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SIGNIFICANCE OF STERILIZATION DURING OBTURATION IN ENDODONTIC PRACTICE: A CROSS SECTIONAL STUDY

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ABSTRACT

Objective: Sterilization is the key factor for successful endodontic therapy. Obturation is one of the determinant step for better results after root canal treatment. The objective of this study is to assess the significance of sterilization during obturation in endodontic practice. A cross- sectional, online based survey was conducted on voluntary participants. Distribution of self-structured questionnaire was done through snowball sampling technique. Chi square test was used to analyze the data. The survey results showed that out of 134 subjects, 24.6% (<0.001) use rubberdam while obturation, 25.4% (<0.001) differentiate between false and true tug back, 55.2% (<0.001) disinfect the heating unit using alcohol and 41.0% (<0.001) disinfect the pulp chamber using ethanol after obturation. **Conclusion**: The present study showed that subjects were aware about importance of sterilization during obturation. Majority of the subjects are following sterilization protocols while performing root canal treatment.

KEYWORDS: Sterilization, Rubberdam, Gutta percha, Disinfection, Obturation.

INTRODUCTION

Obturation in endodontic practice provides hermetic seal in the form of coronal and apical seal and acts as a foundation for the post endodontic restoration. Root canal therapy is probably successful with adequate cleaning and shaping of the root canal system, three-dimensional obturation, and a perfect coronal restoration.[1] Utmost priority is achieving a fluid tight seal from the apical segment till the cavosurface margin of tooth getting treated to prevent reinfection. This indicates that a coronal restoration prevents oral microbial microleakage. Successful endodontic treatment depends on the quality of the obturation as well as the final restoration.[2]

Disinfection and sterilization become achieveable through mechanical instrumentation and copious irrigation in order to remove contaminants, and by further preparing the root canal anatomy for accommodation of three-dimensional obturation and appropriate seal of the root canal system.[3]

To isolate the operating area, rubber dam kit is an essential part for endodontic practice. This includes rubber dam sheet, punch, clamps, forcep, template and dental floss. These instruments can be either disposable or reusable according to their use. If sterilization and disinfection measures are not correctly followed, risk of patient being exposed to an infection increases.[4]

Therefore, this study was conducted to assess the significance of sterilization during obturation in endodontic practice.

MATERIALS AND METHOD

Present study was a cross-sectional, observational, web based survey conducted among the endodontic practitioners who perform root canal therapy in their common practice. This survey was conducted in August 2021. Social media was used to conduct the survey across various states of India. The Institutional Ethical Committee approval was recieved verbally for the conduction of survey. The snowball sampling technique was used to collect the initial eligible respondents who potentially recruited further more respondents from their acquaintances. By using Google forms, an online structured questionnaire was developed. The survey link was generated and was sent through online platforms like WhatsApp, E-mails and Facebook to the contacts of the subjects. The respondents were motivated to refer links to their contacts for participation. The participants were auto directed to the survey on clicking the link. As it was an online survey in English, subjects with appropriate internet access and able to read and understand English were recruited. This online questionnaire contained a total of 15 questions consisting of several questions appearing sequentially in order of clinical steps performed while obturating the root canal system.

DATA ANALYSIS

The information collected from the responders was automatically arranged in a spreadsheet. Data was recorded, tabulated, and statistically analyzed using SPSS, v24 (SPSS Inc, Chicago, IL). Descriptive analysis was applied to calculate frequencies, percentages, and proportions. Chi square test was used to find the level of association among the variables. A p-value of ≤0.05 was considered statistically significant.

RESULTS

One thirty four participants completed the survey questionnaire. Out of 134 (100%), 33 (24.6%) use rubberdam while obturation. 13 (9.7%) perform culture test before obturation. 50 (37.3%) always sterilize gutta percha before obturation. Only 47 (35.1%) subjects use gluteraldehyde for chairside sterilization of gutta percha. 54 (40.3%) keep master cone in dappen dish after checking its tug back. 43 (32.1%) differentiate between true tug back and false tug back by radiographic method. 60 (44.8%) always sterilize cement spatula and glass slab. 85 (63.4%) dry the canal before obturation using paper points. 22 (16.4%) use lentulospiral to coat the sealer into the canal and out of them 31.3% sterilize it. 69(51.5%) always sterilize the spreader. 74 (55.2%) disinfect the heating unit with spirit or alcohol. 61 (45.5%) always sterilize the pluggers. 46 (34.3%) always disinfect the pulp chamber after obturation and 55 (41.0%) prefer it disinfecting with ethanol.

Table 1: Significance of sterilization during obturation in root canal therapy.

S. No.	Questions	Responses	N (%)	X^2 (chi square value)	p- value
1.	How often do you use rubberdam before obturation?	a)Always b)Sometimes c)Never d)Don't know	33(24.6) 51(38.1) 34 (25.4) 16(11.9)	18.299	<0.001***
2.	How often do you perform a culture test before obturating the canal?	a)Always b)Sometimes c)Never d)Don't know	13(9.7) 35 (26.1) 61(45.5) 25(18.7)	37.343	<0.001***
3.	How often do you sterilize your gutta percha?	a)Always b)Sometimes c)Never d)Don't know	50(37.3) 51(38.1) 19 (14.2) 14 (10.4)	34.896	<0.001***
4.	Which medium do you use for the chairside sterilization of gutta percha?	a)Sodium hypochlorite b) Normal saline c)Glutaraldehyde d) All of the above	33 (24.6) 41(30.6) 47 (35.1) 13 (9.7)	19.672	<0.001***
5.	Where do you prefer keeping the master cone after checking its tug back?	a) Dappen dish b) Kidney tray c) Glass slab d) Any where	54(40.3) 35(26.1) 26(19.4) 19(14.2)	20.567	<0.001***
6.	How do you make out between false tug back and true tug back?	a) Tactile method b) Radiographic method c) Co-relating master apical file and master cone d) Never checked	34(25.4) 43(32.1) 45(33.6) 12(9.0)	20.448	<0.001***

