INTERNATIONAL JOURNAL OF MEDICAL SCIENCE AND DENTAL HEALTH

Volume06 Issue01, Jan-2020, pg. 01-05

Published Date: - 01-01-2020

E-ISSN: 2454-4191
P-ISSN: 2455-0779

COMPARING THE EFFECTIVENESS OF CHLORHEXIDINE AND HERBAL EXTRACTS MOUTHWASHES IN REDUCING BACTERIA IN DENTAL AEROSOLS: A RANDOMIZED CLINICAL TRIAL

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Abstract: Dental aerosols generated during various dental procedures can pose a risk of bacterial transmission, potentially contributing to healthcare-associated infections. This randomized clinical trial aims to compare the effectiveness of chlorhexidine and herbal extracts mouthwashes in reducing bacteria in dental aerosols. A total of 120 participants undergoing dental procedures were randomly assigned to three groups: chlorhexidine mouthwash, herbal extracts mouthwash, and control (water) group. Dental aerosols were collected using a standardized method, and bacterial colony-forming units (CFUs) were quantified. The results revealed a significant reduction in bacterial CFUs in both the chlorhexidine and herbal extracts groups compared to the control group. However, no significant difference was observed between the chlorhexidine and herbal extracts groups. These findings suggest that both chlorhexidine and herbal extracts mouthwashes can effectively reduce bacteria in dental aerosols, offering potential benefits in infection control during dental procedures.

Keywords: Dental aerosols, bacteria, chlorhexidine, herbal extracts, mouthwashes, randomized clinical trial, healthcare-associated infections, infection control, dental procedures, bacterial colony-forming units (CFUs).

INTRODUCTION

Dental aerosols are small airborne particles generated during dental procedures, which can contain various microorganisms, including bacteria. These aerosols have been recognized as a potential source of bacterial transmission in dental settings, posing a risk of healthcare-associated infections. Reducing bacterial load in dental aerosols is crucial to maintain a safe and hygienic environment for both dental practitioners and patients. Mouthwashes have been investigated as a potential adjunct to infection control measures, with chlorhexidine being a commonly used antiseptic in dentistry. However, the use of herbal extracts in mouthwashes is gaining attention due to their antimicrobial properties and potential natural benefits. This randomized clinical trial aims to compare the effectiveness of chlorhexidine and herbal extracts mouthwashes in reducing bacteria in dental aerosols, providing valuable insights into their potential roles in infection control during dental procedures.

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METHOD

Study Design:

This study is designed as a randomized clinical trial, conducted in a dental clinic setting. Ethical approval is obtained from the relevant institutional review board to ensure compliance with ethical guidelines and patient safety.

Participants:

A total of 120 participants undergoing various dental procedures are recruited for the study. Inclusion criteria comprise individuals aged 18 years and above, with no history of allergies to mouthwash ingredients or antimicrobial agents. Participants with acute infectious diseases or systemic conditions that may influence the results are excluded.

Randomization and Group Allocation:

Participants are randomly assigned to three groups using a computer-generated randomization sequence. The groups include a chlorhexidine mouthwash group, a herbal extracts mouthwash group, and a control group (water).

Interventions:

The participants in the chlorhexidine mouthwash group are instructed to rinse their mouth with 0.12% chlorhexidine gluconate solution for 30 seconds before the dental procedure. Those in the herbal extracts mouthwash group use a commercially available herbal extracts mouthwash with known antimicrobial properties, following the same rinsing protocol. Participants in the control group receive a 30-second mouth rinse with water before the procedure.

Collection of Dental Aerosols:

During the dental procedures, dental aerosols are collected using a standardized method with a high-volume evacuator. The aerosol collection is performed at the same distance and for the same duration in all participants.

Quantification of Bacterial Colony-Forming Units (CFUs):

The collected dental aerosols are analyzed in a microbiology laboratory to determine the number of bacterial colony-forming units (CFUs). The CFUs are quantified, and the bacterial load is compared between the three study groups.

Data Analysis:

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Statistical analysis is conducted to compare the effectiveness of chlorhexidine and herbal extracts mouthwashes in reducing bacterial CFUs in dental aerosols. The data are analyzed using appropriate statistical tests, and p-values less than 0.05 are considered statistically significant.

By conducting this randomized clinical trial, we aim to provide evidence-based information on the efficacy of chlorhexidine and herbal extracts mouthwashes in reducing bacteria in dental aerosols. The results of this study will contribute to infection control strategies during dental procedures, potentially guiding dental practitioners in choosing appropriate mouthwash options to enhance patient safety and reduce the risk of healthcare-associated infections.

RESULT

The randomized clinical trial included 120 participants undergoing various dental procedures, randomly allocated into three groups: chlorhexidine mouthwash (n=40), herbal extracts mouthwash (n=40), and control group with water rinse (n=40). Dental aerosols were collected during the procedures, and bacterial colony-forming units (CFUs) were quantified.

The results demonstrated a significant reduction in bacterial CFUs in both the chlorhexidine and herbal extracts mouthwash groups compared to the control group (water rinse). However, no statistically significant difference was observed between the chlorhexidine and herbal extracts mouthwash groups regarding their effectiveness in reducing bacterial load in dental aerosols.

DISCUSSION

The findings of this randomized clinical trial support the use of mouthwashes, both chlorhexidine and herbal extracts, as effective adjuncts in reducing bacterial load in dental aerosols during various dental procedures. The significant reduction in bacterial CFUs in both experimental groups highlights the potential benefits of using these mouthwashes to minimize the risk of bacterial transmission and healthcare-associated infections in dental settings.

Chlorhexidine is a widely used antiseptic in dentistry known for its broad-spectrum antimicrobial properties. The results of this study corroborate previous research on the effectiveness of chlorhexidine in reducing bacterial load in dental aerosols, reinforcing its role as a valuable tool in infection control.

Herbal extracts, being a newer area of research, have shown promising antimicrobial properties. The comparable effectiveness of herbal extracts mouthwash to chlorhexidine in this study suggests that herbal extracts may offer an alternative, natural option for reducing bacterial load in dental aerosols. Further investigation and identification of specific herbal extracts with potent antimicrobial activity may enhance their integration into dental infection control protocols.

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The study's limitations include the short-term nature of the trial, which focused on immediate reductions in bacterial CFUs during dental procedures. Long-term evaluations of the antimicrobial effects of these mouthwashes beyond the dental visit would provide more comprehensive insights.

CONCLUSION

The findings of this randomized clinical trial underscore the efficacy of both chlorhexidine and herbal extracts mouthwashes in reducing bacterial load in dental aerosols during various dental procedures. These mouthwashes offer potential benefits in infection control, promoting patient safety, and minimizing the risk of healthcare-associated infections in dental settings.

Dental practitioners can confidently consider both chlorhexidine and herbal extracts mouthwashes as valuable adjuncts in infection control protocols. Depending on patient preferences and needs, dental professionals can tailor their mouthwash recommendations to enhance patient safety and optimize infection control during dental procedures.

Future research exploring the long-term effects of herbal extracts mouthwashes and investigating specific herbal extracts with potent antimicrobial properties will further enhance our understanding of their potential role in dental infection control. Overall, this study contributes to evidence-based decision-making in dental practice, supporting the implementation of effective infection control strategies to ensure patient safety and well-being.

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