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Surveying Dentists' Perspectives on Intracanal Medicaments: A Comprehensive Systematic Review

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Abstract

Background: Endodontic therapy is vital in preserving natural dentition, with the selection and application of intracanal medicaments playing a pivotal role in treatment outcomes. This systematic review explores dentists' perspectives on intracanal medicaments, focusing exclusively on survey articles. Methods: A comprehensive search across databases, including PubMed, Google Scholar and Science Direct was conducted to identify relevant survey articles published within the last decade. Inclusion criteria encompassed studies exploring dentists' knowledge, attitudes, and behaviors related to intracanal medicaments in the context of endodontic therapy. Exclusion criteria were applied to ensure the relevance and quality of the selected studies. Results: The systematic review identified, analyzed, and synthesized findings from survey articles, providing a nuanced understanding of dentists' viewpoints. The analysis delved into current practices and explored factors influencing choices specifically related to intracanal medicaments. The dynamic nature of endodontics necessitated a thorough understanding of practitioners' perspectives to inform evidence-based practices and enhance patient care. Conclusion: This systematic review bridges existing gaps in the literature, offering a contemporary and comprehensive exploration of the factors guiding dentists' choices regarding intracanal medicaments. The insights garnered contribute valuable resources for dental practitioners, educators, and researchers striving to optimize endodontic practices.

Keywords: Endodontic therapy, Intracanal medicaments, Dentists' perspectives, Survey articles, Treatment outcomes.

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INTRODUCTION

Endodontic therapy, a cornerstone in modern dentistry, is crucial for preserving natural dentition. The selection and application of intracanal medicaments are pivotal elements influencing treatment outcomes, with dentists' perspectives shaping clinical practices. This systematic review synthesizes findings from relevant survey articles to comprehensively explore dentists' viewpoints on intracanal medicaments. As emphasized by Gulabivala et al, understanding these perspectives is imperative for refining endodontic protocols and enhancing patient outcomes.[1] The analysis delves into current practices and factors influencing choices in endodontic therapy. [2] Focused exclusively on surveys exploring dentists' perspectives on intracanal medicaments, this review systematically identifies, analyzes, and synthesizes pertinent articles. The examination of dentists' knowledge, attitudes, and behaviors, coupled with an exploration of factors influencing their choices and practices specifically related to intracanal medicaments, contributes valuable insights to the field. The dynamic nature of endodontics necessitates a thorough understanding of practitioners' perspectives on intracanal medicaments.[3] Studies, such as the one conducted by Jasmina Mironova et al, underscore the importance of exploring factors influencing dentists' decisions specifically in the context of intracanal medicaments.[4] By bridging existing gaps in the literature, this systematic review provides a contemporary and nuanced understanding of the factors guiding dentists' choices regarding intracanal medicaments, offering a valuable resource for dental practitioners, educators, and researchers striving to optimize endodontic practices.

METHODOLOGY

This systematic review aims to investigate the prevailing opinions and practices among licensed dentists regarding the selection, application, and assessment of intracanal medicaments in endodontic therapy.

The importance of understanding dentist perspectives is underscored by the potential impact on clinical practices and patient outcomes.

Objectives

To systematically identify, analyze, and synthesize survey articles investigating dentists' perspectives on intracanal medicaments, encompassing their knowledge, attitudes, behaviors, and exploring factors influencing choices and practices in the context of endodontic therapy.

Search Strategy

A comprehensive search conducted in databases such as PubMed, Google Scholar and Science Direct. The search strategy combine controlled vocabulary terms (MeSH terms) and free-text keywords.

Search Terms:

- Dentists OR Dental practitioners OR Endodontists
- Intracanal medicaments OR Root canal irrigants OR Endodontic medications
- Surveys and questionnaires OR Attitude of health personnel OR Practice patterns, dentists

Inclusion and Exclusion Criteria

Inclusion Criteria:

1. Peer-reviewed articles published in the last 10 years.
2. Original survey articles conducted among licensed dentists.
3. Studies focusing on intracanal medicaments in endodontic therapy.
4. Articles published in English.

Exclusion Criteria:

1. Non-survey studies.
2. Studies conducted among non-dental professionals or dental students.
3. Grey literature, conference abstracts, or articles without peer review.
4. Studies published more than 10 years ago.

Study Selection

Two independent reviewers conducted title/abstract screening and full-text review. Disagreements was resolved through consensus or consultation with a third reviewer. The systematic review adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines, with the review protocol registered to enhance transparency and reproducibility (Fig 1) (Table 1).

