

**JOURNAL OF DYNAMICS
AND CONTROL**
VOLUME 8 ISSUE 11

**THE INTEGRATION OF NEW
ENDODONTIC TECHNOLOGIES BY
INDIAN DENTAL PRACTITIONERS**

Dr. Eva Mishra, Dr. Seema Dixit, Dr.
Vertika Mahar, Dr. Anil Dhingra, Dr.
Anshdeep Singh, Dr. Sheetal Grover

Department of Conservative Dentistry &
Endodontics, Seema Dental College & Hospital,
Rishikesh-249203, Uttarakhand, India

THE INTEGRATION OF NEW ENDODONTIC TECHNOLOGIES BY INDIAN DENTAL PRACTITIONERS

Dr. Eva Mishra*, **Dr. Seema Dixit**, **Dr. Vertika Mahar**, **Dr. Anil Dhingra**, **Dr. Anshdeep Singh**, **Dr. Sheetal Grover**

*Department of Conservative Dentistry & Endodontics,
Seema Dental College & Hospital, Rishikesh-249203, Uttarakhand, India*

*Corresponding Author: dr.evamishra@gmail.com

Abstract - Aim: This research aimed to assess the adoption of new endodontic technologies in general dental practices across India in 2024. **Objectives:** The main objective of this research was to recognize and analyze awareness and the practical implementation of new endodontic technologies among dental practitioners in India. **Materials & Methods:** A detailed questionnaire comprising 15 inquiries was formulated and distributed via Google Forms to gather data on the inculcation of new endodontic technologies among Indian Dental Practitioners. A random sampling of dental practitioners all over India was conducted to ensure a varied representation. The questionnaire focused on awareness about newer technologies, procedures, and perspectives of youngsters for their betterment of smile and approach towards professional care. Data collection was facilitated through online responses. **Results:** The survey findings, acquired via Google Forms, unveiled intriguing disparities in awareness regarding the integration of new endodontic technologies in Indian Dental Practitioners. Findings revealed that 80.6% of dental practitioners in India utilized a combination of Apex locator & Radiograph as a preferred method of determining working length. 5th generation apex locator emerged as the predominantly used apex locator, employed by 34.7% of respondents. sodium hypochlorite emerged as the predominant irrigant, employed by 75.7% of respondents. The preferred technique for bio-mechanical preparation was chosen as hybrid by 40.8% of practitioners. Calcium hydroxide emerged as the most frequently used intracanal medicament, accounting for 85.4 % of cases. Lateral condensation with gutta-percha ranked as the most prevalent obturation method, utilized by 44.7%. The majority favored bioceramics as a sealer 47.1%. The composite material was the preferred choice 76.7% for post-obturation restoration, with most respondents opting for PFM crowns following root canal treatment 48.5%. There were no notable differences between genders in the adoption of new dental technologies. **Conclusion:** The results indicate a gradual & steady adoption of new endodontic technologies and materials in clinical practice across India. This survey further highlights the importance of continuous dental education programs for practitioners to stay informed about the latest advancements.

Keywords: Endodontic Practice, Root Canal Therapy, Apex Locators, Working length determination, NiTi Instruments, Irrigating Solutions, Medicaments, Sealants, Obturation Techniques, Emerging Technologies, Survey.

INTRODUCTION

The branch of endodontics is rapidly evolving, with modern approaches incorporating a wide array of new instruments, materials, and techniques. It is widely practiced across the globe to alleviate pulpal pain and pathologies to maintain the affected tooth as a functional unit of the dental arch [1]. Many innovative concepts, techniques, and instruments have been introduced in the field of endodontics for effective cleaning, shaping, and obturation of infected root canals

