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How General Dentists Practice Endodontics: An Exploratory Survey of Treatment Practices and Opinions of General Dental Practitioners in Greater Noida

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ABSTRAC

Endodontics is a specialized branch of dentistry focused on the treatment of diseases related to the dental pulp and surrounding tissues. While endodontic procedures are traditionally performed by endodontists, general dental practitioners (GDPs) often provide these services in their daily practice. This article explores the differences in endodontic practices between GDPs and endodontists, highlighting why the latter may deliver superior care. An exploratory survey was conducted among GDPs in Greater Noida to assess their training, procedures performed, challenges faced, use of diagnostic tools, and referral patterns. The findings aim to provide insights into the current state of endodontic care provided by GDPs and to identify potential areas for improvement.

Material and Methodology:

The study utilized a structured survey questionnaire distributed to GDPs practicing in Greater Noida. The survey comprised multiple sections, including questions about endodontic training and education, the frequency and types of procedures performed, diagnostic tools used, challenges encountered during treatment, referral practices, and commitment to continuing education. Respondents were asked to indicate their practices and opinions, which were then analyzed to identify trends and gaps in their approach to endodontics compared to specialized endodontists.

Statistical Analysis:

Descriptive statistics, including frequencies and percentages, were used to summarize the responses for each survey question. Inferential statistics, such as chi-square tests and ANOVA, were employed.

Results and Conclusion:

The study concludes that endodontists, with their specialized training, focused practice, and commitment to continuous education, are better equipped to handle complex cases and provide higher quality endodontic care. To improve patient outcomes, there is a need for GDPs to pursue additional training and continuing education in endodontics.

Keywords : Endodontist, general dental practitioner, specialists, survey

Introduction

Endodontics, a specialized field within dentistry, focuses on diagnosing, preventing, and treating diseases of the dental pulp and surrounding tissues. While endodontic procedures are traditionally associated with specialists, general dental practitioners (GDPs) also play a crucial role in providing these services. This exploratory survey examines the endodontic practices, challenges, and continuing education needs of GDPs in Greater Noida.(1) By understanding their experiences and opinions, we aim to shed light on current practices and potential areas for improvement in endodontic care.(2,3)

1. **Endodontic Training and Education**

A significant aspect of the survey focused on the formal training and education GDPs receive in endodontics during their dental education. Formal training is essential to equip practitioners with the necessary skills and confidence to perform endodontic procedures.

Training Background: The survey revealed that a considerable number of GDPs had received formal training in endodontics. This training varied in format, including lectures, workshops, and clinical

rotations, with durations ranging from a few weeks to several months. A minority of practitioners reported having no formal endodontic training, indicating a potential gap in their undergraduate education.

