Original Article

An insight into patient's perceptions regarding root canal treatment: A questionnaire-based survey

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Abstract

Background: A key setback of root canal treatment (RCT) is that most patients lack adequate knowledge about it. Understanding and identifying the factors that hinder or discourage patients from undergoing RCT is necessary to adequately address the issue. The review of literature shows that there is a paucity of data about the awareness and acceptance of RCT among patients in Indian population. Thus, the study was conducted with aim to assess patients' awareness of RCT among patients reporting in Desh Bhagat Dental College and Hospital, Mandi Gobindgarh. By surveying the patients, a broad patient perspective on the issue was sought. **Materials and Methods:** This survey was conducted with the help of prestructured questionnaire consisting of 15 questions, distributed to random 450 patients coming to the outpatient department of Conservative dentistry and Endodontics in Desh Bhagat Dental College and Hospital. The completed questionnaires were then analyzed to assess patients' experiences, concerns, and perceptions about RCT. **Results:** There is a lack of awareness among patients regarding RCT. **Conclusion:** It is important to create more awareness among the populace of our country about the significance of maintaining a healthy dentition and attendant sequel if not done so. More patients would consider having endodontic procedures if properly made aware of.

Keywords: Endodontic therapy, perception, questionnaire, root canal therapy, survey

Introduction

Endodontic treatment also known as endodontic therapy or root canal treatment (RCT) involves the removal of diseased pulpal tissue to prevent and intercept pulpal/periradicular pathosis[1] and protection of the disinfected tooth from future entrenchment by microorganisms. RCT not only prevents severance of periodontal fibers that help in proprioception for occlusal feedback[2] and efficient chewing but also aids in the retention of infected teeth that otherwise might have been extracted.[3] If RCT is indicated, neither a simple filling nor taking antibiotics can resolve the tooth infection. Further, if the treatment is delayed, the tooth can undergo extensive destruction from decay and can get too compromised to be saved; then extraction is likely the only option which may lead to chain of events such as shifting of teeth, collapsed occlusion affecting the mastication, and harm esthetics of patient.[4] Tooth replacement if indicated for esthetic and functional rehabilitation is accomplished with prosthetic appliances, including implants making it a costly enterprise. Therefore, RCT should always be considered whenever indicated as it not only favors the preservation of natural teeth but also has excellent clinical outcomes.[5]

Although, RCT is highly prevalent but still is perceived by many patients as a procedure to be feared. Studies have reported that fear and anxiety are major deterrents in seeking RCT in general.[6,7] These fears can be attributed to the ignorance of patients about root canal procedures. Patients often do not understand the nature of endodontic treatment and what it involves.[8,9] Studies in the past had highlighted the need to provide more information about it.[10-13]

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Identifying the factors that result in distress among patients thus hindering them from undertaking RCT is necessary to adequately address the issue. To accomplish these population-based surveys is a key step. The main objective of such surveys is to assess the community and determine how to improve their dental health knowledge so that the patients realize the importance of treatment and thus improving patient's willingness to access the primary oral health care. The review of literature shows there is a paucity of data about the awareness of RCT among patients in Indian population.[14,15] Thus, the study was conducted to assess patients' awareness of RCT and factors influencing the potential acceptance of endodontic therapy.

Methodology

The survey was carried out on the patients coming to the outpatient department of Conservative dentistry and Endodontics in Desh Bhagat Dental College and Hospital. A prestructured questionnaire consisting of 15 questions [Table 1] was given to random 450 patients after obtaining their informed consent. Ethical clearance from the institutional ethics committee was taken before the start of the study. Approval from the ethics committee was obtained. Date of the approval: 25-02-2019.