Data Extraction

A standardized data extraction form was developed to collect information on study design, participant characteristics, survey methodologies, and key findings related to intracanal medicaments Table 2.

Table 1: Survey studies reason for exclusion

S. No.	Author & year	Survey studies reason for exclusion
1.	Hrishikesh Nalimbe et al, 2015	Used pulp devitalizers only
2.	Lokhesudhan et al, 2017	Used systemic Antibiotics
3.	Akshay Khandelwel et al, 2018	Used herbal products only
4.	Haji Maysoon et al, 2020	Included irrigants
5.	Anna Mikhaikina et al, 2023	Used chelating agents
6.	Muhammad Q Javad et al, 2023	Included irrigants

Data Analysis

In this systematic review, a formal risk of bias or quality assessment was not conducted. Given the diverse types of survey articles included in the review, ranging from cross-sectional studies to longitudinal surveys, and the inherent methodological variability in survey designs, applying a standardized quality assessment tool was deemed unsuitable. The decision not to perform a quality assessment was made to avoid potential limitations associated with applying a tool designed for controlled trials to a heterogeneous set of survey studies. This approach allowed for the inclusion of valuable insights from different types of survey research while acknowledging the inherent methodological variations.

RESULTS AND DISCUSSION

The systematic review identified a total of six survey articles meeting the inclusion criteria. The analysis revealed diverse perspectives among dentists regarding intracanal medicaments, with variations observed in knowledge, attitudes, and practices across different regions and practice settings. Key findings include insights into dentists' preferences for specific intracanal medicaments, such as calcium hydroxide, chlorhexidine, and antibiotic pastes, as well as variations in usage patterns and techniques. Factors influencing dentists' choices included considerations of efficacy, safety, availability, cost-effectiveness, and patient preferences. The review also highlighted areas of consensus and divergence among dental practitioners, providing a comprehensive overview of current practices and preferences in endodontic therapy.

1. Survey Methodology and Participant Characteristics

The studies employed different survey methodologies, including observational and descriptive questionnaire surveys. The participant count ranged from 56 to 485, encompassing endodontists, general dental practitioners (GDPs), dental interns, and undergraduate dental students. The studies utilized diverse data collection methods, such as web-based questionnaires, email-delivered open-ended questions, and anonymous questionnaires administered in dental care facilities.

2. Preferences and Practices of Dentists Regarding Intracanal Medicaments

Preferences for intracanal medicaments varied across studies. Thouseef et al. highlighted non-setting Calcium Hydroxide as the most commonly preferred medicament among endodontists.[5] Ahmad A Madarati's study revealed a trend for using intracanal medicaments in cases of necrotic pulp without apical lesions, emphasizing the need for general dental practitioners to reduce reliance on phenol- and formaldehyde-based medications.[6] Ayman Mandorah et al. focused on knowledge gaps among dental professionals and students in Saudi Arabia regarding intracanal medications, emphasizing inadequate knowledge and its potential implications for future endodontic practice in the region.[7]

Table 2: Extracted Data from Included articles [4,5,6,7,8,9]

