Recent Trends in Retreatment Practice Amongst General Practitioners and Endodontists in Ahmedabad City

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Abstract

Aim: This survey was conducted in order to acknowledge the recent treatment modalities and various techniques being employed by General practitioners and Endodontists for retreatment procedures in Ahmedabad city

Materials and Method: Questionnaires pertaining to endodontic retreatment wererandomly distributed to 100 practicing dentists in Ahmedabad city through online media. The questionnaire survey includedbasicdetails such as name, and clinical experience of the dentist and a set of questions based on assessing the trends, techniques, materials, and opinions of dentists regarding endodontic retreatment. Frequency and percentage of distributers were calculated.

Results: In the present survey, 100 practicing dentists participated amongst which 38% were endodontist, 31% were MDS from other branches and rest were general dentist. Amongst which majority of practitioners (84%) preferred RVG as diagnostic tool. 90% of practitioners used dental loupes for magnification. Around 80% practitioners prefer multiple visit approach with metapex as an intracanal medicamentrather than single visit in retreatment cases. Xylene in combination with rotary files is the most commonly selected technique anmongst general pracitioners and endodontists.

Conclusion: This study found a few differences in practice trends amongst endodontist and other practitioners, but overall, most clinicians followed international norms

INTRODUCTION

Root canal treatment has proven to be a predictable procedure with a high success rate. Root canal therapies focus on debridement and disinfection of root canal system. As per data available from numerous studies, endodontic treatment has yielded a success rate of 40%–93%.[1-2] Nevertheless, failures occur in 14-16% of primary endodontic treatments, and retreatments account for approximately 30% of the demand for endodontists. Although retreatments have been primarily performed by endodontists, many senior practitioners and general dentists who are root canal enthusiasts do opt for undertaking endodontic retreatment procedures. Numerous epidemiological studies investigating various aspects of root canal therapy and practice trends of dentists all around the world have been conducted and published. However, there is a dearth of research regarding endodontic retreatment – the knowledge, attitude, treatment trends, and protocols that the practicing dentists follow while taking on a retreatment case

METHOD AND MATERIALS

The present study was an observational, cross sectional and descriptive questionnaire based online survey which was approved by the ethical committee of Ahmedabad dental college and hospital. 100 dental participants were selected and taken under consideration of inclusion and exclusion criteria. Inclusion criteria involved general dental practitioners, endodontists and practicing MDS in branches other than endodontics. Exclusion criteria involved non practicing dentist and dentist practicing outside Ahmedabad city. A questionnaire focussing on endodontic retreatment trends was designed and distributed randomly through a link via online platforms like whatsapp, emails and facebook amongst dental practitioners in Ahmedabad city. The participants were auto directed to the survey on clicking the link.

The Google form questionnaire was prepared in segments which included the information of the 150 practicing dentists and their designation. The next segment included the choice of diagnostic aids, use of magnification and choice of visits for retreatment. The last segment includes the choice of materials used for GP removal, irrigating solutions and obturation techniques.

Name of the doctor *

Your answer

Kindly mention your age *

Your answer

Your designation *

- BDS
- Endodontist
- MDS in branches other than endodontics
- Other:

Diagnostic imaging aids used *

- IOPA
- RVG
- OPG
- CBCT
- Other:

Choice of Number of visits for Retreatment *

- Single visit
- Multiple visit

Use of magnification

- Dental loupes
- Microscope

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Intracanal Medicament used

- Calcium Hydroxide
- Calcium Hydroxide with Chx
- Calcium Hydroxide with Iodoform (metapex)
- Triple antbiotic paste
- NA

Obturation Techniques for Retreatments *

- Cold lateral compaction
- Warm vertical Compaction
- Thermoplastic obturation
- Other:

Endodontic file systems used

- Hand files
- Rotary Files
- Retreatment files

Irrigants used in retreatment *

- Saline
- Sodium Hypochlorite
- Chlorhexidine Gluconate 2%
- EDTA 17%
- Metronidazole

Intracanal Medicament used

- Calcium Hydroxide
- Calcium Hydroxide with Chx
- Calcium Hydroxide with Iodoform (metapex)
- Triple antbiotic paste