in the past few decades. [2] Root canal treatment, being technically intricate, faces failure when it falls short of acceptable standards [3]. In order to ensure that patients are provided with the most current and dependable treatment planning, clinicians need to stay informed about the outcomes of endodontic procedures. The success of root canal treatment depends not only on specific factors such as root canal infection and the complexity of root canal morphology but also significantly on less tangible elements like the skills and attitudes of the dentist. These factors may contribute more to the failure of endodontic therapy than the actual endodontic pathogens. Unfortunately, there is a lack of research data available on the attitudes of general dental practitioners towards endodontic therapy. Several studies have examined the attitudes of general dental practitioners towards various aspects of endodontic treatment in countries such as England, the UK, Belgium, Nigeria, Sudan, Australia, Denmark, the USA, Sweden, Turkey, Jordan, and Iran. [1-28]. Thanks to the advancements in various technologies, such as improved imaging techniques for diagnosis and treatment, specialized instruments and materials for cleaning and shaping root canals, as well as the regeneration of diseased pulpal tissue, there is now a greater potential to save teeth that were previously considered to have a poor prognosis. This can be achieved through either surgical or non-surgical endodontic procedures [4,5]. Guidelines have been formulated in the past decades reflecting an increased interest in quality assurance in endodontic procedures [5,6]. Furthermore, it is also important to know about infection control during the practice of endodontics. This is important because most times aerosols are generated with the use of a handpiece during drilling. Thus, adequate infection control is mandatory to prevent cross-infection among patients, dentists, and other parodontal staff. [7]

Therefore, the main goal of this survey was to gauge the views of general dental practitioners in India on endodontic treatment and their current use of emerging technologies and materials in this field.

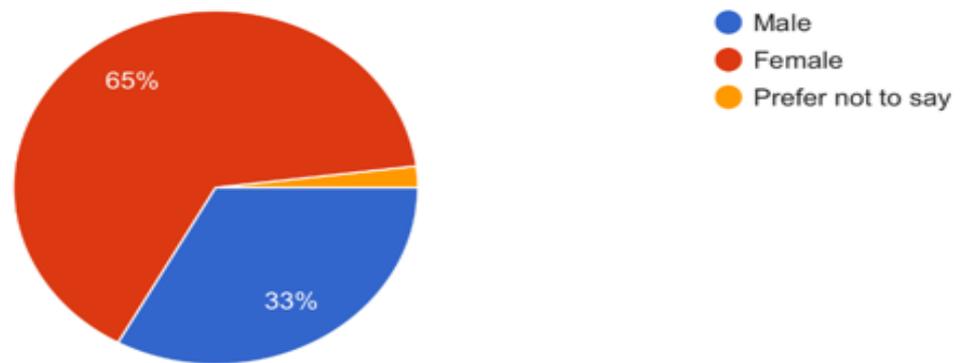
MATERIALS AND METHODOLOGY

The study focused on general dental practitioners in India, with participants chosen from a roster of licensed dentists to accurately reflect this demographic. Before commencing the survey, ethical committee approval was secured, and random selection was employed to mitigate bias. A questionnaire was designed, written in English, and kept succinct at one page on Google Forms. Question categories encompassed various facets of endodontic treatment, including stages of root canal therapy, materials, instrument selection, methods of working length determination, root canal irrigants, intracanal medicaments, obturation techniques, and coronal restoration. To assess the questionnaire's validity and reliability, 20 dental practitioners served as controls in filling it out. Participants were asked to fill out the questionnaire within a week. Those who did not respond were sent reminders three weeks after the initial mail, emphasizing the study's purpose, and confidentiality guarantees, as well as detailing the risks and benefits involved. The 1-page questionnaire comprised 15 questions, with responses tallied and percentages calculated for each section. Data analysis employed descriptive statistics at a significance level of 0.05.

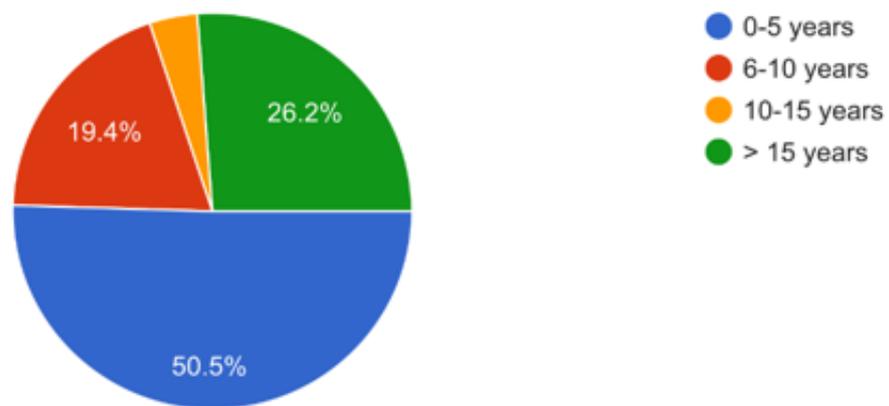
STATISTICAL ANALYSIS:

