth extraction is regarded as a simple surgical procedure that may not even call for prophylaxis. A study by several dental researchers raised worry over the unnecessary use of antibiotics administered by dentists as a preventative measure against infection[29].

A study that involved 207 individuals between the ages of 18 and 45 and evaluated the effectiveness of antibiotics in reducing post-extraction problems in a Chinese population found no connection between the use of antibiotics and the development of dry sockets[30]. Additionally, there was no discernible difference in the findings for gender and dry socket formation. These results were in line with the outcomes of numerous previous studies conducted in Iran, which are geographically comparable to Cairo, which found that although dry socket is more common in females than in males, there were no statistically significant differences between both genders[31]. In this study, a statistically significant difference between the antibiotic group and the non-antibiotic group was discovered while assessing the level of pain on different days in relation to the use of antibiotics and the presence of discomfort. The findings indicate that the majority of non-antibiotic intake cases experienced greater pain (pain VAS value of 7-9 vs. 1-3) than antibiotic intake cases. This discovery runs counter to the findings of earlier studies, including those of other researchers who found no conclusive link between the usage of antibiotics and pain relief.

The majority of teeth were removed in the current study due to severe caries. Following this, periodontal diseases caused extractions and were to blame. Numerous other investigations, including those conducted in Palestine[32] , Pakistan[33], correlate with these findings. The results of this study were in contrast to those of a study by Akinbami BO and Godspower T, who found that acute apical periodontitis was the most frequent cause of extraction. The pulpitis was then irreversible[34].

This research faces a few limitations. First, in order to reduce error, we had to conduct our research in a single, specialized facility that is only for the Department of Oral and Maxillofacial Surgery at Saveetha Dental College and Hospital. We also had to use the same materials and methods both before and after tooth extraction. Second, some patients refused to assist us in carrying out the research. The patients in our study had a variety of educational backgrounds, which guarantees the results' external validity in the South Indian population. The findings of our study highlight the need for educational programs to raise public understanding of the genuine needs for antibiotic use, the accompanying side effects, and, most significantly, to help combat the emergence of germ resistance.

Conclusion:

The results of the current study suggest that systemic treatment of post-extraction prophylactic antibiotics should only be used when strictly necessary. The use of antibiotics after oral extractions is not a one-size-fits-all approach. Dental professionals carefully evaluate each case to determine if antibiotics are necessary based on individual patient factors. By following evidence-based guidelines and considering the specific circumstances, antibiotics can be used effectively to prevent or treat infections, promoting optimal healing and oral health. Antibiotics should only be used in cases of serious infection, and the general population needs to be made aware of this. Antibiotic prescriptions are prevalent for a variety of medical issues among patients. A clear prescription for antibiotics after extraction should be created with the aid of the numerous investigations conducted for the dentist's convenience.

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AUTHOR CONTRIBUTIONS:

Many journals now require a statement detailing the specific role each author played in the research. This is often formatted using the CRediT (Contributor Roles Taxonomy), specifying who handled the conceptualization, the laboratory experimentation (the ZOI testing), the statistical analysis, and the writing or editing of the manuscript.

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CONFLICT OF INTEREST:

This is a mandatory declaration where authors state if they have any personal or financial relationships with the manufacturers of the toothpastes tested (e.g., Colgate, Sensodyne, or Dabur) that could be perceived as biasing the results. The authors declare no conflicts of interest regarding the publication of this paper.

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