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**Dr. Shubham V Dhoble**  
Intern, Government Dental  
College and Hospital, Nagpur,  
Maharashtra, India

**Dr. Sadhana Raina**  
Associate Professor, Department  
of Conservative Dentistry and  
Endodontics, Nagpur,  
Maharashtra, India

**Dr. Palsh R Maheshwari**  
Intern, Government Dental  
College and Hospital, Nagpur,  
Maharashtra, India

## Dental intern's perception of difficulties in performing root canal treatment: A cross sectional study

**Dr. Shubham V Dhoble, Dr. Sadhana Raina and Dr. Palsh R Maheshwari**

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### Abstract

**Introduction:** Root canal treatment (RCT) is a multi-phase procedure and is the one of the most regularly practicing procedures in dentistry. This is the procedure in which many of the undergraduate dental interns face problems in one and the other step. Therefore.

A questionnaire based study was done over 100 interns to determine significant procedural difficulties and challenges encountered by undergraduates during endodontic root canal treatment.

**Material and Methodology:** It was a cross sectional study in which 100 interns with the same year of graduation and level of experience who were willing to participate were involved. All participants were given questionnaires involving 18 questions in which there were 15 close ended questions and three open ended questions. The statistical analysis was done to get the results.

**Results:** For the first 15 close-ended questions, interns found it difficult to manage calcification in pulp chamber and root canals (89.9%), placing rubber dam (80.8%), and removing gutta percha in retreatment cases (75.8%). Interns didn't find any difficulty in irrigation procedure (92.9%), radiographic verification of master cones (92.9%), and giving local anaesthesia (89.9%).

**Conclusion:** Assessment of major difficulties faced by interns during root canal treatment may assist in development of better and effective methods of teaching. This study will help to discover various gaps in teaching schedules which if altered correctly would be of great benefit to the quality of their performance.

**Keywords:** Root canal treatment, endodontic difficulties, procedure, RCT

### Introduction

Root canal therapy is a sensitive and delicate procedure and its success depends upon multiple steps. A single mishap in one step can cause a poor prognosis. Although the latest developments currently being used in RCT have been proposed to make the treatment easier. It is still sufficiently complex for both patient and performer. Several dental students have reported feeling stressed and overwhelmed at Atleast one point in their education. Hence the study was taken up to know the difficulties faced by undergraduate dental students from beginning to end while performing RCT.

A cross sectional study was undertaken among the interns of dental students who have completed their postings in the department of conservative dentistry and endodontics. In this study 100 interns from government dental college and hospital Nagpur were included. The Main aim of this study was to assess the difficulties faced by interns while performing root canal therapy. The main objectives of this study was to assess the difficulties and to obtain feedback and suggestions for improvement in teaching and learning skills. During this study all the participants were given an online questionnaire which includes 15 close ended questions and 3 open ended questions. Total duration of study was 1 month. As root canal treatment is one of the most common treatments performed by dentists, it is very important to be skilled in this procedure. As this is a multi-phase procedure, it is important to learn each and every step because success of root canal treatment depends on each and every step. A mistake in any step can lead to failure of root canal treatment. So in this study questionnaire was prepared in such a way which follows the sequence of treatment phases.

The educational system is a complete system that starts from the source of receiving the information, where the doctor is the provider and the student is the recipient. Developing this process requires knowledge of the main problem.

**Corresponding Author:**  
**Dr. Shubham V Dhoble**  
Intern, Government Dental  
College and Hospital, Nagpur,  
Maharashtra, India

So, we're doing this survey based study to determine significant procedural difficulties encountered by undergraduate students during root canal treatment. It is also very essential to understand how undergraduate students feel about the worth of different components during their academics.

Hence, feedback is an essential part of the assessment process, and competent evaluation can be achieved by the right information, geared toward the success of students and the program.

#### Material and Methods

**Study population:** One hundred interns with the same year of graduation and level of experience, who are willing to

participate will be involved in this study.

