

**Knowledge and perception of dentist and endodontist towards the use of endodontic spacer in central India**

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**Abstract**

**Aim:** To assess the knowledge and perception of General Dentist and Endodontist towards the use of endodontic spacer in Central India.

**Introduction:** Endodontic spacers, an integral part of multivisit endodontics, have traditionally been used below temporary restorations in order to prevent restorative materials from occluding the orifices, and to aid in efficient removal of these materials. Cotton, as an endodontic spacer, still present a clinical problem. To

prevail over complications of cotton, many practitioners have incorporated foam pellets and Polytetrafluoroethylene (PTFE) tape, as spacers. So the present study was conducted to assess knowledge and perception of dentist and endodontist towards the use of endodontic spacer.

**Methodology:** A web based close ended questionnaire survey was conducted among the General Dental Practitioner (GDP) and Endodontists across Central India. The participants comprised of total 288 Dental Health

Care Professionals (DHCPs) including General Dental Practitioners (GDP) and Endodontists. The data were statistically analyzed using Pearson Chi square test.

**Results:** The Endodontist who practiced multivisit endodontics were more likely to use PTFE as endodontic spacer ( $p < 0.001$ ). The General Dentist showed more preference towards use of cotton as endodontic spacer ( $p < 0.001$ ), 59% of them lack knowledge of using PTFE as endodontic spacer.

**Conclusion:** Endodontic spacers are integral part of multivisit endodontics. Earlier cotton pellets were preferred as an endodontic spacer. PTFE with its unique properties of inertness, non-biodegradable and non-fibrous is preferred over cotton by many Endodontists. In this survey it was seen that GDP lacked the awareness of using PTFE as endodontic spacer.

**Keywords:** Endodontic Spacers, Cotton spacer, Polytetrafluoroethylene (PTFE) tape, Temporary Restoration.

## **Introduction**

In endodontics, the objective of the root canal treatment is to eliminate all pathogens from the root canal system by using mechanical & chemical debridement, and to sustain it disinfected by preventing a further influx of microbes during or after endodontic treatment. The infected canals requires multiple visit root canal therapy in most of the cases. To maintain a tight coronal seal between appointments, temporary coronal restorations and endodontic spacers became fundamental parts of a multivisit endodontic procedure, to exclude debris and microbial contamination of the cleaned canals. Endodontic spacers have traditionally been used below these temporary restorations in order to prevent restorative materials from occluding the orifices, and to aid in efficient removal of these materials.

Various types of endodontic spacer materials are available in market including Cotton Pellets, Polytetrafluoroethylene (PTFE) tape, Foams. Cotton is the most frequently used spacer beneath the temporary restorative materials.<sup>6</sup> PTFE tape is an inorganic, non-fibrous, ribbon like material which is inert, nonbiodegradable<sup>13</sup> and nonfibrous<sup>10</sup>.

Previous studies have shown that thickness of temporary restorative material is an important factor in preventing microbial leakage from the oral cavity.<sup>3</sup> Along with it, the type of spacer placed beneath the temporary restoration, may also contribute to microbial leakage.<sup>4</sup>

Thus endodontic spacers are integral part of temporary endodontic restoration in multivisit visit endodontic practice. Hence this study has been conducted to assess knowledge and perception of dentist and endodontist towards the use of endodontic spacer.

## **Materials and Methods**

The designed research protocol was approved by Institutional Ethics Committee. A web-based survey consisting of both open and close-ended questions was generated, addressing the following aspects:

- a) Clinical experience of respondents
- b) Awareness about temporary filling and endodontic spacer materials used in multivisit endodontic treatment
- c) Temporary filling and endodontic spacer materials used in routine practice
- d) Knowledge, perception and usage of temporary filling and endodontic spacer materials used in multivisit endodontic treatment

The participants comprised of total 288 Dental Health Care Professionals (DHCPs) including General Dental Practitioners (GDP) and Endodontists working in government sector, associated in institutions and having private practice in Central India. The questionnaire did not disclose the identity of any participant.

The survey was sent via email and responses were collected in Google Database. An explanation was attached about the importance of their participation and the study purposes. To ensure maximum participation reminders were sent at regular intervals to all the respondents. Loss of participant was considered if the participants failed to respond within 30 days. The data were statistically analyzed using Pearson Chi square test.