Author	Design	Methodology	Main Findings	Participants	Variables	Objectives	Interventions	Limitations
Mironova et al. [4]	Observational Study, Survey-based Design	Survey to 249 dentists, IBM SPSS Statistics 26	High usage of ICMs, difficulty in complete removal, importance in endodontic treatment	249 Dentists	Work experience, clinical use, specialization	Evaluate awareness and clinical use	Calcium hydroxide, Antibiotics, Phenolic compounds	Difficulty in complete removal, Need for increased theoretical knowledge
Thouseef Ch et al.[5]	Observational and Descriptive Questionnaire Survey	Email-delivered open-ended questions, Descriptive statistics	Preferences of endodontists for intra-canal medicaments, common methods of delivery	56 Endodontists	Method of delivery, preference for intra-canal medicaments, use for different endodontic issues	Assess preferences, delivery methods, and importance	Non-setting Calcium Hydroxide, Formocresol, Triple antibiotic paste	Currently available materials have limitations, variability in clinical practice
Madarati et al.[6]	Observational and Descriptive Study	Web-based questionnaire, SPSS, Chi-square test	Recognition of ICMs' main function, trends in usage, need to reduce reliance on certain medications	50 General Dental Practitioners, Endodontists	Demographic characteristics, sample size, data collection method, statistical analysis methods	Investigate preferences and practices among GDPs and endodontists	Calcium hydroxide, Formocresol, Antibiotics	Response rate bias, Limited generalizability, Selection bias
Mandorah et al.[7]	Cross-sectional Questionnaire Survey	Web-based survey, Chi-square test	Inadequate knowledge about ICMs, implications for future practice	485 Participants (Endodontists, GDPs, Interns, Students)	Age, gender, type of practitioner, magnification tool use	Evaluate knowledge and practice, determine preferences	Calcium hydroxide, Formocresol, Antibiotics	Sample size may not be representative, Response bias, Cross-sectional design
Furusawa et al.[8]	Observational Study - Cross-sectional	Anonymous questionnaire, Aspiring dental hygienists	Differences in intracanal medication usage in Japan compared to Europe and US	94 Dental Hygienists in Saitama and Shizuoka Prefectures	Types of frequently used intracanal medications, methods of application	Determine types of frequently used intracanal medications	Calcium hydroxide, Paraformaldehyde, Phenolic compounds	Limited previous research, Variability in surveyed facilities
Jayasenthil et al.[9]	Observational Cross-sectional Survey	Survey with 20 questions, Descriptive analysis in SPSS	Importance of ICMs, common usage, potential adverse effects	100 Dental Practitioners and Non-Endodontic Specialists	Age, gender, practitioner type, magnification tool use	Evaluate knowledge and awareness	Calcium hydroxide, Chlorhexidine, Antibiotics	Limited representativeness, Response bias, Need for more education

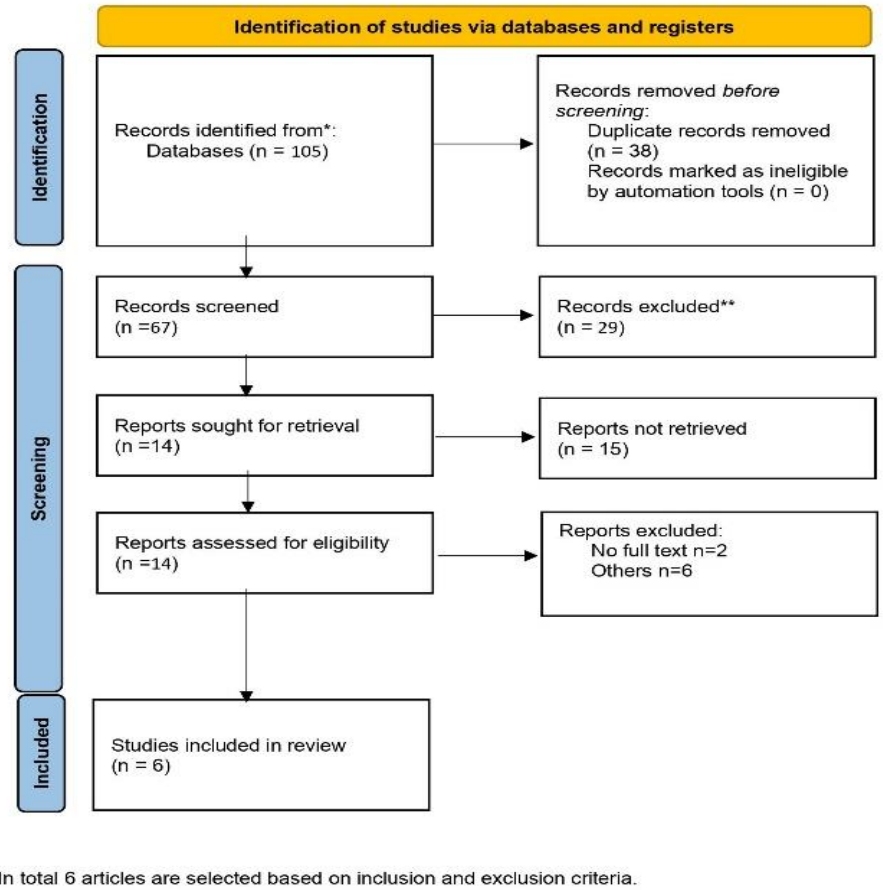

Figure 1: PRISMA flowchart for included article

3. Factors Influencing Medicament Preferences

1. Type of Endodontic Condition: Different endodontic conditions (pulpal necrosis, apical periodontitis, etc.) may necessitate specific medicaments based on their intended action and efficacy against particular microbes. Thouseef et al. emphasize the importance of this aspect, highlighting how medicament choices vary depending on the type of endodontic issue being addressed.[5]