#### Study instrument

All participants were given a validated questionnaire having 15 close ended questions and three open ended questions. The questionnaires were given to them at the end of their posting. The survey was conducted during their posting in the department of conservative dentistry and endodontics. In accordance with the root canal treatment phases, answers were divided. Qualitative and quantitative analyses of undergraduate student's attitudes to problems at particular stages of root canal treatment were organized by percentage.

The obtained data was evaluated by two specialist observers. The data were processed using the SPSS 22.

**Table 1:** Questionnaire given to the participants.

<b>Questionnaire to assess difficulties faced by interns during Root Canal Therapy</b>			
No.	Question	Yes	No
1.	Is it difficult to take periapical radiograph//RVG		
2.	Is it difficult to interpret periapical radiograph ?		
3.	Is it difficult to give anesthesia?		
4.	Is there any difficulty in placing the Rubber dam?		
5.	Is there any difficulty in opening the endodontic access cavity?		
6.	Is there any difficulty in removing roof of pulp chamber		
7.	Is there any difficulty in managing calcification in pulp chamber and root canals?		
8.	Is there any difficulty in identifying and negotiating root canals?		
9.	Is it difficult to determine working length?		
10.	Is there any difficulty in cleaning and shaping of Root canal?		
11.	Is there any difficulty during irrigation procedure?		
12.	Is it difficult to apply intracanal medicament?		
13.	Is there any difficulty in radiographic verification of master cone		
14.	Is there any difficulty during root canal obturation?		
15.	Is it difficult to remove gutta percha in retreatment cases ?		
16.	How often did you experience a complication while performing root canal therapy procedure?		
	a. Never                      b. Seldom                      c. Sometimes                      d. Usually		
17.	How often did you experience a flareup during root canal treatment?		
	a. Never                      b. Seldom                      c. Sometimes                      d. Usually		
18.	Enlist three most difficult steps you experience during the root canal treatment procedure.		

#### Results

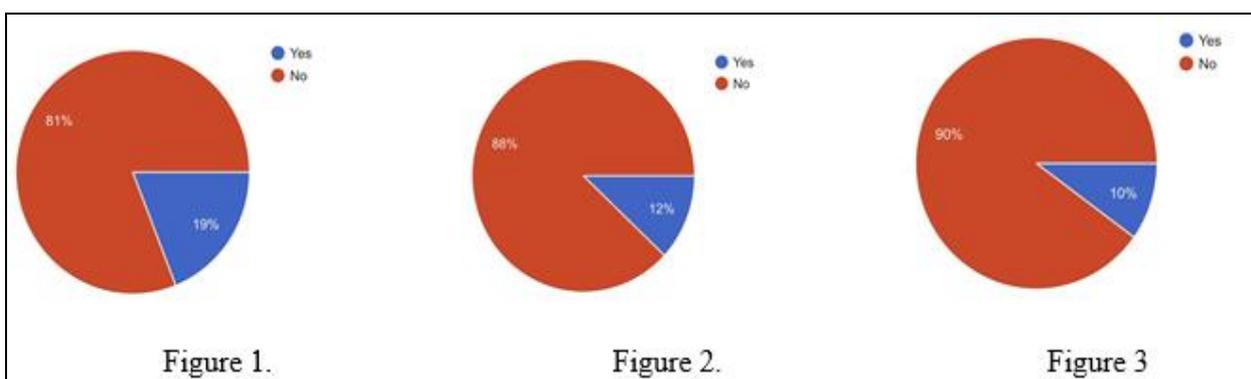
The study was done by over 100 interns who have undertaken all endodontic courses during their postings in the department of conservative dentistry and endodontics. The most difficult step faced by dental interns during root canal treatment was management of calcified root canals (89.9%), followed by placing rubber dams (80.8%) and removing Gutta percha in retreatment cases (75.8%). 52% interns find it difficult to

identify and negotiate root canals. 92.9% of interns have found no difficulty in irrigation procedure and radiographic verification of master cone. 87.9% of interns have no difficulty in interpreting periapical radiographs. According to study and data obtained 65.3% of dental interns sometimes experienced complications while performing root canal treatment.

Results were obtained statistically using SPSS Version 22.