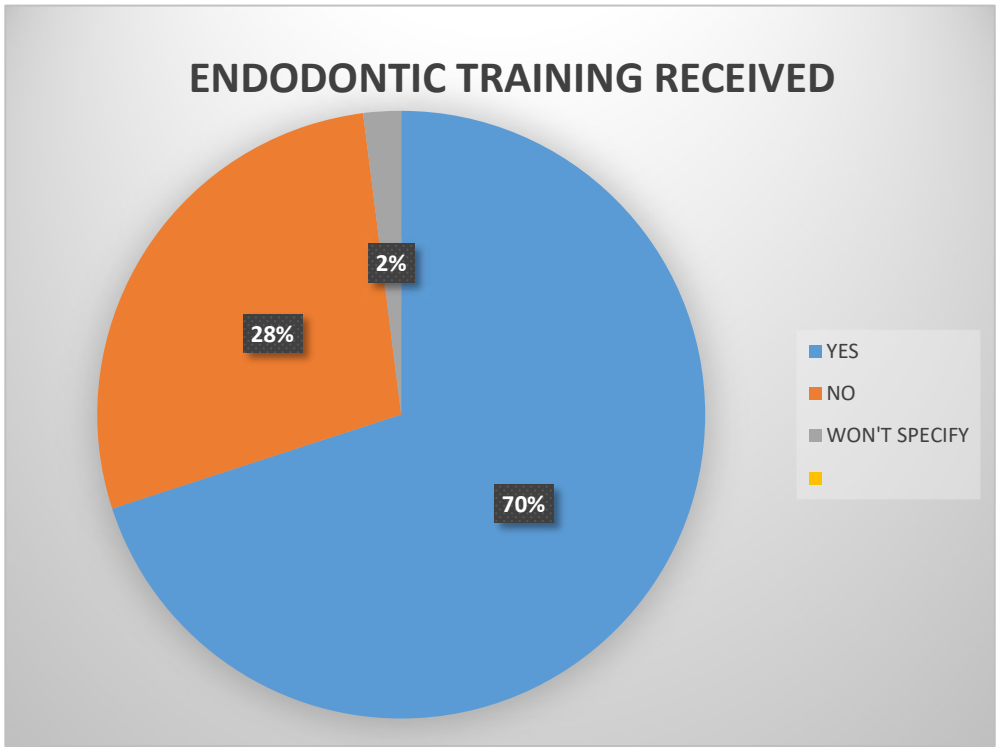

Figure 1 : Indicates how many dentists have formally received endodontic training in the form of hands on, short courses, specialised hands on sessions, Mastership etc

2. **Endodontic Procedures Performed by GDPs**

The survey explored the types and frequency of endodontic procedures performed by GDPs in their practices. (3)

Frequency of Procedures: Most respondents reported performing 5 to 10 endodontic procedures per month, while a smaller group indicated conducting more than 20 procedures monthly. This variation reflects the diverse patient demographics and case complexities encountered by GDPs in Greater Noida.

Common Procedures: The most commonly performed endodontic procedure was root canal therapy, followed by root canal retreatment and pulpotomy. Apical surgeries, such as apicoectomies, were less frequently performed, suggesting that more complex cases are often referred to specialists.

3. **Diagnostic Tools in Endodontic Practice**

Accurate diagnosis is critical in endodontic treatment. The survey assessed the diagnostic tools GDPs use in their practice.

Preferred Diagnostic Tools: Radiographs (X-rays) were the most commonly used diagnostic tool among GDPs, followed by pulp vitality tests, such as cold and heat tests, and electronic apex locators. Cone Beam Computed Tomography (CBCT) was used less frequently, possibly due to its higher cost and limited availability in general practice settings.

4. **Challenges in Endodontic Practice and Referral Patterns**

Endodontic procedures can be technically challenging, and GDPs often encounter various difficulties. The survey sought to identify these challenges and understand referral patterns for complex cases. (4)

Common Challenges: Respondents highlighted several challenges, including difficulty in locating root canals, managing curved or calcified canals, and achieving adequate disinfection. Some practitioners also mentioned patient-related factors, such as anxiety and poor cooperation, as significant hurdles.

5. **Referral Practices**: Many GDPs reported referring complex endodontic cases to specialists, especially when encountering anatomical complexities, the need for advanced surgical procedures, or when

patients requested specialist care. Factors influencing referrals included the complexity of the case, the practitioner's level of expertise, and the availability of endodontic specialists.(5)