Data obtained from the Google Forms responses were subjected to thorough statistical analysis. Descriptive statistics, including frequencies and percentages, were employed to summarize the demographic characteristics and key variables.

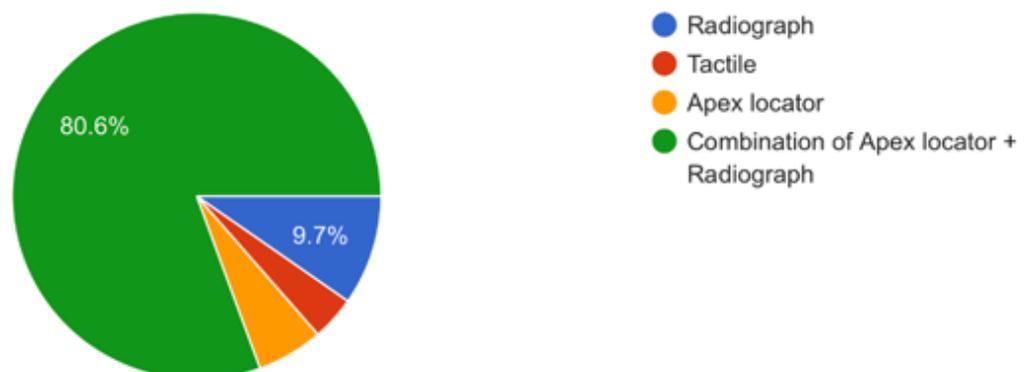
Gender



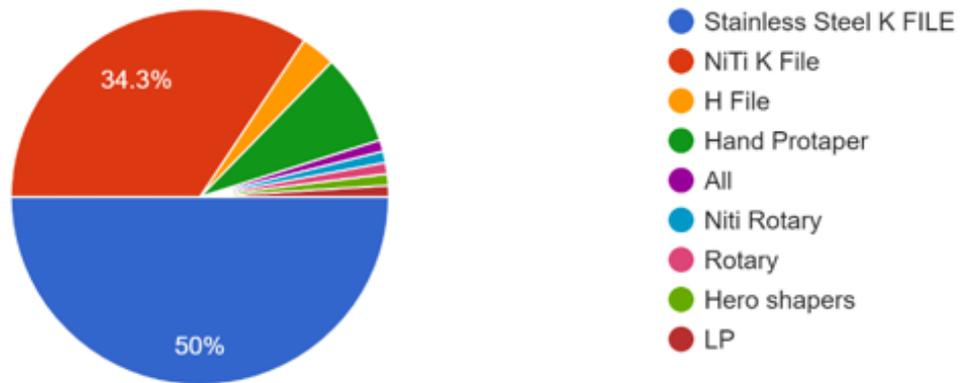
Years Of Professional activity?



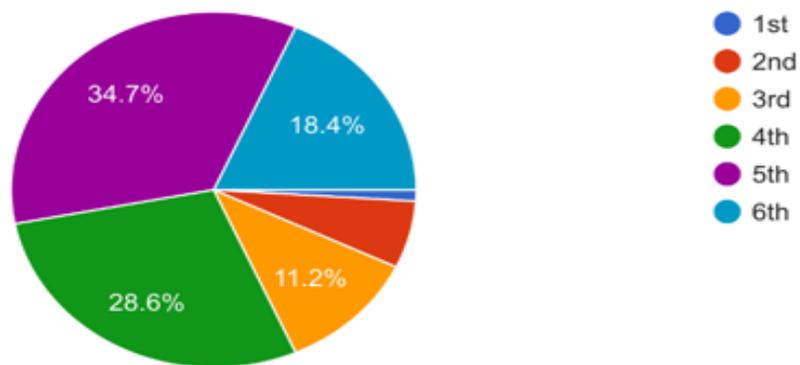
what is your preferred method of determining working length?



