



CURRENT TRENDS IN THE USE OF IRRIGANT ACTIVATION TECHNIQUES AMONGST ENDODONTIST AND GENERAL DENTISTS IN CENTRAL INDIA - A KNOWLEDGE AND PRACTICE BASED SURVEY

Endodontics

Dr. Supriya Khemraj Parwate*	Junior Resident, Department of Conservative Dentistry and Endodontics, VSPM Dental College and Research Center, Nagpur, India. *Corresponding Author
Dr. Vandana Kokane	Associate Professor, Department of Conservative Dentistry and Endodontics, VSPM Dental College and Research Center, Nagpur, India
Dr. Pratima Shenoi	Professor and Head of Department, Department of Conservative Dentistry and Endodontics, VSPM Dental College and Research Center, Nagpur, India.
Dr. Rajesh Kubde	Professor, Department of Conservative Dentistry and Endodontics, VSPM Dental College and Research Center, Nagpur, India
Dr. Himani Thawale	Senior lecturer, Department of Conservative Dentistry and Endodontics, VSPM Dental College and Research Center, Nagpur, India.
Dr. Pooja Nakate	Junior Resident, Department Of Conservative Dentistry And Endodontics, VspM Dental College And Research Center, Nagpur, India.

ABSTRACT

Aim - To assess the knowledge and practice of Irrigant Activation Techniques amongst Endodontist and General Dentists in Central India. **Materials And Methods** - In this online survey a questionnaire consisting of 14 closed ended questions was distributed among Dental Health Care Professionals including Endodontists and General Dentists. Total 202 Responses were collected through google forms. The questionnaire included questions that are focused on Irrigation activation technique based on the knowledge and practice. All statistical analysis was done using Statistical Packages of Social Science SPSS version 21 and p value less than 0.05 was considered statistically significant. **Results** - The usage of irrigation activation technique was more in Endodontists as compared to general dentist. Our data indicated that 94.5% of respondents use sodium hypochlorite (NaOCl) as the primary endodontic irrigant. 85.1% participants use manual dynamic agitation. 55.7% of our respondents aim to remove the smear layer during the endodontic treatment. The mean knowledge score was significantly high among Endodontists as compared to the General dentists. ($p < 0.05$) **Conclusions** - The knowledge and attitude of Endodontists & General dentist is largely positive towards use of Irrigant Activation Technique (IAT) in Central India.

KEYWORDS

Endodontic irrigants, Irrigant agitation technique.

INTRODUCTION

The outcome of root canal therapy ultimately depends on thorough debridement and root canal irrigation. An ideal root canal irrigants should be highly effective against facultative and anaerobic microorganisms arranged in biofilms and have a broad antimicrobial spectrum, be able to dissolve remnants of necrotic pulp tissue, neutralise endotoxins, prevent the formation of smear layers during instrumentation, or dissolve them once they have formed.(1)

The root canal system comprises of minute anatomical connections, fins and isthmus which are difficult to clean and shape by mechanical debridement. Thus, chemical disinfection by means of root canal irrigants is pivotal in these critical areas that remains untouched by mechanical preparation. For irrigation to be effective, certain areas of the root canal must be reached.

Conventionally, irrigation has been done with the help of syringe, but it has proven to be ineffective in the apical part of the root canal.(2)

To enhance the delivery and effectiveness of root canal irrigants, numerous irrigant and irrigant activation procedures are being used. Manual dynamic agitation (MDA) is commonly used method.

In order to increase the effectiveness of irrigants, Endoactivators use sonic energy to produce a hydrodynamic phenomenon. To activate the irritants, a cordless handpiece oscillates polymer tips at 2-3 kHz. In passive ultrasonic irrigation (PUI), non-cutting file tips vibrate at a frequency of 25-30 kHz. Acoustic streaming of the irrigants during PUI is reported to improve cleaning effectiveness and lateral canal penetration. In order to allow irrigants to reach their entire working length without causing apical extrusion, apical negative pressure techniques (ANP) like Endovac use cannulas attached to the chair side suction.(3)

Thus this study is to know the current techniques used in irrigant activation amongst the Endodontists and General dentist in Central India.

