Original Article

To Evaluate The Adoption Of Advance Endodontic Technology By General Dental Practitioner In Gujarat – A Questionnaire Survey

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Abstract

Introduction: The aim of this study is to evaluate the adoption of advance endodontic technology by general dental practitioner of Gujarat state. **Methods:** Around 2200 Invitation was sent to registered dental practitioners of Gujarat state by dental council of India with introductory letter and an informed consent clearly stating the purpose of the study. A questionnaire survey comprising 27 questions. The topics of the questions included endodontic continuing education (CE), professional activity, root canal preparation and instrumentation, choice of irrigants and intracanal medications, choice of obturation procedures, and utilisation of contemporary technologies. **Results:** 789 respondents (36%) returned completed surveys. 99% of general practitioners perform root canals; rubber dams are typically utilised by 4%, sporadically by 51%, and never by 44%. Digital radiography was employed by GPs (72%), as well as magnification (21%), and electronic apex locators (13%).

Key Words: Advance techniques, digital radiography, rubber dam, general practitioner.

Introduction:

Endodontics is one of the fastest growing fields in daily dental practice, which include Root canal treatment, re-treatments, surgery, dental trauma & it is also complex and challenging and fails when treatment is not up to par because it depends not only on specific elements like root canal infection and root canal complexity, but also on the dental professionals' abilities.

CDE programs are being conducted to make general practitioners aware about the newer endodontic technologies, materials and advancements.

The main goal of this survey is to determine the understanding of general dental practitioners towards advance endodontic treatment.

Material and Methods

The intended group of this survey was the general dental practitioners in Gujarat. A sample of 2200 general dental practitioners were chosen from a list of licensed dentists in Gujarat, to represent the intended group. The survey was approved by the ethics committee before it began. To avoid prejudice, the selection process was conducted at random. We used an English-language questionnaire created by an unaffiliated researcher. Different components of endodontic treatment were covered by the question categories, which included professional activity, root canal preparation and instrumentation, choice of irrigants and intracanal medications, choice of obturation techniques and use of newer technologies, and endodontic continuing education completed in the previous two years. In order to gauge validity and reliability of the questionnaire, 20 dental practitioners were asked to fill in the questionnaire as a control. The questionnaire was accompanied with introductory letter and an informed consent clearly stating the objective of the study. Risks and benefits were mentioned to the participants. 27 questions on various facets of endodontic practice were included in the questionnaire. Both an electronic and print version of a questionnaire were distributed. Each response that was given when there were numerous options was counted. Then, based on the quantity of respondents to each question, percentages were determined. Descriptive statistics and the Chi-square (2) test were used to evaluate the data at the 0.05 level of significance.

SURVEY QUESTIONNAIRE

1. Do you perform endodontic treatment in your practice?
   a) Yes ☐ b) No ☐
2. On average, how many endodontic cases do you treat in your clinic per month?
   a) 1-5 ☐ b) 6-10 ☐ c) 11-15 ☐ d) >15 ☐
3. Which type of cases do you routinely treat? (Check all that type)
   a) Anterior ☐ b) Bicuspid ☐ c) Molar ☐ d) Retreatment ☐
4. How do you diagnose the pulpal involvement? (Check all that type)
   a) Signs & Symptoms ☐ b) Pulp testing (heat/ cold/ electrical tests) ☐ c) Intraoral radiograph ☐ d) Extraoral radiograph (OPG, CBCT) ☐
5. Do you use digital radiography?
   a) Yes ☐ b) No ☐
6. How often do you use rubber dam?
   a) Always ☐ b) Usually ☐ c) Sometimes ☐ d) Never ☐
7. Do you use magnification?
   a) No ☐ b) Loups ☐ c) Microscope ☐ d) Others ☐
8. Of the following supplemental anesthesia techniques, indicated any you use routinely (check all that apply)
   a) Intrapulpal ☐ b) Intra osseous/trans-septal injection ☐ c) Intra ligament ☐
   d) Mandibular infiltration with 4% articaine ☐
9. What instruments do you routinely use? (Check all that type)
   a) SS K-files ☐ b) Hedstrom files ☐ c) Gates Glidden ☐ d) Peeso Reamer ☐
   e) NITI Hand files ☐ f) NITI Rotary files ☐ g) C files ☐
10. Which technique do you use for access cavity preparations?
    a) Traditional endodontic cavity ☐ b) Conservative endodontic cavity ☐
    c) Ninja/ Ultraconservative endodontic cavity ☐ d) Truss ☐
11. How do you determine working length?
    a) Radiograph alone ☐ b) Electronic apex locator alone ☐ c) Tactile sensation techniques ☐
    d) electronic apex locator with radiographic conformation ☐
12. Do you use sodium hypochlorite as your primary irrigant?
    a) Yes ☐ b) No ☐