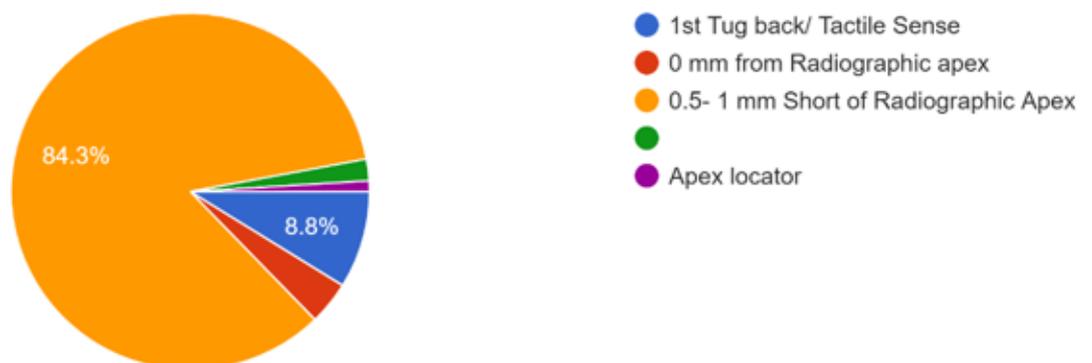
What is the type hand file you prefer for root canal instrumentation?



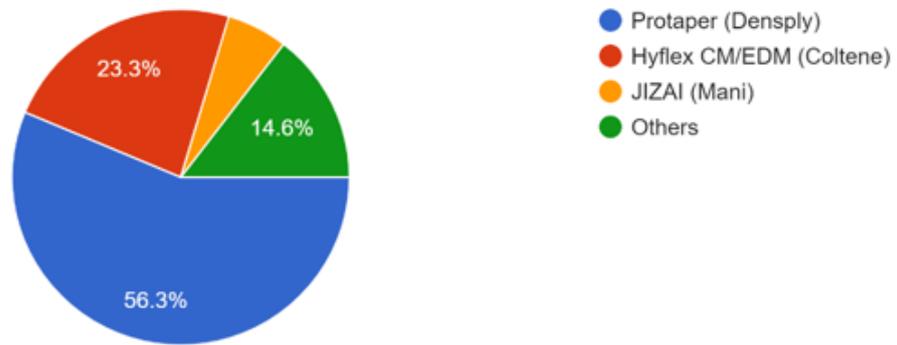
what is your preferred generation of apex locator?



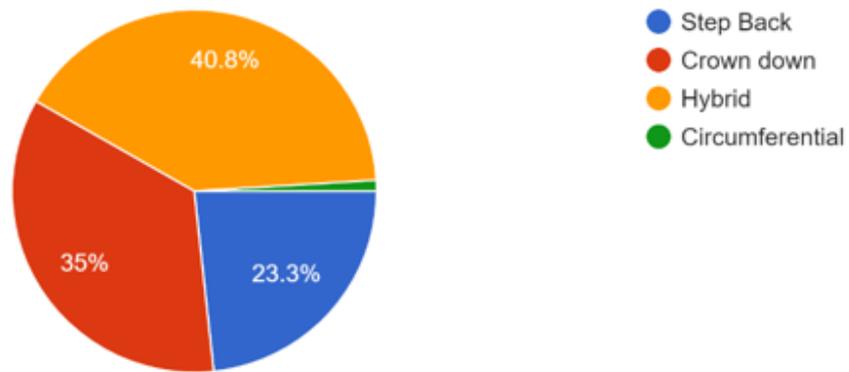
what is your preferred apical limit for working length determination?