Inclusion criteria

1. Persons over the age of 18 years.
2. Persons who are willing to participate in the study.

Table 1: Detailed questionnaire

Instructions: The following questions relate to your knowledge and perception of root canal treatment (RCT). Your answers should indicate the most accurate reply

Name of patient:	**Occupation:**
Age/sex:	
Do you know about RCT?	Yes, I have previous RCT experience Not really, have heard about it from sources such as internet, TV, radio, relatives/friends but I don't know the details (proceed to Q. 6) No, I do not know anything (proceed to Q. 6)
Have you experienced pain during the RCT or inter-appointment phase?	Yes No
Do you experience persistent pain in root canal-treated tooth after ≥6 months after the RCT got completed?	Yes No
What was the number of visits required for RCT done?	1 visit 2-3 visits ≥4 visits
Have you got a post-endodontic RCT restoration and crown placement done?	Yes No
When do you think RCT is indicated for a tooth?	Only when pain associated with the tooth is present The tooth might need RCT, even if it doesn't hurt
After what duration of pain have you reported for treatment?	Within 1-3 days Within 1-3 weeks More than 1 month
Do you self-medicate to resolve any tooth infections?	Yes Pain killers alone Antibiotics alone Painkillers and antibiotics No
What you think is the role of antibiotics in RCT	Resolve endodontic infection so mandatory during or after RCT Not mandatory
Are you concerned about the treatment time?	Single-visit treatment preferred regardless of quality of treatment Quality of treatment matter and not no. of visits
Do you think teeth become weaker after RCT?	Yes No
What is your most unpleasant or anxiety-arousing aspect associated with the RCT?	a. Pain during or after root canal therapy b. Local anesthetic injection, c. Sensation of files worked in root canals d. The need to remove the tooth despite undertaken treatment
Do you prefer a specialist or a general practitioner for RCT?	Root canal specialist General dentist
Do you think getting RCT is too expensive?	Yes No
Will you undergo RCT, if indicated for any tooth or will you prefer extraction?	RCT Extraction
Patient's signature	

Exclusion criteria

1. Uncooperative patients
2. Persons below the age of 18 years.

The completed questionnaires were then analyzed statistically to obtain the results in terms of percentages.

Results

This is a simple observational study. The findings from the individual questionnaire were drawn together and the results were analyzed to find out patients' awareness about RCT. Results obtained are summarized in Tables 2–5.

Discussion

In India, oral health is not yet regarded as a high priority by people who ignore their oral health to an extent that when they eventually seek dental treatment, the involved teeth are inevitably advised extraction. This may be due to patient's ignorance about the existing dental treatment modalities, particularly RCT that can save their decaying teeth. Other factors that may affect the patient's treatment decision include the patient's socioeconomic status,[16] expectations, and attitude toward treatment, and patient's objective or subjective past dental experiences.[17] It is important to understand the opinions, knowledge, and level of awareness about RCT in patients. This will help in ascertaining if more emphasis needs to be given to increase public awareness and in the motivating patients for opting RCT than extraction.

In present study, 24.44% patients disclosed that they were hearing about RCT for the first time whereas 52.22% patients revealed they lacked adequate knowledge about RCT but were familiar with RCT terminology due to passive information received from relatives/friends or other sources such as internet, TV, radio, etc., [Table 2]. The literature also shows that there is a

Table 2: Awareness about RCT in patients

Questions	Response	No. of patients questioned	No. of responses	% of responses
Do you know about RCT?	Yes, I have previous RCT experience	450	105	23.33%
	Not really, have heard about it from sources such as internet, TV, radio, relatives/friends but I don't know details (proceed to Q. 6)		235	52.22%
	No, I do not know anything (proceed to Q. 6)		110	24.44%

Table 3: Experience of previously root canal-treated patients about RCT

Questions	Response	No. of patients questioned	No. of responses	% of responses
Have you experienced pain during the RCT or inter-appointment phase?	Yes	105	70	66.67%
	No		35	33.33%
Do you experience persistent pain in root canal-treated tooth after ≥6 months after the RCT got completed?	Yes	105	14	13.33%
	No		91	86.67%
What was the number of visits required for RCT done?	1 visit	105	23	21.90%
	2-3 visits		62	59.05%
	≥4 visits		20	19.05%
Have you got a post-endodontic (RCT) restoration and crown placement done?	Yes	105	40	38.10%
	No		65	61.90%