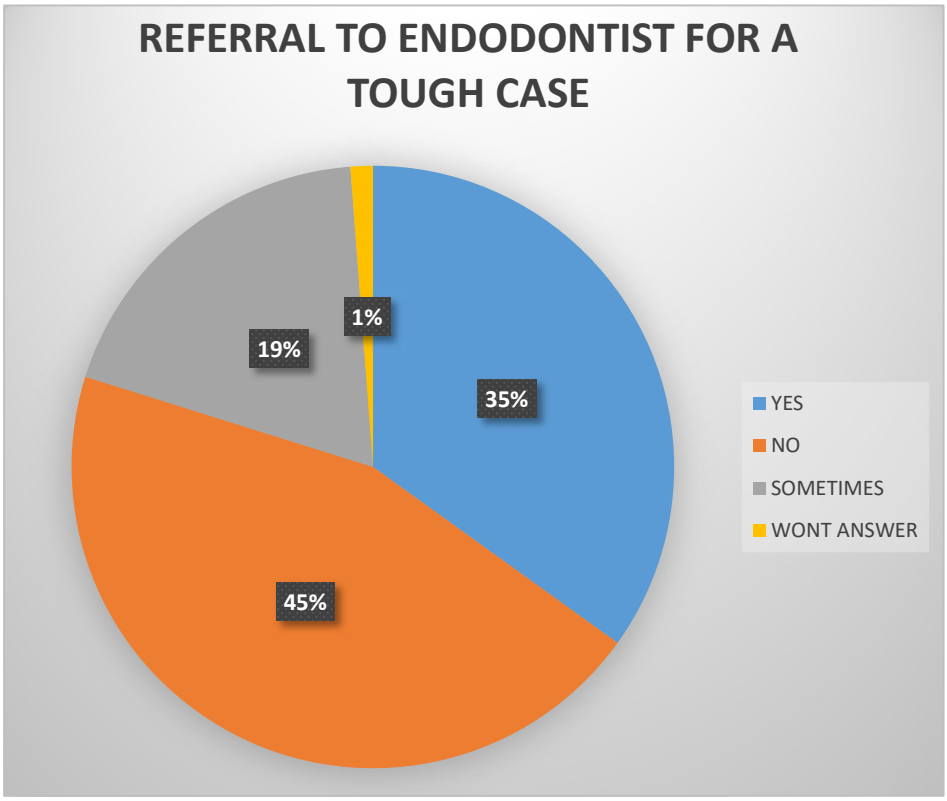

Figure 2 : Indicates how many refer a complex case to an endodontist

6. **Continuing Education and Professional Development**

Staying updated with advancements in endodontic techniques and technologies is vital for providing quality care. The survey explored the continuing education practices of GDPs.

Education Preferences: The majority of GDPs expressed a preference for attending continuing education courses and seminars to stay updated on the latest developments in endodontics. Reading scientific journals, participating in online forums, and engaging in peer discussions were also popular methods of continuing education.

Interest in Further Training: A significant number of respondents showed interest in participating in additional training or workshops focused on endodontics, indicating a strong desire for professional growth and improving clinical skills.