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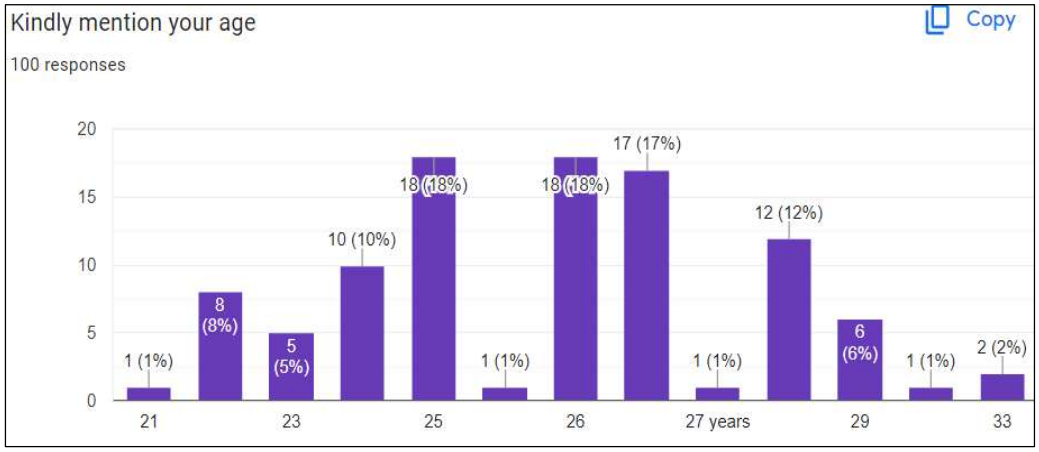
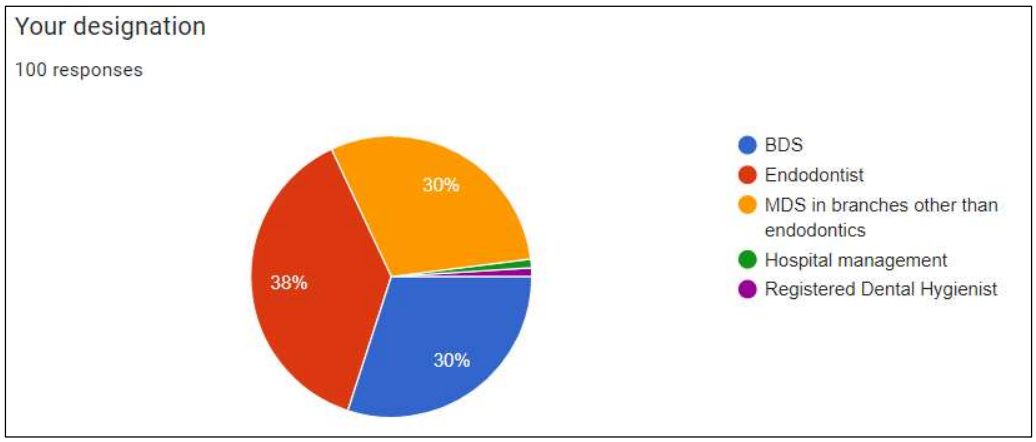
RESULTS