13. Do you use any type of adjunctive activation device during irrigation? (Sonic, ultrasonic, Endo activator, Endo vac, Endo XP Finisher, PAD- Photo activated disinfection)

a) Yes ☐ b) No ☐

14. If multiple visits, which intracanal medicament do you use between two appointments (Check all that type)

a) Formocresol ☐ b) Triple Antibiotic Paste ☐ c) Corticosteroid paste ☐

d) Calcium hydroxide paste ☐ e) None ☐

15. Do you remove smear layer?

a) Yes ☐ b) No ☐

16. Do you routinely treat your endodontic cases in single or multiple visits?

a) Single visit ☐ b) Multiple visits ☐ c) No preference ☐

17. What obturation technique do you most commonly use? (Check all that type)

a) Cold lateral compaction ☐ d) Warm lateral compaction ☐ g) Paste filling ☐

b) Continuous wave compaction ☐ e) Carrier- based obturation ☐ h) Silver point ☐

c) Thermomechanical compaction ☐ f) Schilder technique (classic warm vertical compaction) ☐

18. Which Obturating material do you use? (Check all that type)

a) Sealer pastes ☐ b) Various forms of GuttaPercha ☐ c) Silver cone ☐ d) Resilon ☐

19. Do you use sealer?

a) Yes ☐ b) No ☐

20. Which sealer do you use?

a) Eugenol based sealer ☐ b) Calcium Hydroxide based sealer ☐ c) Resin based sealer ☐ d) Bioceramic ☐

21. Which Post– obturation restorative material do you use? (Check all that type)

a) Composite ☐ b) Amalgam ☐ c) Cements ☐ d) GIC/ Modified GIC (cermet) ☐

22. Do you leave tooth open for drainage?

a) Yes ☐ b) No ☐

23. Do you routinely use a paste/ gel type chelator/ lubricant during canal instrumentation?

a) Yes ☐ b) No ☐

24. Which sterilization methods do you use to sterilize endodontics files? (Check all that type)

a) Autoclaving ☐ b) Carbon dioxide laser sterilization ☐

c) Chemical sterilization (with glutaraldehyde) ☐ d) Glass –bead sterilization. ☐

25. Which method do you use for dealing with fractured instruments? (Check all that type) a) Retrival ☐ b) By- pass the instrument ☐ c) Apical surgery ☐ d) Obturate it ☐ e) Extraction ☐

26. Which post & core do you use? (Check all that type)

a) Customized cast post ☐ b) Bonded Fiber post ☐ c) Metallic Screw post ☐ d) Other ☐

27. About how many hours of endodontics CDE have you attended in the last two years?

a) None ☐ b) 1-5 ☐ c) 5-7 ☐ d) 7-10 ☐

Statistical Analysis

The data were collected and analyzed using SPSS software version 23. (SPSS Inc. Released 2008. SPSS Statistics for Windows, Version 23.0. Chicago: SPSS Inc)

Result

The survey had a total of 789 participants, and replies came from various categories depending on years of experience. Among all groups based on Years of practicing Endodontic therapy, our data indicate that 50% of respondents treated > 15 cases per month. The majority of the teeth that general practitioners reported treating were anterior (32%), bicuspid (42%), and molar (100%) and retreatment (16%). Just 6% of respondents said they desired to finish their therapy in just one visit. The use of a rubber dam was never mentioned by 45% of

respondents. During RCT, just 4% of respondents typically utilise a rubber dam. 51% of respondent sometime use rubber dam during RCT.

