

Difficulties Faced by Dental Students While Performing Root Canal Treatment

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Abstract: ***Background:** Root canal treatment (RCT) is a meticulous procedure that requires focus and precision while working in a confined space such as the root canal system of the tooth. Clinical-training places emphasis on teaching students the application and the execution of fine psychomotor skills such as working with indirect vision, controlling high-speed motor-driven burs during access cavity preparation, and fine tactile sensation during root canal preparation. **Aim:** To rate the difficulty level of dental students while performing Root Canal Treatment. **Material and methods:** A descriptive cross sectional study was conducted between Jan 2016 and April 2016 in a private dental college in Chennai. The inclusion criteria included students who have performed a minimum of 5 root canal treatments. A self administered questionnaire consisting 8 questions was prepared and it consisted of 4 categories. The questionnaire was distributed to 100 students and the details were recorded individually by the interpreter. **Results:** A total of 100 students were included in the study based on the inclusion criteria. The difficulty of performing RCT as rated by the students ranges from a minimum of 3.16 to a maximum of 7.52. 77.3% rated endodontic treatment as a difficult procedure while 21.1% considered root canal treatment as a fairly easy procedure. About 1.6% of students stated root canal to be a very easy procedure. **Conclusion:** The present study showed that almost all the students found difficulty in performing any one step in RCT treatment. The endodontic education and training were good among the students and the proper methods to be handled while performing RCT and awareness were also good.*

Keywords: Clinic, Dental students, Difficulty, Endodontic, Treatment

1. Introduction

Endodontic treatment, which involves treating the vital and necrotic pulp, is often considered to be one of the most difficult and stressful discipline for undergraduate dental students. This could be explained due to intricacies and diversity in the root and root canal anatomy, the introduction of various instruments and materials which eventually leads to lack of self confidence among the students as well as general practitioners.

A root canal is a treatment to repair and save a badly damaged or infected tooth. The procedure involves removing the damaged area of the tooth (the pulp), cleaning and disinfecting it and then filling and sealing it. The common causes affecting the pulp are a cracked tooth, a deep cavity, repeated dental treatment to the tooth or trauma. The term "root canal" comes from cleaning of the canals inside the tooth's root.

Root canal treatment (RCT) is a meticulous procedure that requires focus and precision while working in a confined space such as the root canal system of the tooth.[1] Therefore, clinical-training places emphasis on teaching students the application and the execution of fine psychomotor skills such as working with indirect vision, controlling high-speed motor-driven burs during access cavity preparation, and fine tactile sensation during root canal preparation[2]. The effect of such training on dental students while managing patient pain and inquiries is an important aspect to consider during curriculum assessment.

There are some inadequate root canal treatments performed by students. This inadequacy may be complex and could be strongly related to the Endodontic teaching that was

undertaken at the dental school [3]. There was a trend for practitioners to use the technique that they were taught during undergraduate career [4]. A dentist or endodontist uses root canal treatment to find the cause of and then treat problems related to the tooth's soft core, the dental pulp. In the past, teeth with diseased or injured pulps often were removed. Today, root canal treatment has given dentists a safe way of saving teeth.

The pulp is the soft tissue that contains nerves, blood vessels and connective tissue. It lies within the tooth and extends from the crown of the tooth to the tip of the root in the bone of the jaw.

When the pulp is diseased or injured and cannot repair itself, it dies. The most common cause of pulp death is a cracked tooth or a deep cavity. Both of these problems can let bacteria enter the pulp, causing an infection inside the tooth.

Left without treatment, pus builds up at the root tip in the jawbone forming a "pus-pocket" called an abscess. An abscess can cause damage to the bone around the teeth. When the infected pulp is not removed, pain and swelling can result. Certain byproducts of the infection can injure the jaw bones. Without treatment, your tooth may have to be removed.

Root canal treatment often involves from one to three visits. During treatment, a general dentist or endodontist (a dentist who specializes in problems of the pulp) removes the diseased pulp. The pulp chamber and root canal of the tooth are then cleaned and sealed.