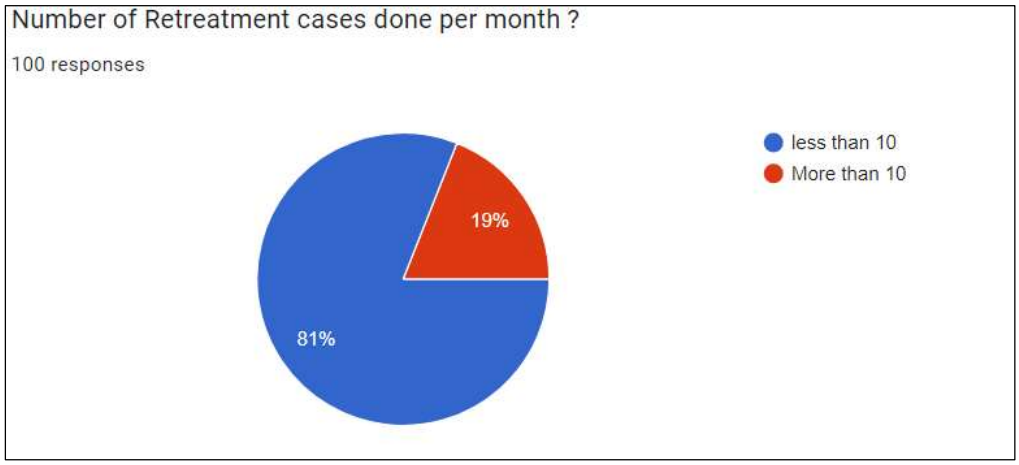


BAR CHART 1



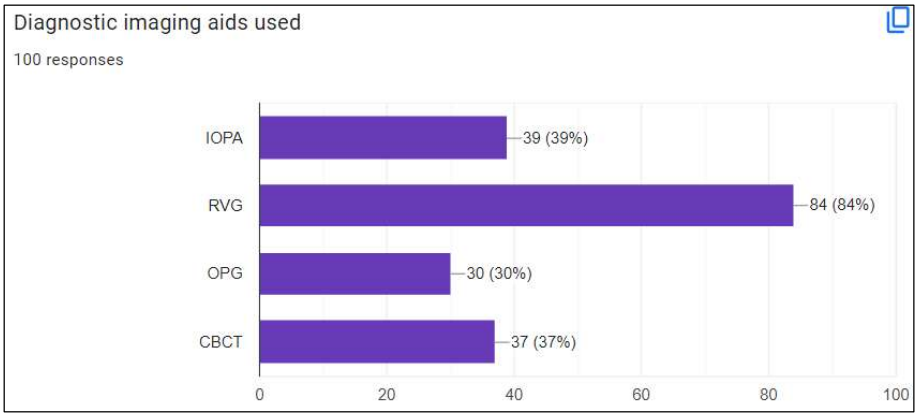
Pie Chart 1: Describes about individual participant's designation

Among the 100 participants, 38% were endodontists, 30% were general practitioners and 30% were MDS from branches other than endodontics



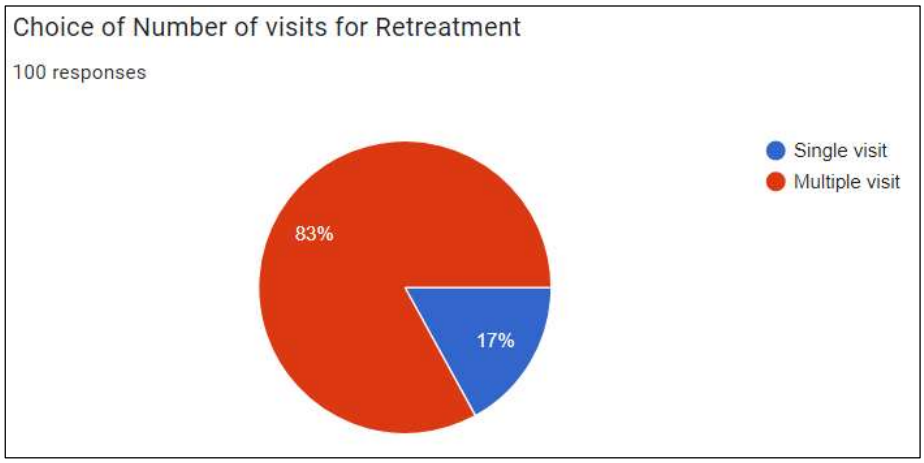
Pie Chart 2: describes about the total number of retreatment cases done in a month

Among the 100 participants, 81% participants performed less than 10 retreatment cases in a month. The rest 19% which included a majority of endodontist performed more than 10 cases in a month.



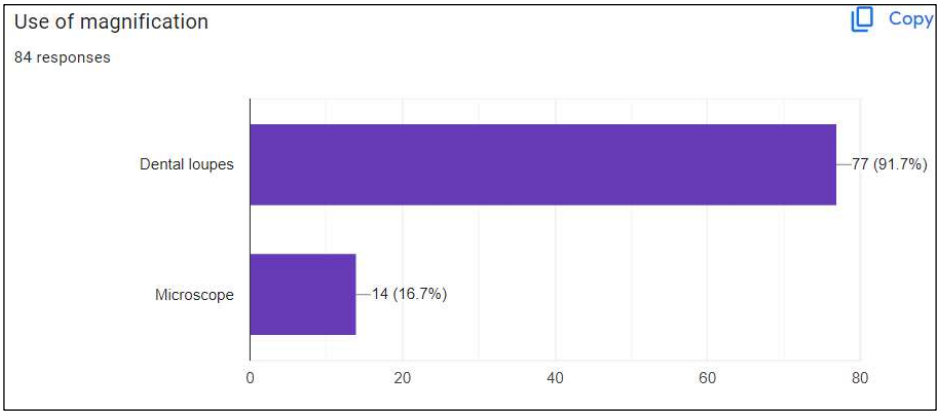
Bar Chart 2: represents the diagnostic aids used by participants