95% of participants use sodium hypochlorite (Naocl) as their main irrigating agent. During instrumentation, 58% of respondents use a paste- or gel-type lubricant or chelator. 88% of respondents are remove smear layer during root canal treatment.69% of respondent are using cold lateral compaction obturation technique and warm lateral compaction was used by 32%. No participants reported use of silver points. 40 % of participants are leaving teeth open for drainage. 50% of the respondents are using calcium hydroxide as an intracanal medicament, 45% are using formocresol, and only 2% are using Triple antibiotic paste. 85% of respondents are using various form of gutta percha as an obturating material. Only 15 % are using sealer paste as an obturating material.100% respondents are using sealer in RCT, among them 38% using eugenol-based sealer, 30% using calcium hydroxide-based sealer, 32% using resin-based sealer. 52% of respondents are using GIC/ modified GIC , 19% are using composite, 19% are using amalgam and 10% are using cements as a post obturation restorative material.36% of respondents are using autoclave,40% are using glass bead sterilization, 17% are using chemical sterilization and only 6% are using carbon dioxide laser sterilizer for sterilization of endodontic instruments.49% of respondents are dealing with fractured instrument with instrument bypass, 10% are obdurate it, 17% are extract the tooth, 6% are retrieve it and 20% are doing apical surgery for fractured instrument.62% of respondents are using fiber post, 27% are using metallic post and only 11% are using custom post for post and core.

The majority of survey participants (63%) use an electronic apex finder to establish working length, either on its own (13%) or in conjunction with radiographic confirmation (20%). [Figure 1] A variety of supplemental anaesthetic, primarily intrapulpal anaesthetic, was reported by 79% of respondents. 65% of respondents reported using NiTi rotary files for root canal instrumentation. 71% of the participants in the study used digital radiography. (Figure 2) A common type of magnification employed by respondents was often loupes (21%). (Figure 3).

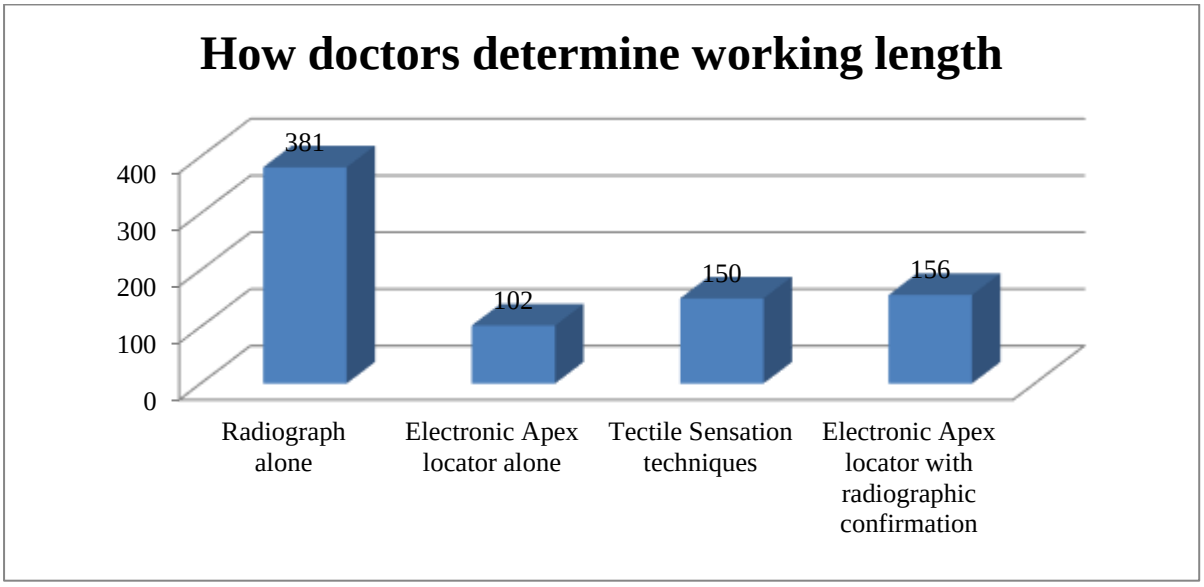

Figure 1: Above chart explains how doctor determine working length.