However there are a number of studies in the recent times focussing on undetected and untreated root canals poorly

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executed root canals and lack of knowledge about the principles of treatment which results in treatment failure. The success of root canal treatment is dependent on various factors like preparation of root canals, mechanical debridement and irrigation, creating a pathway for placing the intracanal medicament and filling and adequate obturation. The identification of canals and enlargement of main canals, determination of working length and creating a geometrical space for adequate disinfection and obturation are the most commonly encountered issues while performing a root canal treatment. Root canal problems stem from infection and inflammation of the tooth's pulp tissue. One potential cause of infection is deep tooth decay. Untreated dental cavities eventually allow bacteria to work their way down to the center of the tooth, where they may infect the pulp tissue. Another path by which bacteria may come into contact with pulp is via chipped or cracked teeth. Any opening in the protective enamel coating has the potential to allow bacteria access to the tooth's pulp.

Trauma to the tooth — the kind that might result from a sports injury or automobile accident, for example — is also a major cause of pulp tissue damage. In this case, it's essential to seek treatment immediately, both to try and save the tooth, and to prevent future problems. In some cases, extensive dental work itself may cause damage to the pulp tissue that will need to be treated via a root canal. Having multiple fillings or restorations on the same tooth increases the chances of this type of injury. Occasionally, common procedures like crown preparation or orthodontics may eventually lead to root canal problem. The quality of training at any institution can best be analyzed by taking the students' perceptions into consideration.¹ Students can provide valuable feedback, which can be beneficial to review the curriculum and improve the overall standard of training, as well as patient care.² Unfortunately, in many situations the students' opinions are often overlooked, especially when considering the future planning of the program. Dentistry is an extensive program that requires a lot of efforts, encouragement, and clinical exposure. A lot of factors play a role during the mental development of dental student, and the most important of them is stress. Few of the possible

stress factors could be competition, frequent examinations, comparisons between students, teacher/student relationships, patient/student relationships, clinical application of theoretical knowledge. These factors can significantly affect the confidence of the student and influence the way students perceive and experience their education.

There are various studies about undergraduate endodontic treatment, endodontic teaching and education which is done in various parts of the world^[5, 6]. Although the quality of root canal treatment amongst dental students has been reported to be low there are not enough studies that have investigated the level of difficulties a student encounters during treatment and the amount of time spent on an individual on each step. Information related to technical difficulties and time taken for treatment may help to find out the points of weakness and lead to improving teaching and training methods. So this study was performed to evaluate the difficulties faced by the dental students while performing root canal treatment and to find out the most difficult step among them depending on the student.

2. Materials and Methods

A descriptive cross sectional study was conducted between Jan 2016 and April 2016 in a private dental college in Chennai. The study was approved by the ethical committee team of the University. The inclusion criteria included students who have performed a minimum of 5 root canal treatments. A self administered questionnaire consisting 8 questions was prepared and it consisted of 4 categories. Category 1 was to record the demographic details. Category 2 evaluated the experience in performing the root canal treatment, A grade of 0-10 was given, 0 for easy and 10 for very difficult. The Category 3 of the questionnaire determined the confidence level of student in performing root canal in single and multirooted teeth. Category 4 evaluated the levels of difficulty in various steps of root canal and the possible reasons (Fig 1).

DIFFICULTIES FACED BY THE DENTAL STUDENTS WHILE PERFORMING ROOT CANAL TREATMENT

1. How many years of experience do you have in performing RCT ?
2. How many RCTs will you perform per month ?
3. How do you rate the difficulty of performing a root canal treatment out of 10
 - 0----- easiest
 - 1
 - 2
 - 3
 - 4
 - 5
 - 6
 - 7
 - 8
 - 9
 - 10 ----- most difficult
4. Which tooth do you find more difficult to perform the treatment ?
 - Central incisor
 - Lateral incisor
 - Upper Canine
 - Lower Canine
 - Upper Premolars
 - Lower Premolars
 - Upper Molars
 - Lower Molars
5. Do you find difficulty in isolation of the tooth ?
 - Yes
 - No
- 5a. If yes, what do you think is the reason-----
6. Do you find difficulty in access opening of the tooth ?
 - Yes
 - No
- 6a. If yes, what do you think is the reason-----
7. Do you find difficulty in cleaning and shaping of the tooth ?
 - Yes
 - No
- 7a. If yes, what do you think is the reason-----
8. Do you find difficulty in performing obturation of the tooth ?
 - Yes
 - No
- 8a. If yes, what do you think is the reason-----

Figure 1: Questionnaire to evaluate the difficulties in performing root canal treatment

The questionnaire was distributed to 100 students and the details were recorded individually by the interpreter to avoid subjective variations in scoring. The data was organized and entered in a master sheet for statistical analysis

3. Results

A total of 100 students were included in the study based on the inclusion criteria out of which 3% had four years of experience, 23% had three years of experience, 35% had two years of experience and the remaining 39% had one year of experience. The number of RCTs that the students performed in a month varied from 5 to 12. The difficulty of performing RCT as rated by the students ranges from a minimum of 3.16 to a maximum of 7.52. 77.3% rated endodontic treatment as a difficult procedure while 21.1% considered root canal treatment as a fairly easy procedure. About 1.6% of students stated root canal to be a very easy procedure.