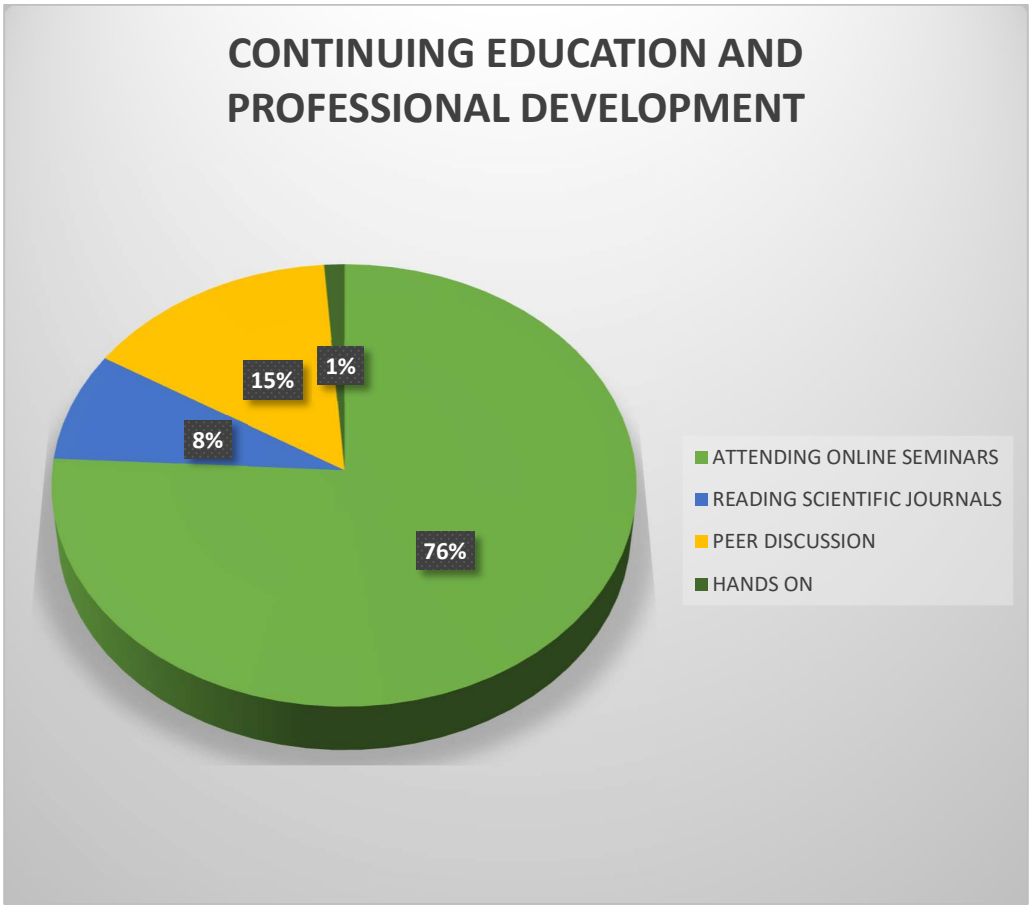

Figure 3 : Indicates how many refer a complex case to an endodontist

7. **Endodontic Practice Protocols**

Adherence to established protocols is crucial for the success of endodontic treatments. The survey examined the use of specific protocols and tools by GDPs.(6,7)

Use of Rubber Dam: While the rubber dam is considered a standard protocol in endodontic procedures to ensure isolation and prevent contamination, its usage varied among respondents. Some GDPs used it consistently, while others did so selectively, depending on the case complexity and patient factors. (8)

Apex Locators and Magnification: The survey found a diverse range in the use of apex locators for determining working length, with some practitioners using them in all cases, while others did so selectively. Similarly, the use of magnification tools, such as loupes or dental microscopes, varied among practitioners, often based on case difficulty and the GDP's comfort level with the technology. (9)

