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# Current Trend of Antibiotic Prescription for Oral Implant Surgery among Dentists in Central India

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**Abstract:** ***Objectives: This study explores the current trends of antibiotic prescription practices for oral implant surgery among dentists in Central India, highlighting the role of antibiotics in preventing postoperative infections and addressing concerns related to antibiotic overuse and resistance. Materials and Methods: A descriptive cross-sectional survey was conducted among 310 dentists, using a structured questionnaire to collect data on antibiotic choices, timing, and duration of prescriptions. Statistical analysis was performed using SPSS, with results evaluated through descriptive and analytical methods. Results: The majority (84.4%) of respondents preferred prescribing amoxicillin 500 mg combined with clavulanic acid 125 mg prophylactically. Most dentists (58.7%) administered antibiotics 24 hours before surgery, while 70.2% continued prescribing antibiotics for five days post-surgery. Ciprofloxacin was the most common alternative for penicillin-allergic patients. Conclusion: Despite 96.8% of participants being aware of antibiotic resistance, the study revealed variations in prescribing patterns, underscoring the need for standardized guidelines. These findings highlight the importance of balancing infection prevention with minimizing unnecessary antibiotic use to combat the global issue of antimicrobial resistance.***

**Keywords:** Antibiotic prescription, dental implants, oral implantology, prophylactic antibiotics, antimicrobial resistance, Central India

## 1. Introduction

Dental implants have revolutionized oral health, particularly for tooth replacement, offering a long-term solution that mimics natural teeth in aesthetics, speech, and function. Introduced by Branemark, dental implants have now become an integral part of prosthetic rehabilitation. However, implant failures still occur, often due to infections. To mitigate these risks, many dentists prescribe antibiotics as a prophylactic measure to prevent postoperative infections. While antibiotics are crucial for combating bacterial infections, their overuse has led to concerns about antimicrobial resistance, especially in procedures like oral implant surgery.

This article provides an overview of a comprehensive study aimed at assessing the current trends in antibiotic prescription for oral implant surgery among dentists in Central India. It evaluates the awareness, practices, and perception of antibiotic use in dental implants, emphasizing the need for evidence-based guidelines to address issues like antibiotic overuse and microbial resistance.

## 2. Materials and Methodology

### Study Design

The study was a descriptive cross-sectional survey conducted among dentists practicing oral implant surgery in Central India. After receiving institutional ethics committee clearance, the study utilized a structured, anonymous questionnaire administered both online and offline to 315 participants. The data collected focused on antibiotic prescription protocols, choice of antibiotics, timing, and duration of prescriptions. The sample was randomly selected, ensuring a diverse mix of practitioners from government, university, and private clinics.

### Statistical Analysis

Data was analyzed using the Statistical Package for the Social Sciences (SPSS Version 25). Descriptive and analytical methods were used, with Chi-square tests applied to determine the statistical significance of differences in responses, shown in table 1. Results with a p-value of less than 0.05 were considered statistically significant.

**Table 1**

| Questions | Mean | Std. Dev. | P Value |
|---|---|---|---|
| 1.Frequency distribution of dentists prefer to do implant supported rehabilitation in their routine dental clinical cases. | 1.99 | 1.04 | 0.826 |
| 2. Medication distribution preferred by dentists prophylactically. | 2.2 | 0.60 | 0.893 |
| 3.Duration of antibiotic prescription prophylactically. | 2.31 | 0.90 | 0.733 |
| 4.Types of antibiotic prescribed immediately after implant surgery. | 2.34 | 0.771 | 0.747 |
| 5.Duration of antibiotic prescription after implant surgery. | 1.8 | 0.510 | 0.523 |
| 6.Distribution of antibiotics for patient with allergy to penicillin. | 2.8 | 0.734 | 0.948 |
| 7.Use of loading dose for antibiotic prescription. | 1.53 | 0.499 | 0.004 |
| 8.Types of antibiotic prescribed in case of peri-implantitis. | 3.46 | 0.723 | 0.753 |
| 9.Awareness regarding drug resistance and adverse effect. | 1.03 | 0.175 | 0.895 |
| 10.Antibiotics which shows most common side effect. | 2.22 | 1.21 | 0.759 |

## 3. Results

Out of 315 respondents, 310 valid responses were included in the final analysis. Key findings included:

**1) Antibiotic Prescription Trends:**

- 84.4% of dentists preferred prescribing amoxicillin 500 mg combined with clavulanic acid 125 mg as a prophylactic antibiotic for implant surgery.
- Smaller groups of dentists prescribed amoxicillin with metronidazole (6.7%) or a combination of amoxicillin, clavulanic acid, and metronidazole (6.7%).