Table 1: Difficulty level of students while performing RCT

| | Isolation of tooth | Access opening | Cleaning & shaping of tooth | Obturation of tooth |
|----------------|---|--------------------|-----------------------------|---------------------------|
| Yes | 53% | 61% | 12% | 12% |
| No | 47% | 39% | 88% | 88% |
| Common reasons | Ripping and tearing of rubber dam sheet | Locating the canal | Ledge formation | Voids may occur sometimes |

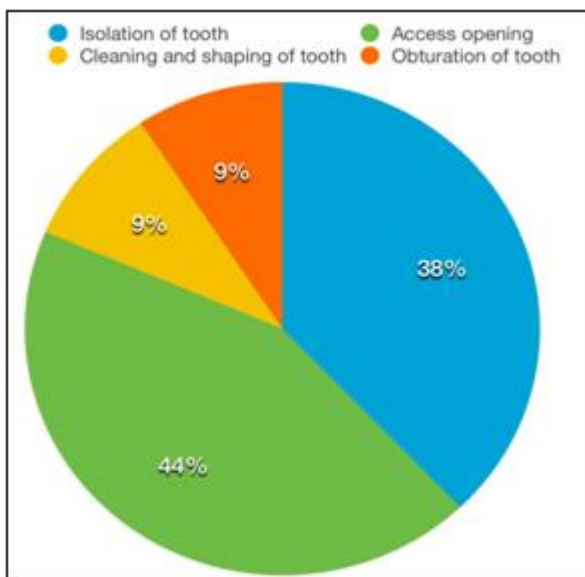


Figure 1: Shows the various reasons for grading root canal a difficult treatment.

4. Discussion

The performance of root canal treatment in a clinical practice is dependent on the undergraduate endodontic teaching. A poor standard of teaching could invariably result in lack of confidence among the students which clinically reflects in a failed root canal treatment. Undergraduate endodontic teaching has an important role in the practise of endodontic by general practitioner. One reason cited in various studies is that the poor technical standards of root

canal treatment amongst general practitioners may be the limited endodontic teaching received at the dental schools [3] [6]. Hence, this study was performed to determine the various challenges faced by a undergraduate student in their endodontic practice.

Recent studies showed that it is very difficult to perform RCT in molar tooth [7] due to its complex anatomy. Hence higher technical quality root canal filling were recorded for single rooted opposite to multi-rooted tooth[8][9][10].It is very much similar to our study because 45% and 16% of students found difficulty in performing upper molar and lower molar RCTs respectively. Some students found little difficulty in performing RCTs in upper and lower premolars, central incisors and upper canines. All students found easier to perform lateral incisors and lower canine RCTs.

Results showed that many students found difficulty in performing isolation of tooth. The main reason is due to tearing or ripping of rubber dam sheet and in some cases it is due to patient's unco operation. The use of rubber dam sheets during RCT offers three main advantages: control of cross infection, protection and improving treatment efficiency.[11]. It is said that in Sudan no more than 2% of general practitioners used a rubber dam sheet [12]. Some practitioners attributed their low rubber dam use to concerns over their training and technical difficulties[13].About 39% of students found difficulty in access opening of tooth. The major reason is due to difficulty in locating the canal .This is in contrast to the study done in Sudan where only 6.2% of people found difficulty in this step. Only 13 % of people found difficulty in performing cleaning, shaping of tooth and obturation of tooth due to reasons like ledge formation and void formation respectively. Many studies mentioned that more stress must be given to students based on Endodontic treatment.

The present study shows that almost all the students found difficulty in performing any one step in RCT treatment. The endodontic education and training are good among the students and the proper methods to be handled while performing RCT and awareness are also good. Results shows that students find more difficulty in isolation of the tooth due to tearing and ripping of rubber dam sheet. So proper training should be given to that step. Majority of students find Molar RCT very difficult, so stress must be given to this to make it easier for the students. Various studies can be done and various techniques can be done to educate the students in a proper way and to make it easier for the students to perform Root Canal Treatment.

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