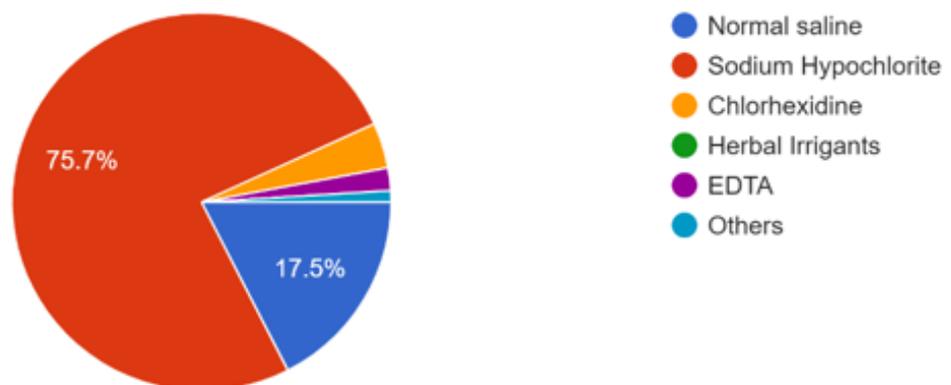
what is your Preferred Rotary Instrument for Root canal Instrumentation?



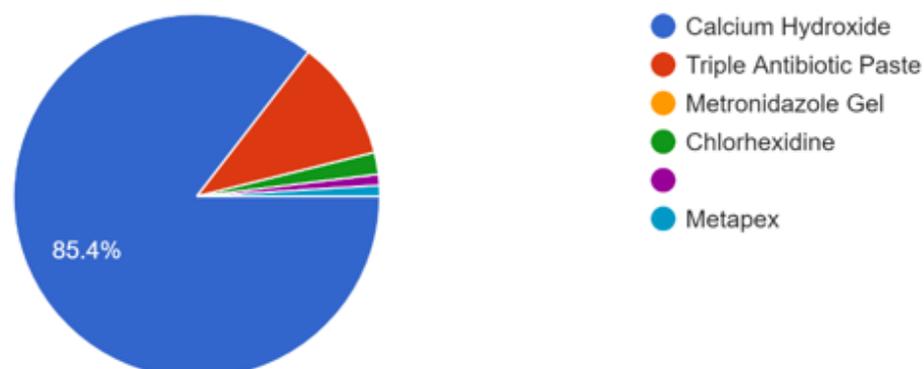
What is your preferred technique for BMP?



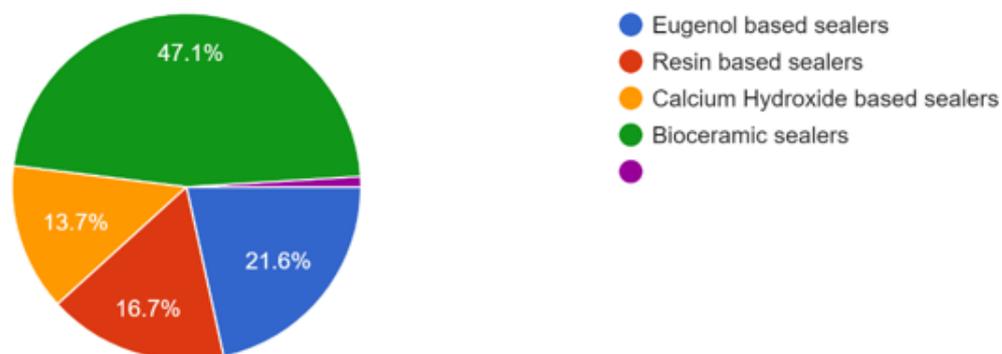
What is your preferred irrigant of choice?



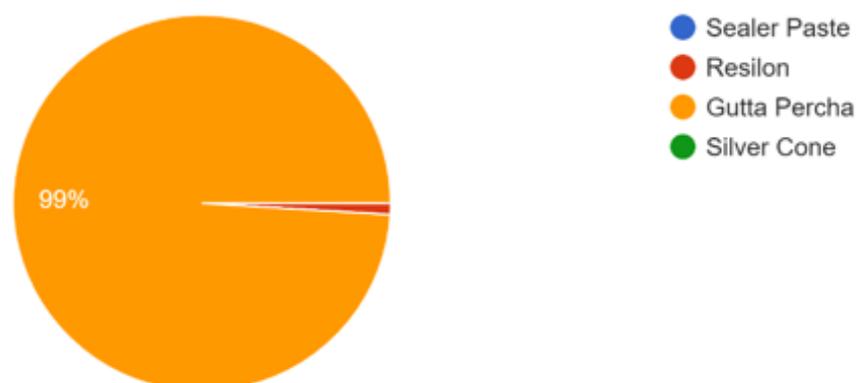
What is your preferred choice for Intra Canal Medicament?