Table 4: Patient's perceptions regarding RCT

Questions	Response	No. of patients questioned	No. of responses	% of responses
When do you think RCT is indicated for a tooth?	Only when pain associated with the tooth is present	450	342	76%
	The tooth might need RCT, even if it doesn't hurt		108	24%
After what duration of pain have you reported for treatment?	Within 1-3 days	450	68	15.11%
	Within 1-3 weeks		297	66%
	More than 1 month		85	18.89%
Do you self-medicate to resolve any tooth infections?	Yes	450	412	91.56%
	Pain killers alone		247	59.95%
	Antibiotics alone		57	13.83%
	Painkillers and antibiotics		108	26.21%
	No		38	8.44%
What you think is the role of antibiotics in RCT	Resolve endodontic infection so mandatory during or after RCT	450	324	72%
	Not mandatory		126	28%

Table 5: Patient's attitude toward RCT

Questions	Response	No. of patients questioned	No. of responses	% of responses
Are you concerned about the treatment time?	Single-visit treatment preferred regardless of the quality of treatment	450	283	62.89%
	Quality of treatment matter and not no. of visits		167	37.11%
Do you think teeth become weaker after RCT?	Yes	450	356	79.11%
	No		94	20.89%
What are your most unpleasant or anxiety-arousing aspects associated with the RCT?	a. Pain during or after root canal therapy	450	232	51.56%
	b. Local anesthetic injection		125	27.78%
	c. Sensation of files worked in root canals		25	5.56%
	d. The need to remove the tooth despite undertaken treatment		68	15.11%
Do you prefer a specialist or a general practitioner for RCT?	Root canal specialist	450	414	92%
	General dentist		36	8%
Do you think getting RCT is too expensive?	Yes	450	291	64.67%
	No		159	35.33%
Will you undergo RCT, if indicated or will you prefer extraction?	RCT	450	378	84%
	Extraction		72	16%

moderate level of consciousness among patients regarding RCT procedure,[18] and there is an upswing in patient's acquaintance to the RCT procedure mainly due to mass media.[18,19] The internet enables us to get knowledge about the unknown, at least nominally if not substantively. 23.33% of patients revealed they had firsthand knowledge about the treatment due to their own previous RCT experience.

66.67% patients with previous RCT experience reported having experienced pain at some point during or after RCT [Table 3]. Postoperative pain, identified as any degree of pain that starts after the initiation of endodontic therapy,[20] is an unpleasant situation for both patient and clinician. RCT induces more frequent and severe postoperative pain than any other dental procedures.[21] The reported frequency of postoperative pain ranges from 1.5 to 53% and more than 50% of patients experience severe postoperative pain.[21] The etiology of pain is multifactorial. It can be due to mechanical, chemical, and/or microbial injury to dental tissues induced or exacerbated during RCT.[22] It has also been related to the variety of factors such as patients' age/gender, anatomy/position of tooth, preoperative symptoms, vitality of tooth, use of intracanal medications, biomechanical preparation technique, and overextension/extrusion of sealer or infected debris.[23] In addition, psychological factors such as fear of dental treatment and anxiety are known to influence pain perception.[24]

13.33% of patients with previous RCT experience revealed that they feel persistent pain in RCT treated tooth [Table 3]. Persistent tooth pain is defined as pain present ≥6 months after endodontic treatment,[25] its frequency is 5.4% to 10.0%.[25] The etiology of persistent pain can be odontogenic or non-odontogenic. Odontogenic causes include teeth with fractures, missed root canals, and persistent infection. Non-odontogenic pain causes include neuropathic disorders, neurovascular disorders, headaches, pain of psychogenic origin, myofascial pain, and referred pain from outside the immediate dentoalveolar region such as cervicogenic pain.[26]