2. Availability of Materials: Accessibility and cost of medicaments can significantly impact preferences. Ayman Mandorah et al. acknowledge this by including availability of materials as a potential factor influencing choices. Limited access to certain medicaments might lead practitioners to adopt alternatives based on what's readily available.[7]

3. Method of Delivery: Delivery methods influence medicament selection. As Thouseef et al. mention, the method of delivery can shape medicament preferences due to different medicaments having varying suitability for different delivery techniques.[5]

4. Practitioner Characteristics: Practitioner characteristics, including age, gender, and professional specialization (e.g., specialist vs. general dentist), significantly influence medicament choices in dental practice. Age reflects accumulated experience and exposure to evolving trends, with older practitioners often favoring traditional choices while younger ones may embrace newer, evidence-based approaches. Gender dynamics also play a role, with research suggesting differing communication styles. Specialists, with focused training, wield deeper knowledge relevant to their specialty, tailoring choices to patient needs, while general dentists opt for versatile medicaments applicable across varied treatments. These characteristics intersect, shaping nuanced choices; for example, an older general dentist may rely on established preferences, whereas a younger specialist might explore alternatives.[7]

5. Technological Advancements: The use of magnification tools during endodontic procedures, as explored by Ayman Mandorah et al, might influence medicament choices. With better visualization, practitioners might be more inclined to use specific medicaments requiring precise application or monitoring.[7]

4. Sample size and methodology

The varied methodological aspects can influence the generalizability and reliability of studies on medicament preferences, as highlighted by Madarati et al.[6]

5. Challenges in Medicament Usage

Challenges in the usage of intracanal medicaments were a recurrent theme across the studies. Difficulty in complete removal of intracanal medicaments was acknowledged, impacting the success of root canal therapy.[4] Ahmad A Madarati's study reported potential adverse effects, such as discoloration, further emphasizing the need for a balanced consideration of medicament choices based on clinical needs. [6]

6. Comparison with International Practices

Masahiro Furusawa's study provided a unique perspective by comparing the usage of intracanal medications in Japan to practices in Europe and the US.[8] This comparison raised questions about the influence of cultural and regional factors on dental practices, highlighting the importance of considering diverse global practices in endodontic care. Therefore, more regional surveys help in better understanding of this criteria.

7. Educational Implications

The studies collectively underscored the importance of continuing dental education programs. Ayman Mandorah et al. emphasized the potential implications of inadequate knowledge among dental professionals in Saudi Arabia and advocated for the development of guidelines, protocols, and educational programs.[7] Athikesavan Jayasenthil et al. highlighted the need for more continuing dental education programs with active practitioner participation to keep them updated about intracanal medicaments. [9]

8. Study Limitations and Suggestions for Future Research

All studies acknowledged limitations, including sample size considerations, potential response biases, and the cross-sectional nature of the designs. Ahmad A Madarati et al. specifically mentioned the limitations of sample size not being representative of the entire population and potential response bias.[6] Thouseef et al. recognized the need for further research and the limitations associated with the variability in clinical dental practice regarding the use of antimicrobial materials for root canal irrigation and medication.[5] Jasmina Mironova's study acknowledged the difficulty in complete removal of intracanal medications based on clinical experience.[4]

9. Global Implications: Understanding Dentists' Perspectives Beyond Borders

In various countries, especially those with diverse healthcare settings and resource constraints, understanding dentists' perspectives on intracanal medicaments is imperative. The approaches and preferences among dental practitioners in different regions influence treatment outcomes. More studies in this domain are essential to bridge existing gaps and cater to the unique challenges posed by diverse cultural, socioeconomic, and healthcare landscapes. The need for tailored and evidence-based endodontic practices is paramount, not only for optimizing patient care but also for informing educational curricula and policy decisions. Conducting additional studies in this field globally is crucial for advancing dental knowledge, enhancing treatment efficacy, and promoting accessible and absolute solutions.

CONCLUSION

In conclusion, the findings from these studies provide an understanding of dentists' preferences and practices related to intracanal medicaments. While crucial, the surveyed questions covering general understanding, medicament specifics, clinical application, safety, and emerging trends are foundational. However, deeper exploration is necessary.

Surveys should probe dentists' decision-making on medicament selection across clinical conditions like irreversible pulpitis versus necrotic pulp. Additionally, assessing awareness of adverse effects and the pros and cons of commonly used medicaments is vital. These insights inform targeted education and development initiatives and shape evidence-based guidelines for endodontic therapy.

Conflicts of Interest

The author reports no conflicts of interest.

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