### **Results**

Out of 320 participants who received the questions, 288 participated in the study, with a response rate of 90%. Endodontists made up 77.8% of the study participants, while GDP made up 22.2%. [Table 1] Most of the study participants worked at academic institutions (78.8 %) out of which 54.5% were from private institution and 24.3% were from government sectors and 21.2 % were in private dental clinics. [Table 2] 81.6 % of the 288 participants had less than 5 years of clinical experience, 14.2 % had 5 to 15 years of clinical experience, and 4.2 % had more than 15 years of clinical experience. [Table 3]

Almost all participants (96.5%) agreed that temporary filling material is an integral part of multivisit Endodontics with 96.9% GDP and 96.4% Endodontists agreeing. The usage of spacer during multivisit endodontic treatment was more prevalent in Endodontists (85.7%) followed by 70.3% GDP which was statistically significant ( $p=0.004$ ). Endodontists (91.5%) had a higher comprehension of PTFE as an endodontic spacer than GDP (54.7%) which was statistically significant ( $p < 0.001$ ). [Table 4]

The present study assessed the perspective of DHCPs about the use of endodontic spacer during multivisit treatment. Cotton was the most common spacer used by GDP (73.4%) while PTFE was a commonly used spacer by Endodontists (98.5%). According to all participants PTFE spacer could show the less microleakage than

cotton spacer during the multivisit treatment with highly significant difference ( $p < 0.001$ ). [Table 5] Sterilization method most often used by GDP and Endodontists was Autoclave (64.58%), followed by UV Chamber sterilization and chemical sterilization. [Table 6] In comparison to 42 % GDP, 99% of Endodontists believed that PTFE could be a superior alternative for cotton spacer ( $p < 0.001$ ). [Table 4]

### **Discussion**

Bacterial infection is the most common cause of pulpal and Periradicular disease.<sup>1</sup> The primary principles of endodontic treatment should be to eliminate almost all bacteria from the tooth, and then attempting to keep the tooth in this disinfected state by preventing any further invasion of bacteria during and after treatment.

When root canal therapy is performed in multiple visits, Provisional (also known as Treatment, Temporary, or Interim) restorations are used in the interim between access cavity preparation and placement of final restorations. The endodontic temporary filling serve the purpose of sealing the access cavity from saliva contamination between treatment sessions until the tooth receives a definitive restoration. Accordingly, temporary filling materials must provide an adequate seal against entrance of bacteria, fluids and organic materials entering the root canal system through the oral cavity, and at the same time prevent seepage of intracanal medicaments.<sup>6</sup>

Both the quality and duration of the seal are crucial factors because the endodontist has minimal control over the timing of the final restoration. Recent in vitro studies have demonstrated that the exposure of the root canal filling to saliva for a few days resulted in extensive coronal leakage ranging from 33% to 85% of the total root length. Lack of satisfactory temporary restorations during endodontic therapy was the second most

contributing factors in continuing pain after treatment commencement.<sup>4</sup>

In the present survey, Cavit G was the temporary restoration of choice for both GDP and Endodontist, 57.8% and 61.6%, respectively followed by Orafil G. Other temporary restorations used for access closure in this survey included IRM, glass ionomer cement, composite resin, and amalgam. [Table 6] The majority of participants, 51.38% placed a cotton pellet beneath the temporary restorations as endodontic spacer followed by 46.52% using PTFE. [Table 5]

During Inter-appointment period cotton is the most commonly used spacer material beneath the temporary restorations for ease of removal and location of the chamber before final restoration.<sup>6</sup> Many clinicians use cotton pellets as medicament carrier. The removal of the cotton fibers can be challenging because they frequently get trapped on the cavity walls, potentially compromising the integrity of the definitive restoration. If a definitive restoration is not provided relatively soon after endodontic therapy, masticatory forces may cause wear or abrasion of the surface of the provisional restoration, thereby reducing its thickness to below the desired 3.5 mm. This may result in the exposure of the entrapped cotton fibers to the oral environment, which could lead to the initiation of coronal microleakage from the oral cavity. <sup>4</sup>Newcomb et al. (2001) in invitro study demonstrated that even a very small amount of cotton trapped between the wall of the tube and the filling material dramatically reduced the sealing quality of the temporary restoration.<sup>14</sup> So to prevail over all these limitations of cotton spacer, many practitioners have tried other materials such as foam pellets and Polytetrafluoroethylene (PTFE) tape, as spacers.<sup>4,7</sup> PTFE is inorganic and non-fibrous which may enhance its effectiveness as spacer. It is inert, autoclavable and easily

available.<sup>4</sup> Stean et al have reported several uses of PTFE tape in dentistry. He categorized dental uses of PTFE tape into three types 1) mechanical barrier applications 2) surgical uses 3) fit checker. Alkadi M et al. reported that PTFE spacer showed improved sealing ability compared with the commonly used cotton pellet and may serve as an alternative endodontic access cavity spacer.<sup>13</sup> In the current study in contrast to 99% Endodontist only 42% GDP thinks that PTFE could be a better substitute for cotton as an endodontic spacer. Also 60.9% GDP and 98.9% endodontists believe that PTFE could show less microleakage compared to cotton and sponges. Our results were in concurrence with the Prabhakar A et al. study, who stated that PTFE tape as a spacer material showed minimal or no microbial contamination as compared to cotton spacer beneath the temporary restoration.<sup>4</sup> The microbial leakage in the access cavity was minimal when PTFE tape was placed as spacer beneath temporary restoration. The possible reasons for non-contamination of PTFE tape could be due to its ease of handling characteristics, particularly its unique property of not adhering to any part of the access cavity. This also ensures that the tape can be removed easily in one piece, leaving behind an access cavity free of any remnant of spacer. Prevention of bacterial uptake is also seen as PTFE tape is inorganic and non-fibrous thus, eliminating the chances of getting impregnated within the temporary restorative material.