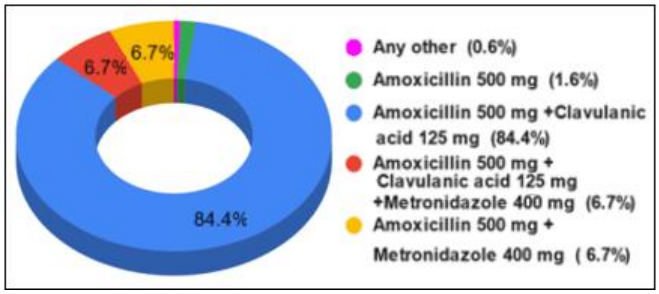


**Figure 1:** Medication distribution preferred by dentists prophylactically

- Result showed that 77.5 % of dentists prescribed amoxicillin 500 mg + clavulanic acid 125 mg immediately after implant surgery, 13.7 % dentists prescribed amoxicillin 500 mg + clavulanic acid 125 mg + metronidazole 400 mg, 6% prescribed amoxicillin 500 mg + metronidazole 400 mg, 1.9% prescribed amoxicillin 500 mg and 1 % prescribed any other antibiotic.

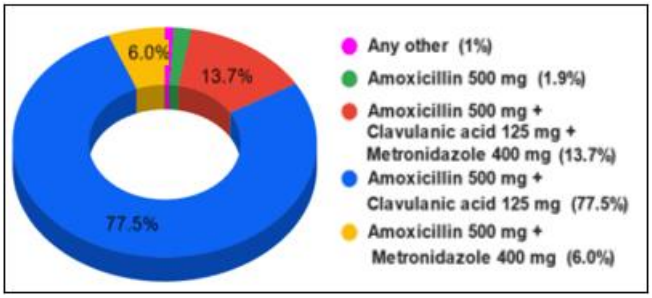


**Figure 2:** Types of antibiotics Prescribed Immediately after Implant Surgery

**2) Timing of Antibiotic Administration:**

- 58.7% of respondents administered antibiotics 24 hours before surgery, while 28.9% prescribed them 1 hour before surgery. A smaller percentage prescribed antibiotics 2 hours or even 48 hours before the procedure.

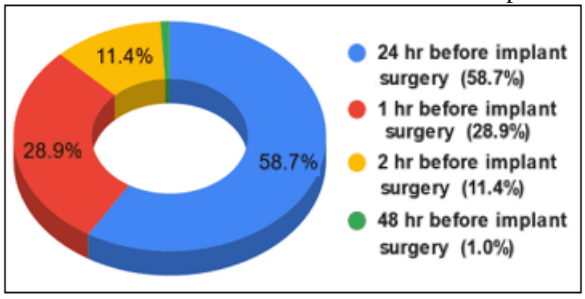


**Figure 3:** Duration of antibiotic prescription prophylactically

**3) Duration of Post-Surgery Antibiotic Use:**

- Most dentists (70.2%) prescribed antibiotics for 5 days post-surgery. Other durations included 3 days (24.8%) and 7 days (5.1%).

**4) Penicillin Allergy Alternatives:**

- For patients allergic to penicillin, ciprofloxacin was the most common alternative (49.2%), followed by azithromycin (35.6%), clindamycin (13%), and metronidazole (1.9%).

**5) Awareness of Antibiotic Resistance:**

- A significant majority (96.8%) of respondents were aware of the risk of antibiotic resistance, although this awareness did not always translate into practice.

**6) Loading Dose and Peri-Implantitis Treatment:**

- Only 46.3% of dentists used a loading dose for antibiotic prescriptions, while 56.8% preferred a combination of amoxicillin, clavulanic acid, and metronidazole for treating peri-implantitis.