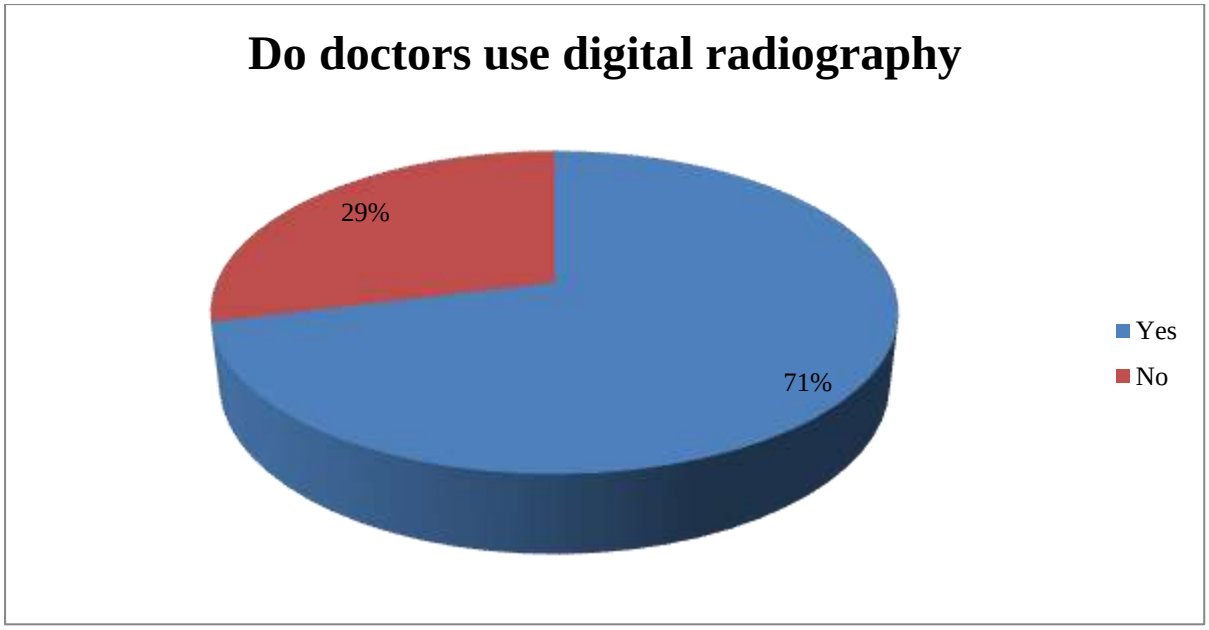

Figure 2: Above chart explains whether doctor use digital radiography or not. As per the data, 71% doctors use digital radiography whereas 29% doctors do not use digital radiography.

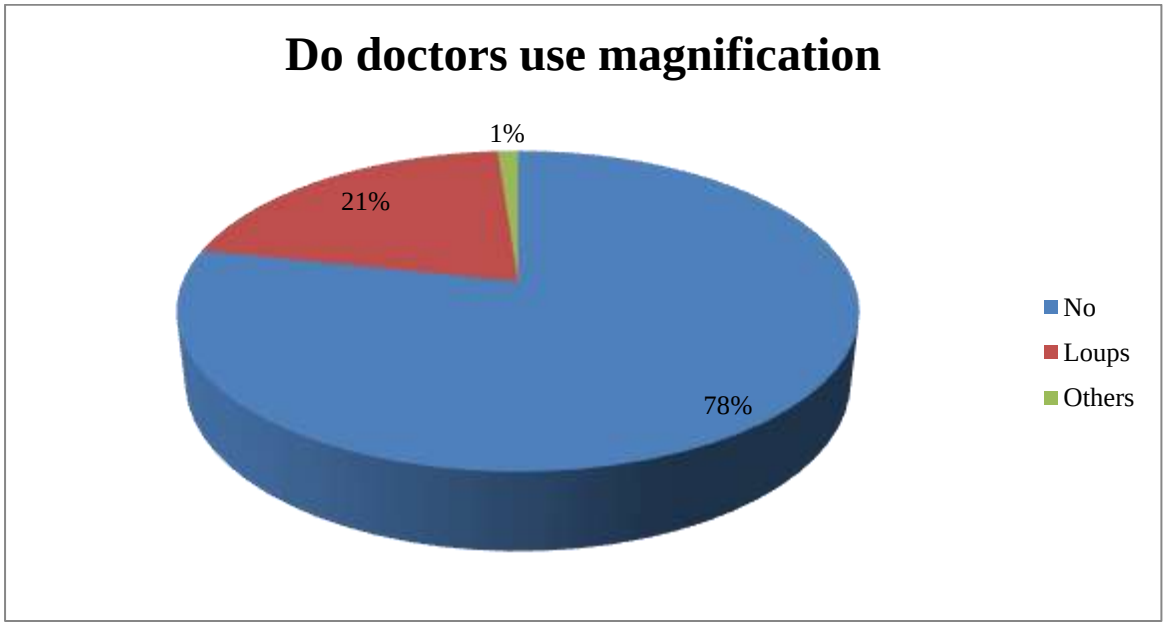

Figure 3: According to the above chart, 78% doctors do not use magnification. 21% doctors use loupes whereas 1% doctors use others.