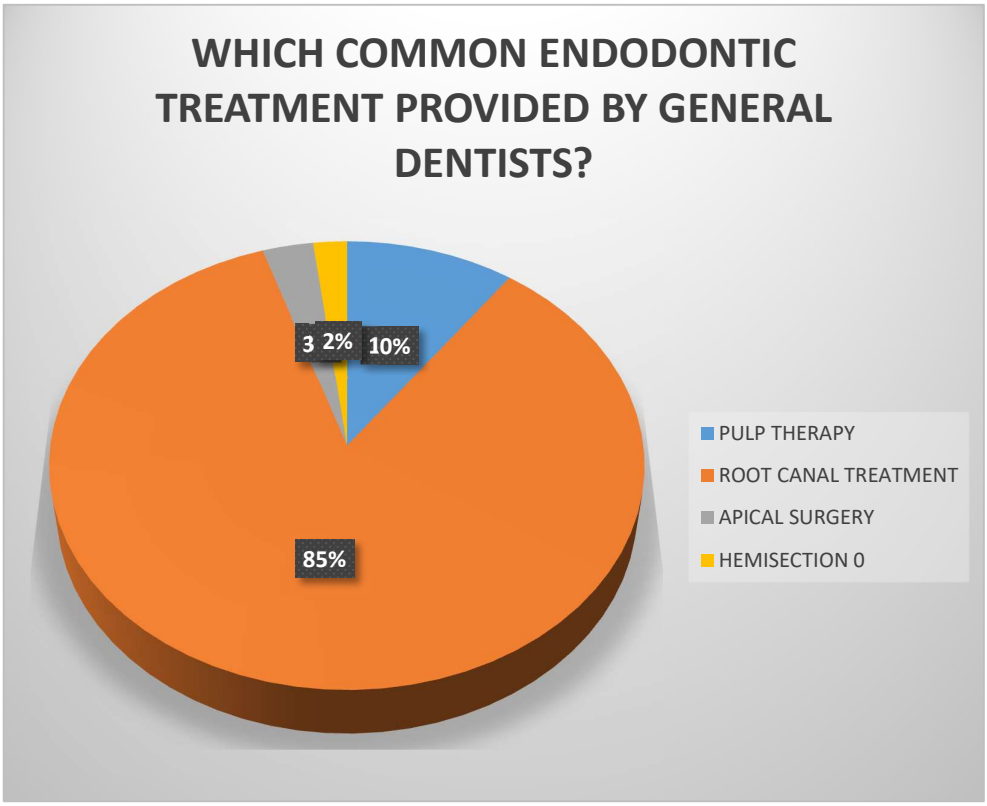

Figure 4 : Indicates which is the most performed treatment by GDPs

8. **Treatment Approaches and Patient Management**

Understanding GDPs' perspectives on treatment approaches and patient management can provide insights into their decision-making processes.

Routine Follow-Up: Many GDPs conducted routine follow-up appointments for patients who had undergone root canal treatment to monitor healing and identify any post-treatment complications.

Predictability of Treatment: Most respondents considered root canal treatment a predictable option for most cases, reinforcing their confidence in providing such care to their patients.

9. **Financial Considerations in Endodontic Treatment**

The survey also explored how financial considerations might impact treatment decisions and outcomes.

Impact of Financial Status: A significant number of GDPs acknowledged that the financial status of a patient could affect the treatment outcome and plan. This reflects the reality that economic factors often influence the choices patients make regarding their care.

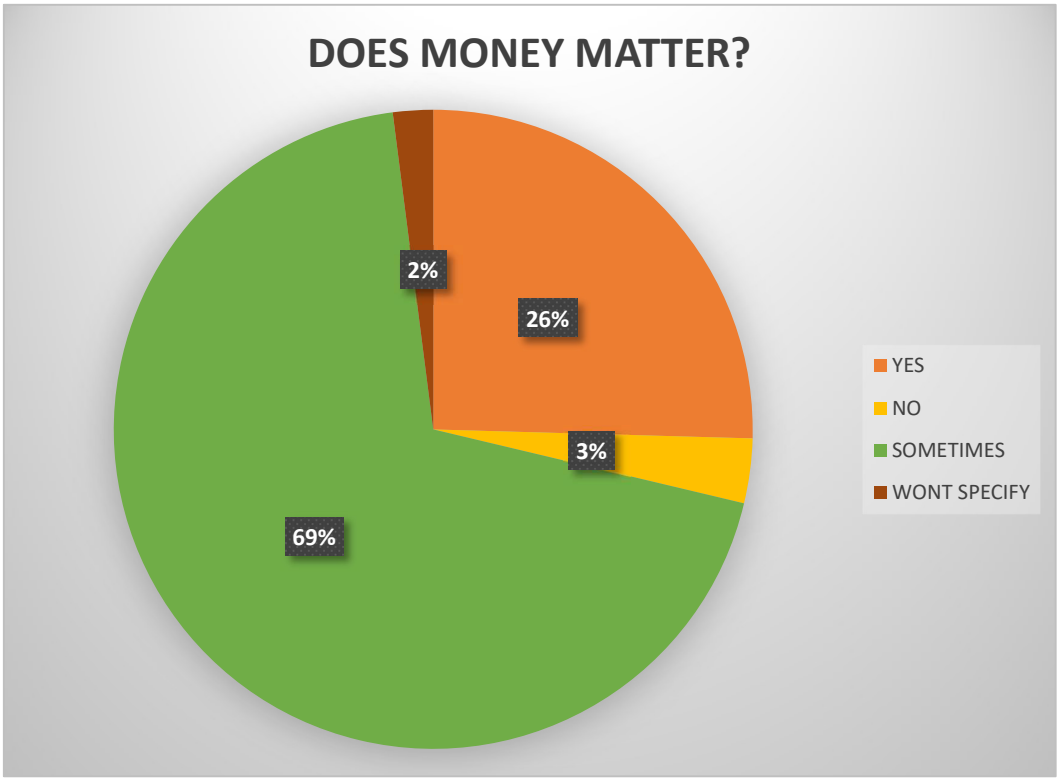

Fig 5: Indicates if the treatment plan is formulated according to the patients financial barriers

Statistical Analysis for the Endodontic Practices Survey

To gain meaningful insights from the survey on endodontic practices among general dental practitioners (GDPs) in Greater Noida, a statistical analysis was conducted on the collected data. This analysis aimed to quantify the prevalence of various endodontic practices, identify patterns, and understand correlations between different variables.