Among all the participants, RVG was the most preferred tool for diagnostic imaging before confirming a retreatment case. Second most commonly used aid was IOPA followed by CBCT. 37% participants preferred use of CBCT for confirming the diagnosis of retreatment and all of them were endodontist.



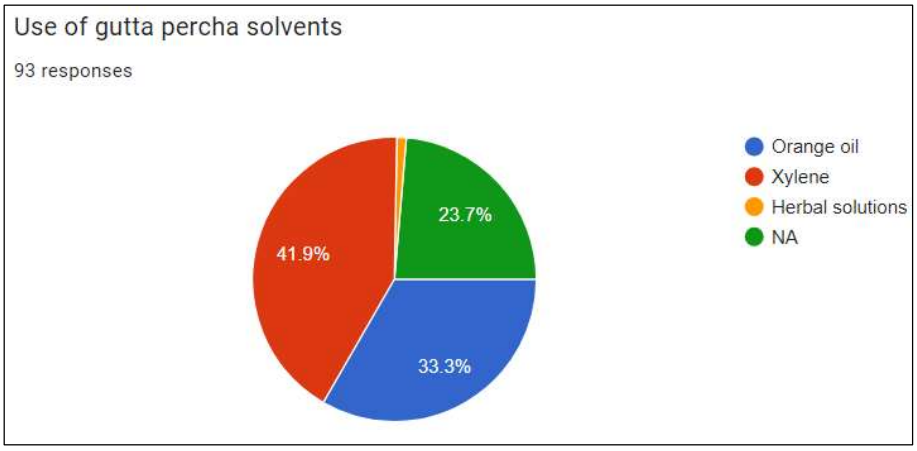
Pie Chart 3: represents the choice of number of visit for retreatment cases

Majority of the participants (83%) preferred multiple visits for retreatment cases. The rest 17%, which mainly consists of endodontist, preferred single visit for a few cases.



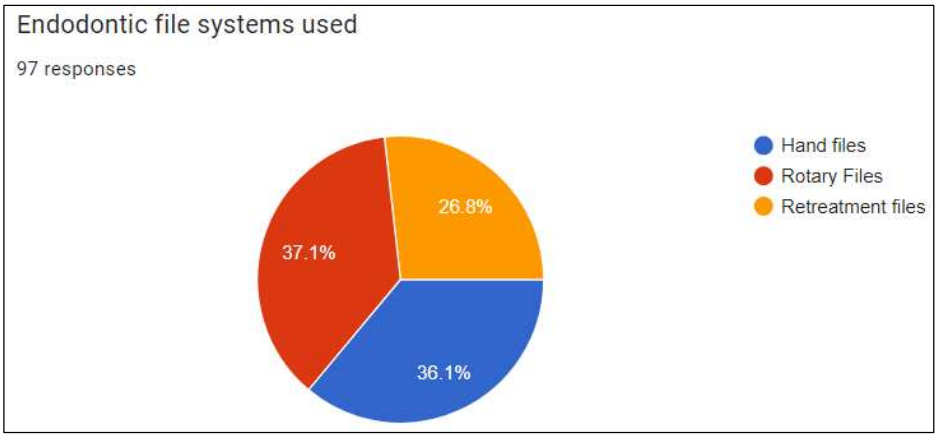
Bar Chart 3: describes the choice instrument for magnification

Only about 84 respondents agreed to the use of magnification in retreatment cases. 91.7% chose dental loupes over microscopes.