MATERIALS AND METHODS

This is a cross sectional observational study in which a web based close ended questionnaire survey was conducted among the Endodontists and general dentists in Central India. Sample size was number of response rate obtained from practitioners. The validated questionnaire have total 13 questions which are focused on the knowledge and practice of irrigant activation techniques used amongst Endodontists and General Dentists. The response to each question was calculated and appropriate statistical test was applied.

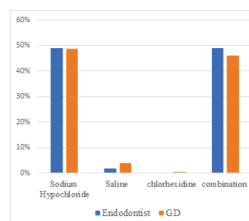
Statistical Analysis

The data obtained from the study was tabulated and entered in Microsoft excel sheet. The level of significance was at 5% (0.05), and the power of the study at 80%. Frequency analysis was done for frequency and proportion. Pearson's Chi square test of proportion was done.

Mean and Standard deviation was calculated. To compare mean between the groups, Independent sample t test was done.

All statistical analysis was done using Statistical Packages for Social Sciences (SPSS) Statistics for Windows, Version 21.0. Armonk, NY: IBM Corporation. All statistical analysis was done at 95% Confidence interval and p value less than 0.05 was considered to be statistically significant.

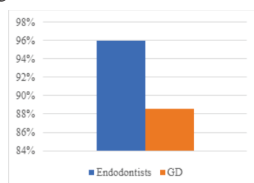
RESULTS



Graph 1 – Primary Irrigant of choice

The respondents of the survey, comprised of 51 Endodontists & 150 General Dentists. While in 13 questions (4 knowledge based and 9 practice based), First part of questionnaire focused on knowledge of irrigation activation technique (IAT). All the Participants present in the study 51 Endodontist and 150 General Dentist found apical third portion of root canal is difficult to disinfect. During negative pressure irrigation technique 50.9 % of Endodontist & 58 % of General Dentist preferred to place the needle 2mm short of working length.

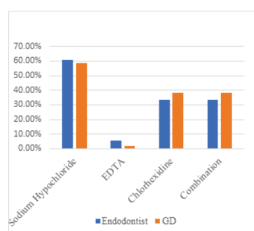
Primary irrigant of choice is NaOCl, 49% of Endodontist and 48.6% of General Dentist used it. Saline was used by 1.9% of Endodontist and 4% of General Dentist, 0.6% General Dentist used Chlorhexidine while, 49% of Endodontist and 46% of General Dentist used combination of irrigants.



Graph 2 – Use of Irrigant Activation Technique

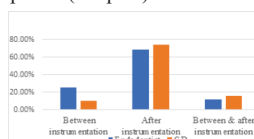
Irrigation Activation Technique was used by 96% of Endodontist and 88.6% of General Dentist.(Graph 2)

With regard to irrigant used for activation, 5.8% of Endodontist and 2% General Dentist used EDTA, 33.3% of Endodontist and 38% of General Dentist used chlorhexidine. Sodium Hypochlorite was used by 60.78% of Endodontist and 58.6% of General Dentist. While, 33.3% Endodontist and 38% of General Dentist used combination of irrigants. (Graph 3)



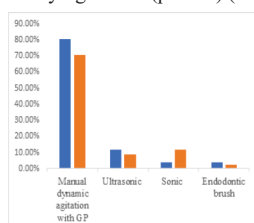
Graph 3 – Irrigant use for Activation

When participants were asked regarding performance of Irrigation Activation Technique (IAT), 25.4% of Endodontist and 10 % General Dentist performed in between instrumentation, while 68.6% of Endodontist and 74% of General Dentist performed after instrumentation. 11.7% Endodontist group and 16% General Dentist responded for both options.(Graph 4)



Graph 4 – Performance of Irrigant Activation Technique

Most commonly utilised adjunct for irrigation activation is Manual Dynamic Agitation with GP, which is used by 80.3 % of Endodontist and 70.6% of General Dentist. 11.7% of Endodontist & 8.6% of General Dentist used Ultra Sonic Activation method. Sonic Activation was used by 3.9 % of Endodontist and 11.7% General Dentist. 14% of General Dentist used Negative Pressure and Endodontic Brush was used by 3.9% of Endodontist and 2.6% of General Dentist. This difference in proportion was statistically significant ($p < 0.05$).(Graph 5)



Graph 5 – Adjunct use for Irrigant Activation Technique

DISCUSSION

Roots have complex external and internal morphological characteristics. A thorough knowledge of the general anatomy and its variations is a pre-requisite in determining successful outcomes of surgical and non-surgical root canal treatment.