**Table 2:** Results Achieved

No.	Question	Yes	No
1.	It is difficult to take periapical radiography/RVG	19.2%	80.8%
2.	Is it difficult to interpret periapical radiograph?	12.1%	87.9%
3.	Is it difficult to give anaesthesia?	10.1%	89.9%
4.	Is there any difficulty in placing the Rubber dam?	80.8%	19.2%
5.	Is there any difficulty in opening the endodontic access cavity?	37.4%	62.6%
6.	Is there any difficulty in removing roof of pulp chamber?	42.9%	57.1%
7.	Is there any difficulty in managing calcification in pulp chamber and root canals?	89.9%	10.1%
8.	Is there any difficulty in identifying and negotiating root canals?	52%	48%
9.	Is it difficult to determine working length?	11.1%	88.9%
10.	Is there any difficulty in cleaning and shaping of root canal?	12.2%	87.9%
11.	Is there any difficulty during irrigation procedure?	7.1%	92.9%
12.	Is it difficult to apply intracanal medicament?	16.2%	83.8%
13.	Is there any difficulty in radiography verification of master cone?	7.1%	92.9%
14.	Is there any difficulty during root canal obturation?	20.2%	79.8%
15.	Is it difficult to remove gutta percha in retreatment cases?	20.2%	79.8%
16.	How often did you experience a complication while performing root canal therapy procedure?	75.8%	24.2%
	a.Never 7.1%		
	b. Seldom 23.5%		
	c. Sometimes 65.3%		
	d. Usually 4.1%		
17.	How often did you experience a flare up during root canal treatment?		
	a.Never 26.8%		
	b. Seldom 24.7%		
	c. Sometimes 47.4%		
	d. Usually 1.1%		



**Fig 1, 2, 3:** Comparing the Results Achieved.

According to Figure 1, only 19% of the total study population faced difficulty while shooting Radiograph for Diagnostic purpose while majority of the total population faced no difficulty with this step of the procedure. According to Figure 2, only 12% of the total study population faced difficulty while interpreting the Radiograph for Diagnostic purpose while the

majority of the total population faced no difficulty with this step of the procedure. According to Figure 3, only 10% of the total study population faced difficulty while administering Local Anaesthesia while majority of the total population faced no difficulty with this step of the procedure.

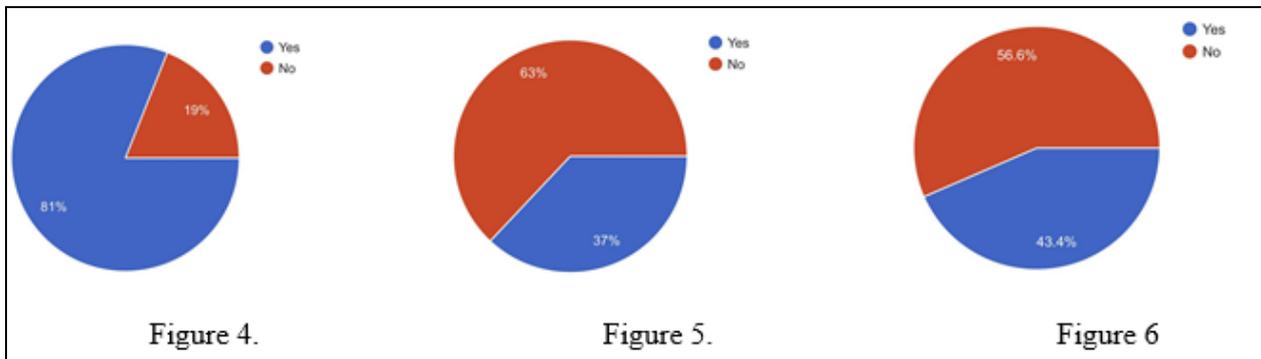


Fig 4, 5, 6: Comparing the Results Achieved

According to Figure 4, only 19% of the total study population faced zero difficulty while placing the rubber dam while the majority of the total population faced difficulty with this step of the procedure. According to Figure 5, only 37% of the total study population faced difficulty while opening the Endodontic

access cavity while the majority of the total population faced no difficulty with this step of the procedure. According to Figure 6, 43.4% of the total study population faced difficulty while reroofing the pulp chamber while the 56.6% of the total population faced no difficulty with this step of the procedure.