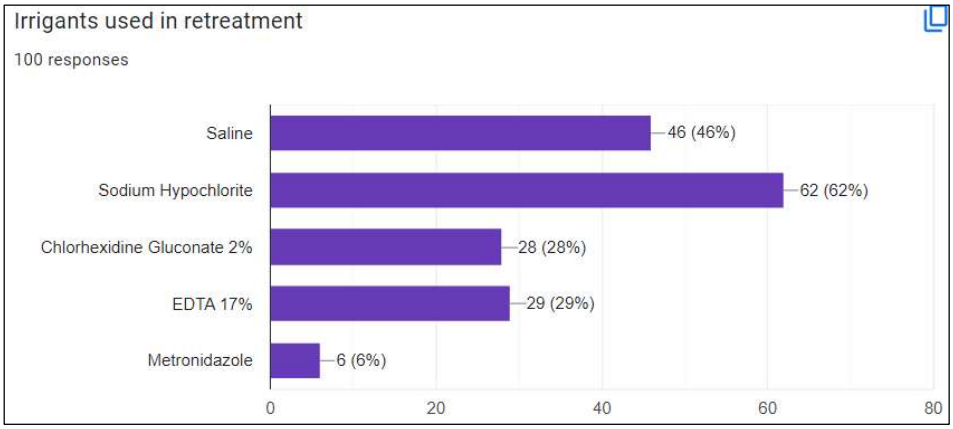
Pie Chart 4: describes the use of guttapercha solvents

93 respondents out of 100 participants confirmed to the use of gp solvents in retreatment cases. Amongst them a majority of participants (41.2%) prefferd to use xylene, followed by orange oil (33.3%) and herbal solutions (1.1%). Around 23.7% participants refrained from using any form of gp solvent



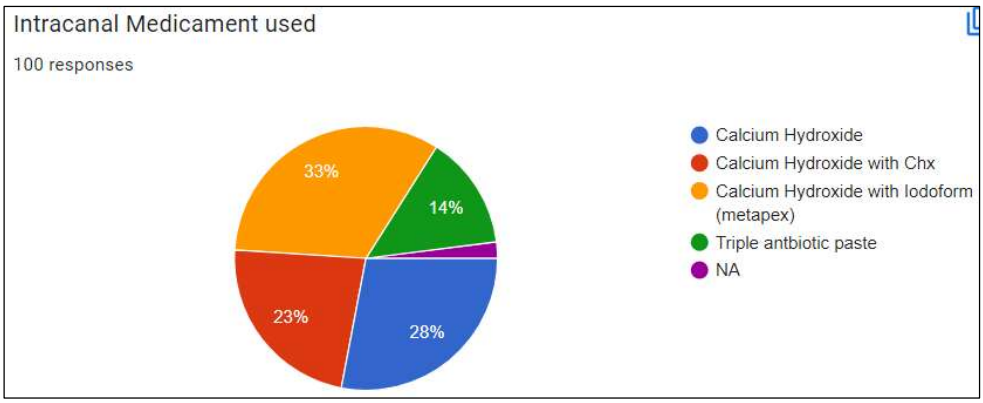
Pie Chart 5: represents the preference of file system used

Around 97 responses out of 100 were shown in this segment. The responses seemed to be equally divided amongst options indicating no major inclination towards one particular system. 37.1 % respondents preferred rotary files, followed by 36.1% in manual hand files and 26.8% retreatment files.



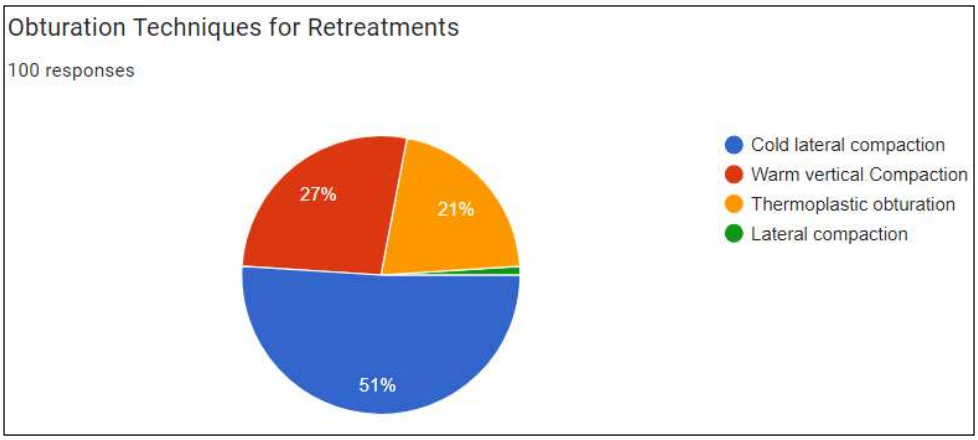
Bar Chart 4: indicates the most frequently used irrigating solution

Sodium hypochlorite (62%) was the most frequently used irrigating solution amongst other solutions. 46% respondents preferred saline. Chlorhexidine gluconate and EDTA was preferred in almost equal numbers. Metronidazole (6%) was the least used irrigating solution.