Our study disclosed that the majority (59.05%) patients with previous RCT experience got their treatment completed in 2–3 visits, whereas 21.90% patients had single visit endodontics followed by 19.05% patients who paid ≥4visits for treatment [Table 3]. With the introduction of high-tech automated tools in field of endodontics, now RCT can be performed in single visit. The increasing number of dentists are incorporating single-visit endodontics as the main component of contemporary practice. On the other hand, some dentists prefer the traditional multiple-visit protocol believing that it has a long history and a high clinical success rate. Literature shows that most practitioners (52.4%) complete RCTs in three visits and 26.8% do it in single sitting whereas very few dentists complete RCT in more than three visits.[27]

Only 38.10% of patients with previous RCT experience got a post-endodontic restoration and crown placement done [Table 3]. Endodontically treated teeth are primarily weakened because of dental caries, trauma, or preexisting restorations.[28] Also, the chemicals such as sodium hypochlorite (NaOCl) and ethylenediaminetetraacetic acid (EDTA) used during RCT predominantly result in collagen depletion; this affects the elasticity of dentine and predisposes the tooth to fracture during shearing forces.[29] The literature shows that success rate in RCT teeth with immediate permanent restorations is higher than those with long-term provisional restorations.[30] In a study comparing the longevity of endodontically treated teeth with or without crowns, those without crowns were lost six times more than those that were crowned.[31] Thus, the definitive restoration should be placed as soon as possible after the completion of RCT.

The myth that the pain associated with the tooth is must to indicate that there is a need for RCT can be a devastating mistake. Many teeth might need RCT but will not exhibit pain. In cases of chronic apical abscess, the infected tooth might present only a visual cue such as associated draining fistula.[32] This prevents the pressure from building in the tissue; therefore, patient does not experience any pain. In such cases, the tooth needs RCT,

even if the tooth doesn't hurt. In some patients, particularly with history of trauma, the associated tooth becomes non-vital over the period of time but can remain asymptomatic. In such cases, a routine radiographic survey or coronal discoloration may present the first indication that something is wrong with the tooth. Our study revealed that 76% patients think tooth has to be associated with pain if indicated for RCT [Table 4].

66% of patients revealed that they wait for the dental pain to get relieved by itself and go to dentist only if pain doesn't subside within 1–3 weeks. While 15.11% patients reported that they go to dentist within 1–3 days of feeling dental pain. 18.89% patients revealed that they go to dentist after a month's duration if pain doesn't stop bothering them [Table 4]. Pain is a sensory function that informs our brain when infection or trauma has disrupted a tissue in the body.[33] The patient should understand that pain in teeth is the alarm that warns that the tooth is infected and needs treatment. Unnecessarily delaying or avoiding treatment won't help because the tooth won't get better on its own. Left untreated; bacteria from the infected tooth pulp can travel into periapical tissues to cause a painful, pus-filled abscess, which will require urgent treatment. In extreme cases, it can also result in serious systemic manifestations, especially in medically compromised patients. So, dental pain should be addressed at earliest and should not be ignored.

When questioned about taking self-medication for tooth infection, 91.56% revealed that they always turned to self-medication for their dental problems. Frequently used drugs for self-medication were analgesics (59.95%), followed by 26.21% of patients using analgesics in combination with antibiotics while 13.83% of patients use antibiotics alone to manage dental infection [Table 4]. Self-medication is defined as the use of medications without consulting a doctor regarding indication, dose, and duration of drug.[34] The most common reasons for self-medication is to avoid long waiting periods in hospitals and to save money.[35] The results of our study are consistent with other studies that demonstrated a high prevalence of self-medication among dental patients and show analgesics are the most common form of self-medication.[36,37]