Additional activation of root canal irrigants by using devices (Sonic, ultrasonic, Endo activator, Endo vac,Endo XP finisher, PAD- Photo activated disinfection) was used by 20% of participants. 88% of respondents are using conservative endodontic cavity for access cavity preparation, 12% are using traditional endodontic cavity for access cavity preparation.

Discussion

According to the authors' knowledge, this study is the first to have information published about the general dental practitioners in Gujarat who have adopted advanced endodontic treatment.

In contemporary endodontics, rubber dam isolation is regarded as the gold standard of care. According to a survey of general dentists in the United States, 59% of respondents always use rubber dams. In Gujarat, only 4% of practitioners frequently employed rubber dams during root canal procedures. Rubber dams may not be used

because they are more expensive, take more time, need more skill or training, are not accepted by patients, or are not included in the undergraduate teaching curriculum[2]. GPs who participate in more CDE programmes use rubber dams for isolation more frequently.
Even though more than 35% of the root canal surface might be left uninstrumented even with the use of NiTi rotary instrumentation[3], root canal irrigation is a crucial part of nonsurgical endodontic treatment. The vast majority of general practitioners in this study (95%) reported using NaOCl as their primary irrigant, which is consistent with endodontists in the US (91%)[5]. NaOCl has significant benefits in tissue disintegration[11] and antibacterial activity[10]. In vitro dentin debris removal from apical abnormalities and bacterial count reduction are two recent research' findings that may benefit from activating irrigants during endodontic therapy. Only 20% of general practitioners (GPs) in this study reported employing an irrigation adjunct, as opposed to at least 50% of endodontists as described elsewhere[14]. This has been strongly correlated with CE attendance, indicating that it might be a crucial subject for future endodontic CE courses to concentrate on.

One of the most important endodontic procedures is the determination of the working length. Overinstrumentati on causes the displacement of infected dentine or debris into the periradicular tissues in teeth with intracanal inf ections, which can impede recovery. Only 13% of respondents use an electronic apex locator for working length , which is less than the apex locator used in Saudi Arabia (solaiman et al 2011) and Portland, which is 18% (Gin a et al. 2014). 48% of respondents use radiographs alone for working length determination, which is more than GPs of Portland. Only 20% of respondents use a combination of radiographs and electronic
apex locators for working length determination, which is less than GPs of Portland 52%.
Seventy one percent of respondents are using digital radiography which is almost similar to digital radiography used in Portland 72%.
The prepared root-canal system has been obturated using a variety of techniques over the years, each with its own claims of simplicity, effectiveness, or superiority. However, cold lateral condensation with guttapercha remains the most often utilized obturation procedure among general dentistry practitioners, with 69% of practitioners using it. The warm vertical compaction 13% was one of the less favoured alternatives. Dentists did not appear to be great proponents of the more current improved obturation procedures. This could be explained by the higher expenses involved or by a lack of knowledge and experience.

A clinical investigation found that only 17.2% of second mesiobuccal canals could be detected without the use of magnification, and that there was a threefold increase in the likelihood of finding the second mesiobuccal canal when magnification was used15. In West LA, endodontists were reported to employ dental operating microscopes (DOM) 52% of the time in 1999, according to a questionnaire survey16; however, in the current study, 54% of the time, magnification was reported to be primarily achieved by the use of loupes. Due to a lack of knowledge and skills that will be improved by participating in CDE programmes, as well as the cost of microscopes, GPs did not employ DOMs, which is maybe not surprising.

A complete mechanical preparation is necessary for successful root canal therapy. K-files and H-files were the most popular root canal instruments, each being utilized by 63% and 49% of the respondents, respectively. 69% of respondents reported using NITI hand files, while 66% reported using NITI rotary files in regular practice. There is little doubt that using rotary systems resulted in substantially shorter instrumentation sessions and fewer visits required to finish a case. The practitioners may have been drawn by this. The "trialability" and "complexity" features, however, seem to be necessary in order to transition from traditional to rotary instrumentation technique. Significantly more dentists were willing to adopt a new rotary system to the daily practice, when training was included in the educational package, as compared to just lectures and written information [13].

Conclusion

Numerous cutting-edge ideas, methods, and tools have been introduced into dentistry practise over the past decade. General dental practitioners used traditional diagnostic, preparation, and obturation techniques despite the availability of a number of innovative tools and methods, according to the majority of respondents. Rarely were working microscopes and magnifying glasses employed during endodontic procedures. This study demonstrated

the value of creating higher levels of specialised training or continuing dental education for practitioners in order to keep practitioners' knowledge current.

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