1. Descriptive Statistics

Descriptive statistics were used to summarize the survey data. This included calculating frequencies, percentages, means, and standard deviations for the various questions:

a) **Endodontic Training**: The proportion of GDPs who received formal training in endodontics during their dental education was calculated, along with the types and durations of training received.

b) **Endodontic Procedures**: The average number of endodontic procedures performed per month by GDPs was determined, as well as the frequency distribution for the different types of procedures (e.g., root canal therapy, retreatments, pulpotomy, etc.).

c) **Diagnostic Tools**: The usage rates of different diagnostic tools (e.g., radiographs, CBCT, pulp vitality tests) were computed to understand which tools are most commonly employed by GDPs.

d) **Challenges and Referral Practices**: The challenges encountered by GDPs during endodontic procedures were categorized and quantified. Referral practices were analyzed to determine how often GDPs refer complex cases to specialists and the factors influencing these referrals.

2. Inferential Statistics

Inferential statistics were employed to explore relationships and differences between various groups of GDPs:

a) **Chi-Square Test**: This test was used to assess the association between categorical variables, such as the relationship between formal training in endodontics and the likelihood of performing more than 10 procedures per month. The chi-square test helped determine if there was a statistically significant difference in endodontic practice patterns based on training background.

b) **ANOVA (Analysis of Variance)**: ANOVA was used to compare the means of different groups (e.g., GDPs with different levels of formal training) regarding the number of procedures performed, the usage of diagnostic tools, or the frequency of encountering specific challenges. This analysis helped identify whether differences in practice patterns were statistically significant.

3. Correlation Analysis

Correlation analysis was performed to assess the strength and direction of relationships between continuous variables:

a) **Pearson Correlation Coefficient**: This was used to measure the correlation between the number of endodontic procedures performed per month and factors such as years of experience, frequency of continuing education, and use of advanced diagnostic tools. Positive or negative correlations indicated whether more experienced GDPs or those who frequently engage in continuing education tend to perform more endodontic procedures.

4. Regression Analysis

Regression analysis was conducted to explore potential predictors of specific endodontic practices:

a) **Logistic Regression**: This type of regression was used to predict binary outcomes, such as the likelihood of using a rubber dam or referring a case to a specialist, based on independent variables like training, experience, or perceived challenges.

b) **Multiple Regression**: Multiple regression was applied to examine the combined effect of various factors (e.g., training, years of practice, availability of diagnostic tools) on the number of endodontic procedures performed. This analysis provided insights into which factors most strongly influence GDPs' endodontic practices.

Discussion

The survey conducted among general dental practitioners (GDPs) in Greater Noida provides valuable insights into their endodontic practices, highlighting several areas where the level of care and expertise may be inferior compared to that of specialized endodontists. The differences in training, experience, and specialized knowledge contribute to why general dentists might not achieve the same level of proficiency in endodontics as those who have dedicated their careers to this specialty.

1. Differences in Training and Education

One of the primary reasons for the disparity in endodontic outcomes between general dentists and endodontists is the difference in training and education. While GDPs typically receive basic endodontic training during their dental education, the extent and depth of this training are often limited. The survey revealed that many GDPs received only introductory-level lectures or workshops on endodontics, with minimal clinical exposure. In contrast, endodontists undergo rigorous postgraduate training specifically focused on endodontics, which includes extensive clinical practice, advanced theoretical knowledge, and exposure to a wide range of complex cases.(9)

Lack of Specialized Training Among GDPs: The survey data indicated that a significant portion of GDPs had not received formal, specialized training in endodontics beyond their undergraduate studies. This lack of advanced training means that GDPs may not be fully equipped to handle complex cases or unexpected complications during procedures. In comparison, endodontists are trained to manage a wide variety of endodontic issues, from straightforward root canals to more challenging cases involving intricate root anatomy or apical surgery.(9)