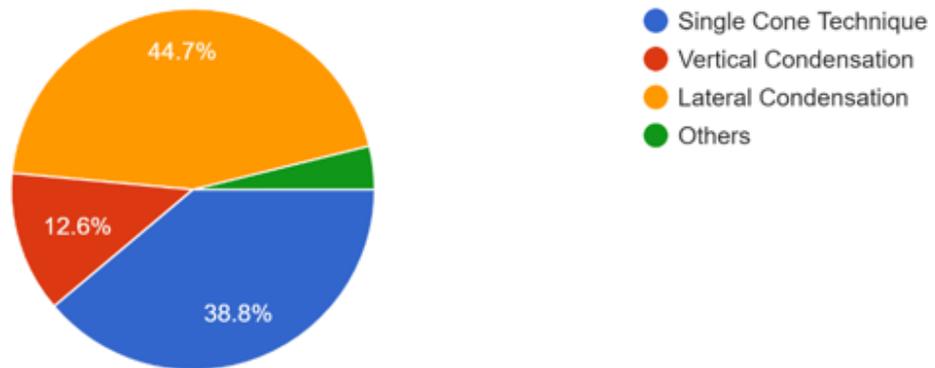
What is your preferred choice of root canal sealer?



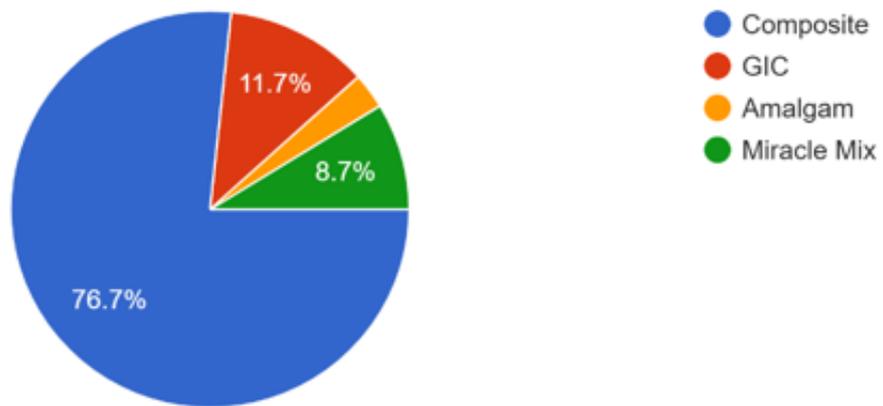
what is your preferred obturating material of choice?



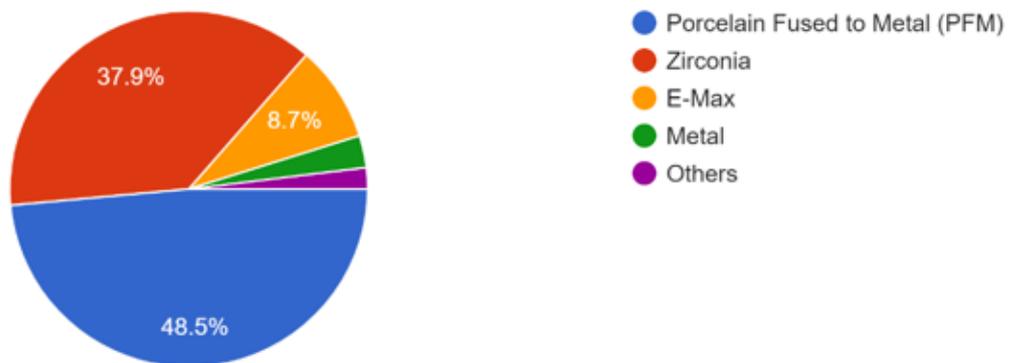
What is your preferred obturation technique?