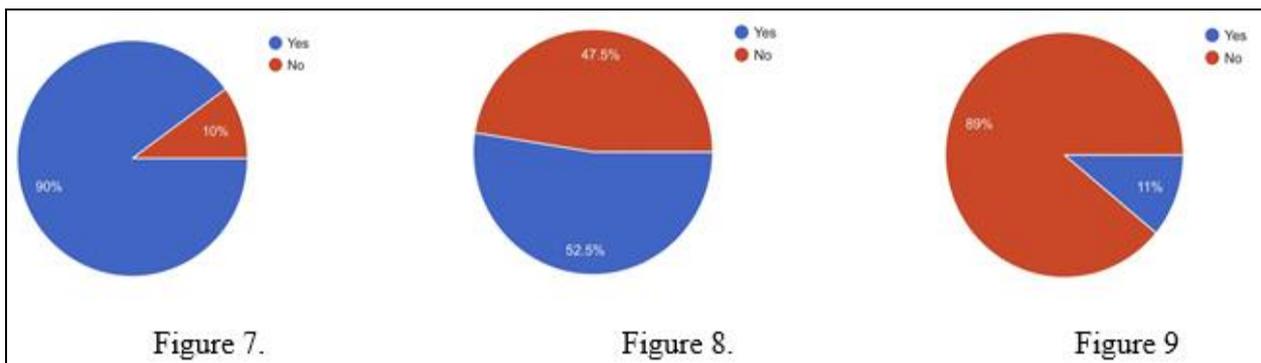


Fig 7, 8, 9: Comparing the Results Achieved

According to Figure 7, only 10% of the total study population faced no difficulty while managing calcification in the pulp chamber and root canal while the majority of the total population faced difficulty with this step of the procedure. According to Figure 8, 47.5% of the total study population faced no difficulty while negotiating the root canals while

52.5% of the total population faced difficulty with this step of the procedure. According to Figure 9, only 11% of the total study population faced difficulty while determining the working length while the majority of the total population faced no difficulty with this step of the procedure.

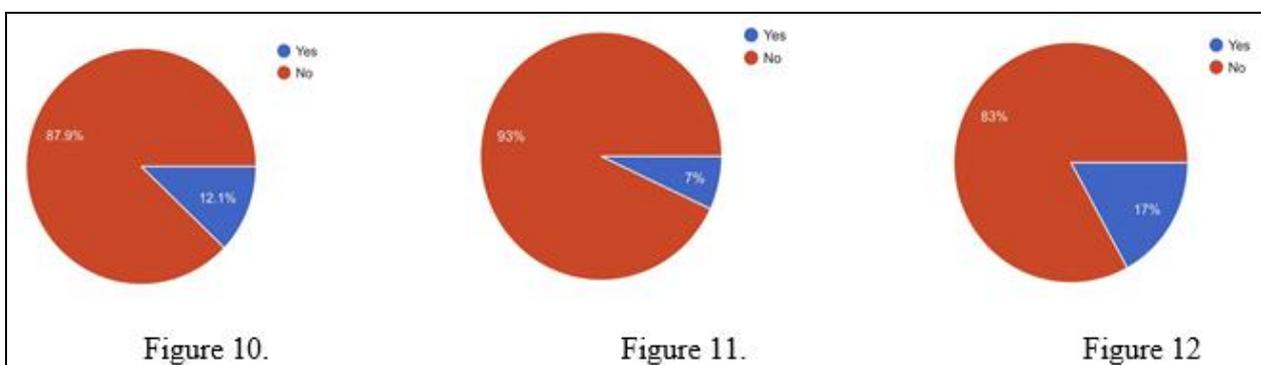


Fig 10, 11, 12: Comparing the Results Achieved

According to Figure 10, only 12.1% of the total study population faced difficulty while cleaning and shaping of root canal while the majority of the total population faced no

difficulty with this step of the procedure. According to Figure 11, only 7% of the total study population faced difficulty while irrigating the root canal while majority of the total population

faced no difficulty with this step of the procedure. According to Figure 12, only 17% of the total study population faced difficulty while applying intracanal medicaments while

majority of the total population faced no difficulty with this step of the procedure.