Pie Chart 6: represents preference of intracanal medicament

Calcium hydroxide is the most favoured choice of intracanal medicament universally. But according to this survey, only 28% respondents used plain calcium hydroxide. Around 56% respondents preferred using calcium hydroxide in combination with other agents. 33% used calcium hydroxide in combination with iodoform (metapex) and 33% used calcium hydroxide in combination with chlorhexidine gluconate. 14% respondents preferred using triple antibiotic paste.



Pie Chart 7: represents the preference of obturation technique

Among all the 100 participants, majority of them preferred obturation with cold lateral compaction technique (51%). The next most preferred technique for obturation was warm vertical compaction (27%), followed by thermoplasticized obturation technique (21%).

DISCUSSION

Traditional methods employed for evaluating the knowledge, perspectives, and attitudes of healthcare professionals have encompassed face-to-face or telephone interviews, as well as hardcopy questionnaires (Van Gelder et al., 2010).[3] Nevertheless, these methods are progressively proving to be less effective in delivering high-quality outcomes within budgetary constraints (Ekman & Litton, 2006).[4]

As more healthcare professionals gain access to the internet, its role as both a tool and subject of survey studies is expanding (Braithwaite, 2003). [5]Web-based questionnaires, which offer an alternative to traditional data collection methods, are increasingly appealing. However, they often face the drawback of relatively high nonresponse rates compared to traditional modes of data collection (Wyatt, 2000; Van Gelder et al., 2010). [3]

The age range chosen for the study was 22-55 years but the majority of study participants in the present study belonged to the age group of 24-27 years and among them Endodontists were 38% and General Dental Practitioners were 30%. One of the reason for this could be the younger practitioners exhibits greater proficiency and familiarity with web based questionnaires and internet technology than the older practitioners.

The majority of clinicians according to this study (81%) performed fewer than ten retreatment cases in a month. This low percentage of retreatments conducted by dentists can be attributed to various factors. These include the high success rate of root canal treatments (RCTs) performed initially, instances where failed RCTs result in poor prognosis due to dentists' inability to perform retreatments, substantial procedural errors during RCTs that cannot be rectified with retreatment, extractions due to patient's noncompliance, and financial constraints experienced by patients. [8,9]

The majority of practitioners (83%) favoured multi-visit endodontic retreatment, however, Some Endodontists (17%) preferred performing single-visit retreatments. This was supported by a study done by Yelda Erdem Hepsenoglu et al (2018) which evaluated post operative pain after single visit vs two visit root canal treatment using two different intracanal medicament accessed at 1,2,3,7 days and after 1 month reported that there was there was no significant difference in the postoperative pain between single visit vs two visit retreatment at 1,2,3,7 days and postoperative pain was significantly higher in both the calcium hydroxide group and the CHX group in comparison with the single-visit group.The reason for this according to Neelakantan et al who investigated the antimicrobial activity of several canal medicaments against Porphyromonas gingivalis and Prevotella intermedia, stated that the effect of Ca(OH)2 was significantly reduced after 48 hours, whereas the CHX gel lasted for 72 hours.[10,16]

However in the result of our study majority of Practitioners are still preferring multi visit retreatment which is in agreement with a study done by Yoldas et al in which they compared the efficacy of one-visit vs. two-visit retreatment using a medication that combined calcium hydroxide and a 2% CHX solution and showed that the two-visit retreatment was more effective for reducing postoperative pain and any potential flare-ups.