What is your preferred material for post endodontic restoration?



What is your preferred type of crown after RCT?



DISCUSSION

This study attempts to provide published insights into the provision of endodontic care by general dental practitioners in India. The substantial response rate ensured that the findings were reflective of the general dental practitioner community in India. Among the respondents, there was a distribution of 35% male and 65% female practitioners. To examine how the duration of practical experience influences the choice of materials and techniques used, the sample was categorized into groups based on years of professional practice.. The distribution of years in practice among the respondents was not uniform, mainly attributed to a notable surge in the number of graduates over the past decade. Determining the working length is paramount in endodontic procedures. Excessive instrumentation beyond the apex, can result in the inadvertent displacement of infected dentin or debris into the surrounding tissues, impeding proper healing. Achieving the most accurate determination of the working length typically involves a combination of radiographic imaging and electronic apex locators. Nonetheless, the widespread adoption of electronic apex locators in regular practice remains limited as per current data. Furthermore, only 9.7% of the participants reported using digital radiography. The ideal working length was found to vary between 0.5 to 1 mm from the radiographic apex. In a study conducted in Flemish, it was noted that 38.9% of the practitioners prepared root canals 1 mm short of the radiographic apex. [18]. Success in root canal treatments depends on precise biomechanical preparation. Among the various hand instruments used, 50% of the respondents reported using stainless steel K-files. The survey data also revealed that 34.3% of respondents in general dental practice utilized nickel-titanium K files. The integration of rotary systems was associated with quicker instrumentation procedures and a reduced need for multiple visits to complete treatment. This efficiency likely contributed to the preference of 56.3% of practitioners for the Protaper rotary file system, with Hyflex CM/EDM being the next popular choice. The root canal therapy involves meticulous use of irrigating solutions, with sodium hypochlorite being the preferred choice for root canal irrigation by 80.9% of general dental practitioners in India. [9]. Calcium hydroxide, used as an interappointment dressing, was employed by 85.4% of respondents. Lateral Condensation with gutta-percha was the most favored obturation technique, chosen by 44.7% of practitioners. Bioceramic sealers were the preferred sealer for 47.1% of respondents, followed by zinc oxide–eugenol sealers at 21.6%. In post-endodontic restorations, composite material was favored by 76.7% of practitioners. The majority of practitioners routinely placed crowns post root canal treatment, with 48.5% opting for PFM crowns. General dental practitioners showed a positive attitude towards performing endodontic treatment and adopting new technologies in their practice. It is imperative to emphasize the importance of scheduled follow-up appointments after endodontic treatment. These routine follow-ups play a critical role in monitoring the success and effectiveness of the procedure over time. [10].

CONCLUSION

In the past decade, the field of endodontics has seen a surge in the introduction of groundbreaking concepts, methods, and tools. Despite the presence of numerous new technologies, a significant number of general dental practitioners continue to rely on conventional diagnostic, preparation, and obturation approaches. These observations highlight

the importance of offering advanced specialist training and ongoing dental education programs to enable practitioners to remain current with the latest advancements in the field.

List of References:

1. Küçükkaya S, Görduysus M, Görduysus MO, Anil D. A questionnaire survey on current endodontic practice of dental practitioners in Turkey. *Clin Dent Res.* 2015;39(3): 101-109
2. kishen A, Peters OA, Zehnder M, Diogenes AR, Nair MK. Advances in endodontics: potential applications in clinical practice. *J Conserv Dent.* May-Jun 2016;19(3): 199-206.
3. Gupta R, Rai R. The adoption of new endodontic technology by Indian Dental practitioners: a questionnaire survey. *J Clin Diagn Res.* 2013;7(11): 2610-2614.
4. Salehrabi R, Rotstein I. Endodontic treatment outcomes in a large patient population in the USA: an epidemiological study. *J Endod.* 2004 Dec;30(12): 846-50
5. European Society of Endodontology. Consensus report of the European Society of Endodontology on quality guidelines for endodontic treatment. *Int Endod J.* 1994 May;27(3): 115-24.
6. De Moor R, Hülsmann M, Kirkevang L-L, Tanalp J, Whitworth J. Undergraduate curriculum guidelines for endodontology. *Int Endod J.* 2013 Dec;46(12): 1105-14
7. Endodontic practice amongst Nigerian dentists undergoing postgraduate training Shakeerah Olaide Gbadebo, Deborah Mojirade Ajayi. *PAMJ - 39(218).* 28 Jul 2021.
8. Blum J-Y, Machtou P, Ruddell C, Micallef JP. Analysis of mechanical preparations in extracted teeth using ProTaper Rotary instruments: value of the safety quotient. *J Endod* 2003; 29: 567–75.
9. Slaus G, Bottenberg P. A survey of endodontic practice amongst Flemish dentists. *Int Endod J* 2002; 35: 759-67
10. The Adoption of New Endodontic Technology by Indian Dental Practitioners: A Questionnaire Survey. Ruchi Gupta, Rochna Rai. *Journal of Clinical and Diagnostic Research.* 2013 Nov, Vol-7(11): 2610-2614.
11. Ahmed MF, Elseed Al, Ibrahim YE. Root canal treatment in general practice in Sudan. *Int Endod J* 2000; 33: 316-9.
12. [Akpata ES. Endodontic treatment in Nigeria. *Int Endod J* 1984; 17: 139–51.
13. Amman J. Rubber dam usage for endodontic treatment: a review. *Int Endod J* 2009; 42(11): 963-72.
14. Barnes JJ, Patel S, Mannocci F. Why do general dental practitioners refer to a specific specialist endodontist in practice? *Int Endod J* 2011; 44: 21–32.
15. Bjrndal L, Reit C. The adoption of new endodontic technology amongst Danish general dental practitioners. *Int Endod J* 2005; 38: 52–8.
16. Demant S, Markvart M, Bjrndal L. Quality-Shaping Factors and Endodontic Treatment amongst General Dental Practitioners with a Focus on Denmark. *Int J Dent* 2012; 2012: 526137.
17. Elham FG, Sedigheh Z. The Use of Instruments by Iranian Endodontics and General practioners. *The Open Dent J* 2012; 6: 105-10.
18. Hommezm GM, Braem M, DeMoor RJ. Root canal treatment performed by Flemish dentist. Part 1. Cleaning and shaping. *Int Endod J* 2003; 36; 166–73.
19. Hommezm GM, Braem M, DeMoor RJ. Root canal treatment performed by Flemish dentists. Part 2. Canal filling and decision for referrals and treatment of apical periodontitis. *Int Endod J* 2003; 36; 344–51.

20. Jenkins SM, Hayes SJ, Dummer PMH. A study of endodontic treatment carried out in dental practice within the UK. *Int Endod J* 2001; 34: 16–22.
21. Kaptan RF, Haznedaroglu F, Kayahan MB, Basturk FB. An investigation of current endodontic practice in Turkey. *Sci World Journal*. 2012; 2012: 565413.
22. Koch M, Eriksson HG, Axelsson S, Tegelberg A. Effect of educational intervention on adoption of new endodontic technology by general dental practitioners: a questionnaire survey. *Int Endod J* 2009; 42; 313-21.
23. Lee M, Winkler J, Hartwell G, Stewart J, Caine R. Current trends in endodontic practice: Emergency treatments and technological armamentarium. *J Endod* 2009; 35: 35-9.
24. Marshall K, Page J. The use of rubber dam in the UK: a survey. *Br Dent J* 1990; 169: 286-91.
25. Parashos P, Messer HH. Questionnaire survey on the use of rotary nickel-titanium endodontic instruments by Australian dentists. *Int Endod J* 2004; 7: 249–59.
26. Pitt-Ford TR, Stock CJ, Loxley HC, Watsson RM. A survey of endodontics in general practice in England. *Br Dent J* 1983; 83: 222–4.
27. Whitten BH, Gardiner DL, Jeansonne BG, Lemon RR. Current trends in endodontic treatment: report of a national survey. *J Am Dent Assoc* 1996; 127: 1333–41.
28. Whitworth JM, Seccombe GV, Shoker K, Steele JG. Use of rubber dam and irrigant selection in UK general dental practice. *Int Endod J* 2000; 33: 435-41