The current strategy in endodontics involves using irrigation activation more frequently to improve disinfection and smear layer reduction in root canals.(4)

Utilizing the Irrigation Activation Technique (IAT) enables thorough cleansing of the untouched and crucial portion of root canal. Currently there is a scarcity of literature on knowledge & practice base of Irrigation Activation Technique(IAT) amongst dental practitioners in Central India.

Thus, the primary objective of this present survey was to investigate the prevalent practices of IAT among Endodontists & General dentist in Central India.

Majority of the respondents 49 % Endodontist and 48.6% of General Dentist use sodium hypochlorite as the primary irrigant and 49% of Endodontist & 46% of General dentists use combination of irrigants, whereas in an previous survey by Natansabhapathy et al. amongst Post graduate & Endodontists in India 77.8% used NaOCl & 26.4% felt that NaOCl will not be sufficient in many clinical scenarios that may develop during endodontic treatment.

A survey conducted among members of American Association of Endodontics in 2012(5) revealed that 77 % of practicing Endodontists preferred to remove smear layer before obturating the root canal system. This differed from the results of our study that indicate 55.7% of participants aimed to remove smear layer, using EDTA.

In this study, 96% of Endodontist & 88.6% of General dentist used IAT, which was higher than what was reported in India, where only 87.3% of them used IAT. The fact that the root canal system is more intricate than previously thought may be the cause of this variation in outcome. Thus, with greater awareness, adjunctives to improve chemical disinfection with root canal irrigants have become more and more common.

The physical stretching, folding, and cutting of fluid laminas which is carried by the push-pull motion of the gutta-percha point in the canal results in higher intracanal pressure during lateral canal irrigation.(6) Additionally, it makes possible for used molecules of the active NaOCl irrigant to be mixed more effectively with fresh, unreacted solution. Manual dynamic irrigation had shown to be significantly more effective than auto dynamic and conventional irrigation as stated in an earlier study by McGill S et al in 2008.(7) This method has the drawback of being more time-consuming and laborious even though it is simple and less expensive.

80.3 % of Endodontist and 70.6% of General Dentist preferred using MDA technique as it is simpler and easier to perform, followed by Ultrasonic 11.7% of Endodontist & 8.6% of General Dentist used it. Very few participants use Sonic activation & Endodontic brushes was used by 3.9% of Endodontist and 2.6% of General Dentist. These results are highly indicative of increasing predilection towards use of other adjunctives to enhance efficacy of endodontic irrigants amongst dental practitioners. MDA does not require any extra equipment and hence it is more popular technique. Study conducted by Akyuz Ekim et al in 2015, it was proved that, The most effective method for eliminating the smear layer in the apical portion of the root canal system is ANP. Because of the greater irrigant flow, the absence of fluid stagnation, and the constant replenishment of NaOCl during the irrigation process, negative pressure irrigation has a higher cleaning effectiveness.(8)

Spoorty et al in 2013 demonstrated that penetration of irrigants up to working length is improved by negative pressure irrigation, and the addition of ultrasonic activation further enhances irrigant penetration into lateral canals.(9)

However, only 11.7% of dentists use Apical Negative Pressure technique in Central India.

Multiple irrigant were used during IAT by many of the respondents and

19.9% used all three irrigants, NaOCl, EDTA and CHX. However clinicians should take caution that, the use of combination of irrigants might result in the production of precipitate, which can be toxic and difficult to remove.

Many respondents felt that they have lack of knowledge and awareness of irrigant activation technique, some felt it requires expensive armamentarium and it is time consuming procedure, Thus it necessitates introduction of alternatives for irrigant activation at reasonable costs to enhance their popularity and use amongst dental practitioners.

CONCLUSION

Irrigation activation techniques improve intracanal cleanliness, has better antimicrobial capacity, tissue dissolving property and smear layer removal therefore, their use is recommended throughout root canal preparation.

Within the limitations of this study, it can be concluded that 96% of Endodontists & 88.6% of Dental practitioners use varying IAT to enhance efficacy of irrigation.

The knowledge and attitude of Endodontists & General dentist is largely positive towards use of IAT in Central India.

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