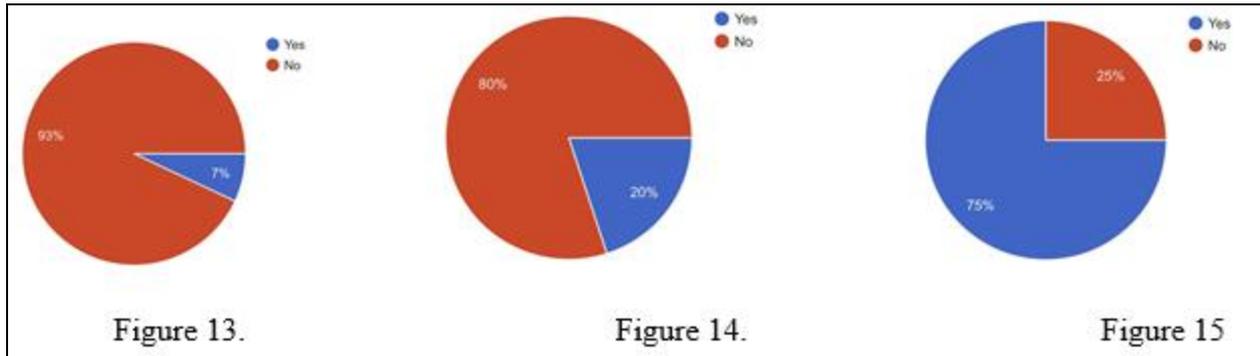


Fig 13, 14, 15: Comparing the Results Achieved

According to Figure 13, only 7% of the total study population faced difficulty while radiographic verification of Master Cone while the majority of the total population faced no difficulty with this step of the procedure. According to Figure 14, only 20% of the total study population faced difficulty while obturating the root canals while the majority of the total

population faced no difficulty with this step of the procedure. According to Figure 15, only 25% of the total study population faced no difficulty while removing Gutta Percha in Retreatment cases while majority of the total population faced difficulty with this step of the procedure.

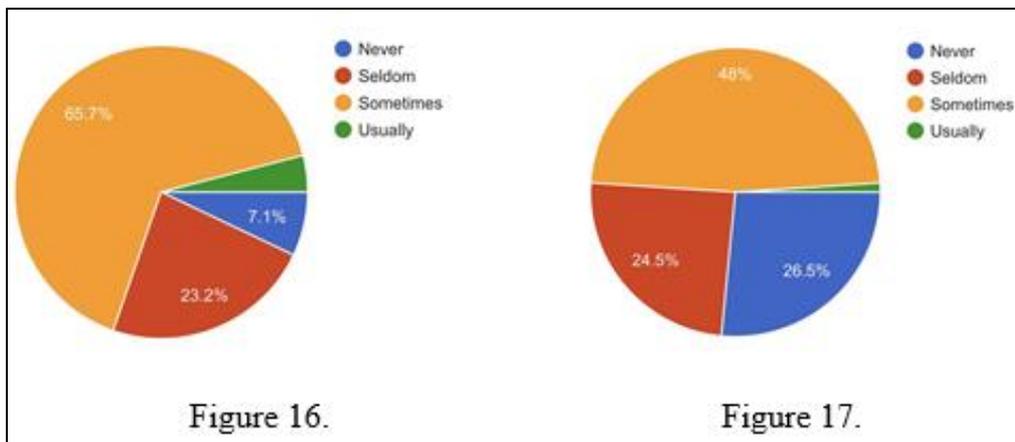


Fig 16, 17: Comparing the Results Achieved

According to Figure 16, only 7% of the total study population never faced Complications in performing Root Canal Treatment while 23% seldom faced any complications, 65% sometimes did and a small proportion usually found complications of the total population. According to Figure 17, only 27% of the total study population never faced Flare-ups in performing Root Canal Treatment while 25% seldom faced any

complications, 48% sometimes did and a small proportion usually found Flare-ups of the total population. The results were statistically analyzed using SPSS Version 22. Most of the values achieved while processing were insignificant. P-Value achieved through Chi-Square Test was 2.4, which was found to be insignificant.