RVG was the most favoured diagnostic imaging aid among all respondents. RVG has many advantages as an imaging device. It can capture, view, enhance, and store radiographic images in an easily reproducible format that does not degrade over time. It uses no X-ray film and requires no chemical processing. Radiation exposure is minimal as well. These qualities make it the imaging device of choice. Statistical analysis indicated that there was a significant association between the qualification of the dentist and what diagnostic imaging aids they used ($P < 0.05$). The imaging preference for Endodontists was RVG > CBCT > intraoral periapical radiograph (IOPA), whereas for general dental practitioners, it was RVG > IOPA > CBCT.[8]

According to a study by S patel et al in 2019 Endodontists failed to identify missed canals in 41% of cases in routine endodontic practice by common radiographic methods like IOPA (Intaoral periapical radiograph) and RVG (radiovisiography) hence CBCT improves identification, location, evaluation of teeth with anamolous anatomy and periapical pathology and vertical root fractures [13]

Our survey reported an increasing trend among all dentists relying on CBCT for better diagnosis of retreatment cases. However, the prevalence was more in Endodontists than General practitioners. CBCT helps in providing a three-dimensional (3D) visualization of the pathologic area of interest and helps improving the diagnosis and treatment plan of the practitioner.[6] Other factors responsible may be increased awareness of the benefits of CBCT, as well as increased availability of CBCT centers throughout the city of Ahmedabad

Studies have shown greater detection of undiagnosed pathology with CBCT in endodontically failed teeth. CBCT examination is a useful tool with the potential to modify clinician's decision making in endodontic cases. A study done by Gustavo Rodrıguez et al done to evaluate Influence of Cone-beam Computed Tomography in Clinical Decision Making among Specialists showed that the examiners altered their treatment plan after viewing the CBCT scan in 27.3% of the cases. This change suggests that CBCT imaging helps in clinical decision making before going for retreatment as CBCT imaging has greater potential to assess for subtle radiographic signs of root fractures, apical periodontitis, resorptions, perforations, missed canals and root canal anatomy compared with PA radiographs[11, 12]

The preferred magnification aid among practitioners was dental loupes. A higher proportion of endodontists utilized magnification during retreatments compared to General dental practitioners

The utilization of microscopes and loupes improves the clinician's visual acuity in the operating field, thereby refining and elevating their clinical performance. According to David J. Bowers' study, the use of magnification aids indeed enhances clinicians' fine motor skills. Bowers concluded that dental loupes improved clinician dexterity by 17.5%, while operating microscopes increased it by 57.7%. [14]

Dental loupes emerged as the most widely preferred magnification device among clinicians, regardless of their qualifications. Although loupes may not offer the same level of effectiveness as microscopes, they come with several advantages. They are easier to use, more affordable, and have a lower learning curve. Unlike microscopes, loupes do not necessitate intensive specialized training. Additionally, clinics equipped with microscopes often require trained assistants to aid during procedures, a necessity eliminated when using loupes. Another crucial consideration, particularly in metropolitan areas like Ahmedabad, is the limitation of space. Given the exorbitant real estate prices, dental clinics in Ahmedabad are typically more confined compared to those in other parts of India. Dental microscopes occupy a considerable amount of space, making loupes a more practical choice in such settings.[8]

During retreatment cases, majority of practitioners regardless of designation acknowledged using gutta-percha (GP) solvents. The prevalent reliance on GP solvents in endodontic retreatment procedures can be attributed to their ability to expedite the removal of old, infected gutta-percha fillings, thereby allowing more chair-side time for chemomechanical preparation. Many clinicians find GP solvents advantageous due to their lower technique sensitivity and facilitation of faster removal of well-compacted gutta-percha points.

Among the Gp solvents Xylene was most preferred followed by orange oil and herbal solutions

Although Xylene being the best solvent, it has shown carcinogenic potential due to presence of chloroform. Orange oil was more biocompatible and better removal of different types of sealers and less canal trasporation was observed

Conversely, 27.3% participants avoided using gutta-percha solvents. This avoidance may stem from the drawbacks associated with GP solvents, such as their cytotoxicity to periapical tissue, potential reduction in the bond strength of root canal sealers, and hindrance to the contact of irrigants with the canal walls.[15]

CONCLUSION

This study found some differences in practice trends among endodontists' and other dentists, but overall, most clinicians followed internationally accepted protocols. Given the complication associated with retreatment cases, the knowledge regarding causes for retreatment and use of materials like retreatment files, solvents and medicaments required for each case is lacking among general practitioners which is beneficiary to endodontist.

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