2. Frequency and Variety of Endodontic Procedures Performed

Another factor contributing to the difference in endodontic care quality is the frequency and variety of procedures performed. According to the survey, most GDPs perform relatively few endodontic procedures per month, often fewer than 10. This limited exposure restricts their opportunity to develop and refine their skills. Additionally, the range of procedures performed by GDPs is often limited to basic root canal therapies and, occasionally, root canal retreatments. More complex procedures, such as apical surgery (apicoectomy), are rarely performed by GDPs, further narrowing their experience base.

Specialization and Repetition: In contrast, endodontists dedicate their entire practice to endodontics, performing a high volume of diverse procedures regularly. This specialization allows them to refine their techniques, improve their diagnostic acumen, and gain experience with a wide range of cases, from simple to highly complex. The repetitive nature of their work enhances their proficiency and confidence in managing all aspects of endodontic care, leading to better patient outcomes.(10)

3. Use of Advanced Diagnostic Tools and Techniques

The survey results highlighted significant differences in the use of advanced diagnostic tools and techniques between GDPs and endodontists. While most GDPs reported using basic diagnostic tools like radiographs (X-rays) and pulp vitality tests, fewer utilized more advanced technologies such as Cone Beam Computed Tomography (CBCT) or electronic apex locators in all cases. This limited use of advanced diagnostic tools can

lead to less accurate diagnoses and treatment planning, potentially compromising the quality of care provided.(11)

Advanced Diagnostic Capabilities of Endodontists: Endodontists, on the other hand, routinely use cutting-edge diagnostic tools like CBCT, which provides three-dimensional imaging and detailed views of the root canals and surrounding structures. These tools are essential for diagnosing complex cases, such as those with calcified canals, missed canals, or anatomical variations, and for planning intricate surgical procedures. The frequent use of such technologies enhances the endodontist's ability to deliver precise and effective treatment, reducing the likelihood of treatment failure.(12)

4. Handling of Endodontic Challenges and Complications

General dentists often encounter significant challenges when performing endodontic procedures, as noted in the survey. Common issues include difficulties in locating root canals, managing curved or calcified canals, achieving adequate disinfection, and dealing with patient-related factors such as anxiety or limited cooperation. When confronted with these challenges, GDPs may lack the specialized knowledge or experience to address them effectively, increasing the risk of suboptimal outcomes or procedural complications.(1)

Expertise in Managing Complex Cases: Endodontists are specifically trained to manage these challenges. Their advanced education includes in-depth training in recognizing and overcoming anatomical complexities, employing specialized instruments and techniques to address these issues, and managing patient-related factors through tailored approaches. Endodontists' focused expertise and experience allow them to provide more predictable and successful outcomes, especially in challenging cases.

5. Commitment to Continuing Education and Professional Development

The survey also highlighted differences in commitment to continuing education and professional development between GDPs and endodontists. While many GDPs engage in some form of continuing education, such as attending seminars or reading scientific journals, the depth and focus of this education may not be as specialized as that of endodontists. Endodontists are required to continuously update their knowledge and skills through focused courses, workshops, and certifications that specifically address advancements in endodontic techniques and technologies.(13)

Continuous Learning and Innovation: Endodontists are often at the forefront of adopting new technologies and methods in endodontics, such as regenerative endodontics, minimally invasive techniques, and the use of advanced biomaterials. Their ongoing education and specialization enable them to provide cutting-edge care that is not only effective but also efficient and patient-friendly.

Conclusion

This exploratory survey provides valuable insights into the endodontic practices of GDPs in Greater Noida. While many practitioners perform a range of endodontic procedures, challenges remain, particularly in managing complex cases and staying updated with evolving techniques. The findings highlight the need for ongoing education and training to enhance endodontic care quality among general dentists. The survey underscores the importance of addressing these gaps to improve patient outcomes and ensure that general dental practitioners are well-equipped to provide comprehensive endodontic care.

Acknowledgment

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