Table 3: Statistical analysis of Data

Chi-Square Tests					
	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.421 <sup>a</sup>	1	.120		
Continuity Correction <sup>b</sup>	1.320	1	.251		
Likelihood Ratio	2.090	1	.148		
Fisher's Exact Test				.213	.127
Linear-by-Linear Association	2.397	1	.122		
N of Valid Cases	100				
a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 2.09.					
b. Computed only for a 2x2 table					

Most of the students faced Removing Gutta Percha, managing Calcification of canals and identifying and Negotiating Root Canals as the most difficult steps while performing Root Canal Treatment.

### Discussion

Previous research has shown that the most common reason for loss of tooth is periapical or pulpal pathologies. Moreover, RCT is crucial not only for removing these pathologies but also for maintaining the teeth in the mouth and to provide support to the prosthetic restorations if ever needed. For the given reasons, it is basic for a dental student to master the challenges of the procedure and perform high quality RCT.

Regarding the difficulties in taking periapical radiography, our study showed that only 19% of the students were having trouble. Contrast to this, in 2009, Peker and Alkurt stated that the wrong angulation with regard to anatomical areas was one of the most common mistakes among students when taking periapical radiographs [13]. Also according to study conducted in Saudi Arabia, 40% of the students faced difficulty during this step and according to study conducted in Andhra Pradesh India, majority of students faced difficulty during this step [14]. The present study determined that one of the major problems facing dental students was identifying root canals. Similar findings were reported by Seijo *et al.* and the study conducted in Saudi Arabia found similar results [15]. Opening an endodontic access cavity and removing the pulp chamber correctly are very important, to identify the root canals, as shown in this study. Furthermore, during the preclinical education, the quantity and quality of demonstrations with artificial and extracted teeth must be increased by the staff when teaching the performance of clinical procedures. This training is highly beneficial for dental students, giving them the opportunity to evaluate their expertise early.

On the other hand, the dental students reported having the least difficulty in irrigation procedures and medicament application. Similar results were reported by Dr. Vaishnavi *et al.* in her study conducted in Andhra Pradesh India. This may be related to the irrigation process requiring lesser time and efforts than other steps of root canal treatment, specially when compared to mechanical preparation and root canal obturation. Furthermore, applying intracanal medicament is relatively quicker. As a result of dental students being confident in irrigation and intracanal medicament application, they hardly appeared in patients' postoperative complaints.

Results also showed that many students found difficulty in applying rubber dams. Contrast to our findings, Study conducted by Ayaman O *et al.* found that 70% of their students had no difficulty in applying rubber dams. The primary reason is due to tearing of the rubber dam sheet and in some cases it is due to the patient's uncooperation. The use of rubber dams during RCT offers 3 main benefits: control in cross infection, protection and enhancing treatment efficiency [18].

And as Obturation is the last step of the whole process and of course one of the most extremely important steps of them all for a successful treatment, The stress and the length of this procedure can also overwhelm both the patient and the undergraduate student. The undergraduate student should be allowed to have exposure to further cases to surpass this difficulty. Kaplan *et al.*, 2020 study found that the student finds a difficulty in doing obturation by (54.7%) while in ours only a small percentage (20%) of the students find difficulty during obturation. Study conducted in Saudi Arabia found similar results as ours, where a very small percentage of students found difficulty during obturating the canals. Similar results were

also found in a study conducted by John *et al.* in Chennai India.

### Conclusion

Highlighting the main problems faced by undergraduate dental students during root canal treatment may assist in detailing teaching methods during the endodontics education. According to this study points that need to be given attention are rubber dam application and handling of calcified canals. To proceed with improving students' educational experience, it is crucial to receive continuous feedback from undergraduate students. Although many further studies are required about this subject, this cross sectional survey study helped to find various gaps in the education which if altered properly, would be of great advantage to both the quality of performance and the time dental schools spent trying to deal with these difficulties.

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### Author's Contribution

Not available

### Conflict of Interest

Not available

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