7.	How often do you sterilize your cement spatula and glass slab?	a) always b) Sometimes c) Never d) Don't know	60(44.8) 42(31.3) 21(15.7)) 11 (8.2)	42.896	<0.001**
8.	How do you prefer drying the canal before obturation?	a) Negative pressure by syringe b) Paper points c) Surgitips d) Endo aspirator	44(32.8) 85(63.4) 3(2.2) 2(1.5)	139.851	<0.001**
9.	How do you prefer coating the sealer into the canal?	a) Lentulospiral b) Spreader c) File d) Paper point	22(16.4) 44(32.8) 46(34.3) 22(16.4)	15.851	0.001**
10.	How often do you sterilize your lentulospirals?	a) always b) Sometimes c) Never d) Don't know	42(31.3) 33(24.6) 25(18.7) 34(25.4)	4.328	0.228
11.	How often do you sterilize your spreaders?	a) always b) Sometimes c) Never d) Don't know	69(51.5) 37(27.6) 19(14.2) 9(6.7)	62.179	<0.001***
12.	How do you prefer disinfecting the heating device/ heating unit?	a) Normal saline b) Spirit/ Alcohol c) Autoclave d) Never done	17(12.7) 74(55.2) 14(10.4) 29(21.6)	69.045	<0.001***
13.	How do you prefer sterilizing the pluggers?	a) Always b) Sometimes c) Never d) Don't know	61(45.5) 49(36.6) 16(11.9) 8(6.0)	58.299	<0.001***
14.	How often do you disinfect the pulp chamber after obturation?	a) Always b) Sometimes c) Never d) Don't know	46(34.3) 40(29.9) 25(18.7) 23(17.2)	11.373	0.010**
15.	How do you prefer disinfecting the pulp chamber after obturation?	a) Ethanol b) EDTA c) Citric acid d) Normal saline	55(41.0) 12(9.0) 19(14.2) 48(35.8)	40.149	<0.001***

Chi square test , p < 0.001* – Very highly significant, p < 0.01** – Highly significant, p ≤ 0.05* – Significant , p > 0.05 – Not significant.**

DISCUSSION

Endodontics is a branch of dentistry that evaluates all the pathologies that affect both vital and necrotic dental pulp. It is a discipline that demands the practitioner to be attentive and accurate for aseptic field of operation. Reusable instruments can become a potential source of infection for the practitioner, and if sterilization and disinfection protocols are inappropriate, patients may be at risk of an re-infection. Disinfection procedures are definitely associated with sterilization procedure simultaneously.[5]

Rubber dam provides an appropriate isolation and sterilized field that further enhances the success rate of root canal therapy. Several techniques can be employed for evaluation of conditions within the root canal, such as a bacterial culture test, a smear test, or a cell culture test to determine the quantity of bacteria persistent inside the canals and periapical area.[6] Gutta percha is also an unnoticed source of infection as manufacturing of the cones occurs under aseptic conditions, but subsequently they are colonized by microbes while packing procedures and therefore, require a systematic use of these cones after following proper decontamination process.[7] Most widely used agents for the disinfection and sterilization of gutta-percha cones are sodium hypochlorite (0.5–5%), chlorhexidine (2%), gluteraldehyde, paraformaldehyde, peracetic acid (1-2%), hydrogen peroxide (3%), polyvinylpyrrolidone-iodine, MTAD.

Tug-back of master cone is usually left unmentioned but plays a pivotal role in obturation procedure and is recommended to provide an apical seal. It is best evaluated by radiographic method after checking the extent of master cone till the minor constriction. If it fails to reach there, it indicates a false tug back.[8] After confirmation of master cone, practitioners prefer keeping the master cone over a surface, preferably dappen dish, before the commencement of obturation. Therefore,

sterilization of gutta percha before obturation is recommended.

Glass-bead sterilization for 45 seconds at 240°C is recommended as the sterilization methods for sterilization of instruments like spreaders, pluggers and lentulospirals for desirable elimination of microbes and smear layer from their surfaces. UV light at 240–280 nm is preferred for glass slab.[9] Amounts of moisture stagnant in the root canal after irrigation can influence the sealing ability of root canal sealers further compromising the bonding ability between the dentin and conventional sealer. This is even more influenced by the amount of moisture that remains in the canal before obturation and the persistent residual sealers within the canal and the pulp chamber as well. Also, bacteria gets a suitable environment for proliferation in moist conditions.[10]

Sealer is coated on the dentin surface of pulp chamber while obturation, even if done carefully. This significantly reduces the strength of bonding of adhesive systems that are preferred for post endodontic restoration. This adhering sealer is intended to be cleaned to disinfect the pulp chamber dentin usually by the use of ethanol, acetone, isopropyl alcohol and amyl acetate.[11]

CONCLUSION

Present study proved that subjects were aware about significance of sterilization protocols during every step of endodontic therapy and they also agreed for further incorporation of such procedures into their day to day practice. But highlighting the importance of sterilization and disinfection during obturation and spreading more awareness regarding the same is yet required.

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