### **Conclusion**

Endodontic spacers are integral part of multivisit endodontics. Earlier cotton pellets were preferred as an endodontic spacer. PTFE with its unique properties of inertness, non-biodegradable and non-fibrous is preferred over cotton by many Endodontists. In this survey it was seen that GDP lacked the awareness of using PTFE as endodontic spacer.

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## Legend Table and Figure

Table 1: Qualification

	Frequency (n)	Percentage (%)
General Dentist	64	22.2%
Endodontist	224	77.8%

Table 2: Type of Health Sector where working

	Frequency (n)	Percentage (%)
Government sector	70	24.3%
Associated with institution	157	54.5%
Private Practice	61	21.2%

Table 3: Years of Clinical Experience

	Frequency (n)	Percentage (%)
<5 years	235	81.6%
5 -15 years	41	14.2%
> 15 years	12	4.2%

Table 4

	General Dentist N= 64 n (%)	Endodontist N=224 n (%)	p value <sup>^</sup> , Significance
4. Temporary filling material is an integral part of clinical dentistry	62 (96.9%)	216 (96.4%)	p =0.863
6. Uses spacers for multi visit endodontic treatment	45 (70.3%)	192 (85.7%)	p =0.004*
7. Knows about newer materials which can be used as endodontic spacer apart from cotton	40 (62.5%)	198 (88.4%)	p<0.001**
9. Knows that PTFE tape also serve as endodontic spacer	35 (54.7%)	205 (91.5%)	p<0.001**
10. Introduced PTFE tape in your day-to-day practice	13 (20.3%)	163 (72.8%)	p<0.001**
11. Sterilize the spacer before use	48 (75%)	200 (89.3%)	p =0.004*
16. PTFE is better substitute for cotton spacer	27 (42%)	222 (99%)	p<0.001**

\*p<0.05 – significant difference      \*\*p<0.001 - highly significant difference

<sup>^</sup>p value calculated using Pearson Chi square test

Graph 1

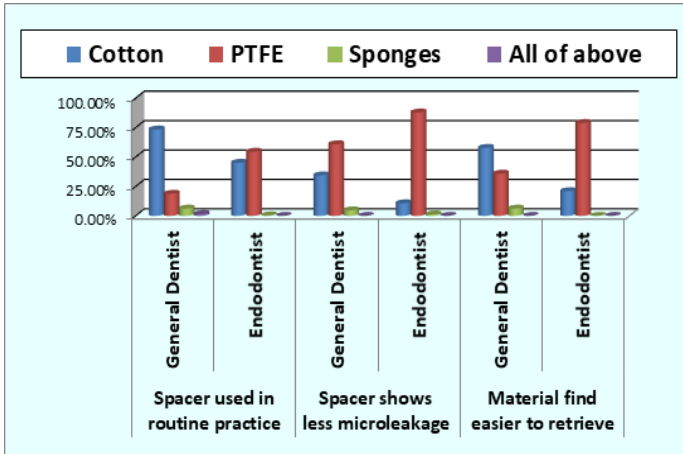


Table 5

5. Which temporary material do you use in your day to day practice	General Dentist n (%)	Endodontist n (%)	p value <sup>^</sup> , Significance
Orafil –G	15 (23.4%)	67 (29.9%)	p = 0.028*
Cavit G	37 (57.8%)	138 (61.6%)	
IRM	8 (12.5%)	17 (7.6%)	
Others	4 (6.2%)	2 (0.9%)	
12. Mode of sterilization	General Dentist n (%)	Endodontist n (%)	p value, Significance
Autoclave	30 (46.9%)	156 (69.6%)	p <0.001**
U V Chamber	12 (18.8%)	44 (19.6%)	
Chemical sterilization	9 (14.1%)	18 (8%)	
All of the above	13 (20.3%)	6 (2.7%)	
13. How long do you use temporary /spacer materials	General Dentist n (%)	Endodontist n (%)	p value, Significance
3 days	27 (42.2%)	55 (24.6%)	p =0.006*
3-7 days (1 week)	31 (48.4%)	111 (49.6%)	
7- 14 days (2 weeks)	5 (7.8%)	56 (25%)	
14-20 days (3 weeks)	1 (1.6%)	2 (0.9%)	

\*p<0.05 – significant difference\*\*p<0.001 - highly significant difference.

<sup>^</sup>p value calculated using Pearson Chi square test