Responding to the question of the role of antibiotics in RCT, 72% patients were of the view that antibiotics help in resolving endodontic infection so their use is mandatory in RCT, whereas 28% of patients think antibiotics are not mandatory [Table 4]. A study done by Abu-Mostafa *et al*.[38] revealed that majority of the patients believe that antibiotics relieve dental pain and should be taken before visiting the dentist if they experience facial swelling. This explains why patients take antibiotics for dental pain. This finding is close to that of Mouhieddine *et al*.[39] who reported 71.9% of patients trusted antibiotics with the same concept. These studies show that the patients have poor knowledge about dental uses of antibiotics. Our study was in accordance with these studies. The literature shows that collateral antibiotics are not effective in preventing or resolving signs and symptoms in cases with irreversible pulpitis, symptomatic apical periodontitis, or localized acute apical abscess, when adequate local debridement, medication, and incision for drainage have been achieved.[40,41] The patients should be educated that the key to successful management of endodontic infection is adequate debridement and drainage for both soft and hard tissue. Antibiotics in these circumstances are futile, expose the patients to undesirable side effects in addition to contributing to the development of antimicrobial resistance.[42] Patients should avoid pressuring the dentist for an antibiotic prescription during RCT and routine prescribing of antibiotics during RCT must be discouraged.

In our study, 62.89% of patients preferred single- over multiple-visit treatment regardless of the quality of treatment [Table 5]. Patients view dental visits as an unpleasant necessity and want to be done with it as early as possible. Also, single-visit RCT being less time-consuming is more appropriate to the needs of itinerant and busy patients.[43] The literature also shows that dental patients prefer the least number of visits to complete RCT to avoid changes in lifestyle and reparative postoperative pain.[44] The success rates of single-visit and multiple-visit RCTs are similar[45] and multiple-visit treatment is not associated with a better quality of RCT compared to single-visit treatment.[46]

A vast majority of patients (79.11%) agreed that they believe RCT teeth become weak [Table 5]. It is a common myth. There is no scientific demonstration that RCT teeth have compromised mechanical properties and are brittle or weaker than vital teeth.[47] A conservative endodontic access cavity preparation will reduce tooth stiffness by only 5%.[48] The ensuing RCT steps such as biomechanical preparation and obturation will result in a marginal reduction in fracture resistance or will have little or no effect on the biomechanical properties of the tooth.[47]

The patients avoid dental treatment in spite of their oral problems because of anxiety and fear for dental procedures.[49] For some patients, the words "drill" and "needle" are where the fear lies whereas others are anxious about the dental instruments. In our study, fear of pain was quoted as their most anxiety-arousing aspects (51.56%) followed by fear of local anesthetic injection (27.78%), the need to remove the tooth despite undertaken treatment (15.11%), and the least stress arousing aspect was the sensation of files being worked in root canals (5.56%) [Table 5]. The literature supports that pain and fear of anesthesia are factors that encourage patients to avoid dentists[50] and most patients fear RCT because it is painful.[51] However, it has been found that the anticipated pain is greater than pain experienced and that after the treatment, anxiety for future RCT gets significantly reduced.[52] Endodontically treated tooth which is properly restored yields long-term success rates of 97%[53] and even if the root canal-treated tooth becomes infected again years down the line, the tooth can be saved through endodontic retreatment or an apcectomy. However, in some cases such as vertical tooth fracture or severe decay, there may be no other viable option other than tooth extraction. The patient should be counseled to opt RCT instead of tooth extraction.

The majority of RCT in India is provided by general dentists and many of them do not comply with the formulated guidelines on the quality of RCT. A study conducted on the adoption of new endodontic technology (instruments, concepts, and techniques) in India shows that majority of general dentists still used conventional diagnostic, preparation, and obturation techniques and rarely used magnifying lenses and operating microscopes.[54] RCT is technically demanding and it fails when treatment falls short of acceptable standards. It is important to acknowledge that the outcome of RCT is very much influenced by less specific, more distinct factors such as dentist's skills and attitudes. In the present study, most patients (92%) prefer specialist for RCT [Table 5]. The results of our study are in accordance with previous studies by Bajawi AM *et al.*[55] and Ahamed ZH *et al.*[7] that revealed that 57.37% and 86.6%, patients of respective study preferred a root canal specialist.

In our study, 64.67% patients agreed that they find RCT too costly [Table 5]. It is a difficult myth to dispel because every dentist has his own rates. In most cases, RCT is pricier than most routine dental procedures such as restorations. But, it is justifiable as RCT is more complex procedure, takes longer time, and requires more skill. Then again, RCT is usually cheaper than having a tooth extracted and replaced with a prosthesis or implant. In the end, RCT is going to save a natural tooth, so despite high costs involved, it is a sound investment. Dietz[56] rightly stated that although it cannot be said that RCT is inexpensive, there is good value received for the money spent.