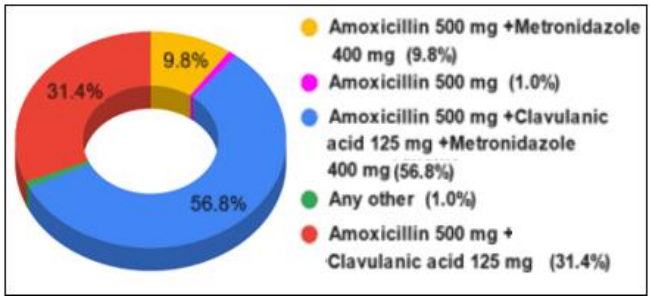


**Figure 4:** Types of Antibiotic Prescribed in case of Peri-implantitis

## 4. Discussion

The study found that a significant majority (84.4%) of dentists prefer prescribing amoxicillin 500 mg combined with clavulanic acid 125 mg prophylactically. Other combinations included amoxicillin 500 mg with metronidazole 400 mg (6.7%) and a combination of all three (6.7%).

The results of the study align with previous research indicating a widespread practice of prophylactic antibiotic prescription in dental implant surgeries. For instance, studies by Subasree Soundaranjan et al. (2022)[9] and Fabio Rodríguez Sánchez et al. (2019)[22] also found that amoxicillin 500 mg is a commonly prescribed antibiotic following implant placement. Additionally, these studies highlighted a lack of adherence to evidence-based guidelines, which was also observed in the current study.

A large proportion of dentists (58.7%) prescribed antibiotics 24 hours before the surgery, indicating a preventive approach to minimizing infections. A smaller percentage administer antibiotics 1 hour (28.9%), 2 hours (11.4%), or even 48 hours (1%) before surgery. Post-surgery, most dentists (70.2%) prescribe antibiotics for 5 days, while others prescribe for 3 days (24.8%) or 7 days (5.1%).

It is noteworthy that most other studies also recommend amoxicillin as the drug of choice in dento-alveolar surgery and oral implant surgery prophylaxis.[1,8]

Khalid E. El-Kholey et al. (2018)[27] and Iciar Arteagoitia et al.[22] highlighted significant variations in antibiotic prescribing patterns and a general tendency towards over-prescription, which aligns with the findings of the present study.

For patients allergic to penicillin, ciprofloxacin (49.2%) was the most preferred alternative, followed by azithromycin (35.6%), clindamycin (13%), and metronidazole (1.9%).

A high percentage (96.8%) of dentists were aware of the issue of antibiotic resistance and its adverse effects, yet the prescription patterns did not always reflect this awareness.

For treating peri-implantitis, the most commonly prescribed regimen was a combination of amoxicillin 500 mg along with clavulanic acid 125 mg and metronidazole 400 mg (56.8%).

The use of a loading dose was less common, with only 46.3% of dentists using it in their antibiotic prescription protocols.

The prevalent use of antibiotics, especially amoxicillin combined with clavulanic acid, underscores the need for standardizing antibiotic protocols in dental implantology to prevent misuse and overuse. The variability in antibiotic regimens and the extended duration of antibiotic courses raise concerns about antibiotic resistance and potential adverse effects. Given that a significant percentage of dentists are aware of drug resistance and its adverse effects, there is a critical need for continuous education and training to ensure adherence to evidence-based practices.

The study revealed a high level of awareness among dentists regarding the issue of antibiotic resistance, with 96.8% acknowledging its adverse effects. Despite this awareness, the study found that many dentists still prescribe antibiotics in scenarios that may not warrant their use. This discrepancy highlights a gap between knowledge and practice, emphasizing the need for stricter guidelines and policies to mitigate the risk of developing antibiotic-resistant microorganisms.

## 5. Conclusion

The study provides valuable insights into the current trends in antibiotic prescriptions for oral implant surgery among dentists in Central India. The results highlight the dominance of amoxicillin-clavulanic acid combinations and emphasize the need for standardized, evidence-based guidelines. Addressing these issues is critical to reducing antibiotic overuse and preventing resistance, ultimately improving patient outcomes in dental implantology.

This article provides a detailed analysis of the study, including a review of relevant literature, statistical analysis, and the clinical significance of findings. The conclusions drawn from this research emphasize the need for standardized antibiotic prescription practices to ensure better patient outcomes and reduce the risk of antimicrobial resistance.

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