In the present study, majority (84%) participants preferred RCT over-extraction [Table 5]. This shows that if patients are properly educated regarding RCT, they get motivated to undertake the treatment. 16% patients chose extraction of tooth. The fear of dental treatment due to anticipated or previously experienced pain is an important factor causing patients to avoid dental treatment.[57] Pain is an important prognosticate for the performance of RCT and experiencing an unexpected pain undermines patient's confidence in dentist. Informing patients about expected postendodontic pain and prescribing medications to manage it can not only win confidence of patients but also increase patients' pain threshold, and improve their attitude toward future dental treatment.[58]

Misconceptions and myths prevent patients to approach RCT from a rational perspective. The literature shows that a higher likelihood of seeking dental care is associated with good dental health knowledge.[59] Thus, there is a need for educating patients about the advantages of saving their natural teeth via RCT. The increased awareness and knowledge about RCT can result in not only motivating patients to access dental services but also willingness to seek and accept RCT. To accomplish these various measures that can help are discussed in Table 6.

Conclusion

The study provided insights into patient's perceptions regarding RCT and helped in identifying fears and myths attached to the treatment procedure. Our study disclosed that there is a lack of knowledge and awareness about the RCT in patients. There is a need for educating patients about the advantages of saving natural teeth via endodontic therapy.

Clinical relevance

Such population-based surveys are helpful in assessing the community and understanding patient's psychology regarding RCT. It is of importance, particularly in developing countries like India, where people ignore their oral health largely due to the lack of dental health knowledge or misconceptions about treatment. Adequately educating the patient about existing treating modalities, counseling against the myths related to RCT, and guiding a patient for what to expect from RCT is of utmost importance in helping the patient develop a positive approach

Table 6: Measures that can help to increase awareness and knowledge about RCT

Measures	Importance
Presenting information to patients in primary oral health care settings	Charts, diagrams, or models can be helpful if the information is appropriately presented and transformed into patient knowledge. The information will make patients familiar with the procedures and reduce their procedure-related distress. Professional videos illustrating the success and safety of RCTs can effectively educate patients and will improve their acceptance of RCTs.
Conducting regular oral health education sessions	Conducting regular oral health education sessions with special emphasis on RCT in rural as well as the urban populations can help alter the patient's knowledge and attitude toward RCT. Such educational sessions should be provided at schools and colleges also, especially in rural areas where dental myths are more common. This will not only improve the attitude of the children toward dental treatment but also gives directions for future generations seeking timely dental treatment.
Use of internet and its associated social platforms	Young adults keep themselves reasonably well-informed through the internet and its associated social platforms. Internet is the most preferred and approachable source for present generation to seek information about the unknown. Thus, sources such as social media, the internet seem to be a good platform through which mass public can be reached and educated to accept RCT.
Root canal awareness week	The government should celebrate Root Canal Awareness Week as a national effort to raise awareness about RCT. It is a brilliant way to convey to general public the important role an endodontist plays in dental health, educate the patients about the benefits of RCT, dispel their myths about RCT, and teach the public that RCT should not be feared. During this week, vigorous well-planned awareness campaigns highlighting the advantages of retaining natural teeth via RCT should be organized by Indian dental associations and respective state dental associations in their areas.

toward RCT. The primary care dentists should play active roles in promoting RCT by emphasizing the importance of saving natural teeth and dispelling myths and misperceptions about endodontic treatment. Educating patients regarding RCT will change the attitude of patients and make them accept the treatment.

Limitations of the study

This study is a self-report survey. Hence, there is a possibility of response bias. Generalizability of this study is limited, as it represents only the views of patients in Mandi-Gobindgarh, Punjab. Patients in other parts of India will have different opinions. Further studies should be undertaken on larger scales to develop more understanding of patients' attitudes at different socioeconomic and community levels toward RCT.

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Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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