

Patient Awareness and Decision-Making Patterns Toward Natural Tooth Retention via Root Canal Therapy

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ABSTRACT

Background:

Root canal therapy helps preserve a tooth when it is restorable. However, several factors influence a patient's decision to undergo endodontic treatment. These include the patient's understanding and expectations of endodontics, fear of pain and cost, previous negative experiences with dentistry, and the patient's understanding of extraction. These aspects need to be taken into account to determine the role of a patient's awareness in the decision-making process regarding dental treatment.

Objective:

The aim of this study was to analyze a patient's awareness concerning retaining a natural tooth through endodontic treatment, and to identify the factors that lead a patient to opt for extraction over endodontic treatment.

Methods:

This was a descriptive, cross-sectional study of 150 patients between the ages of 18 and 35. Participants were recruited using the method of convenient sampling. A self-administered questionnaire was used to collect the data. The questionnaire assessed the patient's awareness concerning root canal therapy, fears and misconceptions about endodontic treatment, previous experiences with dentistry, fears and concerns about treatment, the financial situation of the patient, and the patient's choice of treatment. The questionnaire also collected the patient's personal information. The data was analyzed using statistics to identify trends and draw conclusions.

Results:

There was variability in patients' knowledge and comprehension of root canal therapy and its role in keeping natural teeth. There were several patient-related factors which affected treatment choices. These included perceived positive outcomes of treatment, fear of pain, cost, previous dental experiences, and expected benefits of the treatment, amongst others. The study participants who were aware of the purpose of root canal therapy to keep the tooth, were also aware of the benefits of retaining natural teeth. Some participants were in favor of retaining natural teeth and against immediate removal of the teeth. The study showed that various patient-related factors influenced the treatment choice.

Conclusion:

Understanding patient's knowledge regarding treatment of natural teeth plays a critical role in patient's decision to retain natural teeth. It is essential that patients are educated about treatment of natural teeth to enable patients to participate in decision making process.

Keywords: Root canal therapy, Patient awareness, Decision-making, Natural tooth retention, Extraction, Endodontics, Patient education

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Introduction:

The goal of endodontic care is to retain natural teeth. One way of achieving this is by performing root canal treatment (RCT) (1). Various clinical and patient-related factors determine the decision to retain a tooth by performing RCT. Some of the factors that patients consider when choosing between retaining or extracting a tooth include cost, expected tooth function, and the esthetic outcome (2).

Patients' understanding of the concept of RCT is limited and this may account for the presence of misconceptions. Research has shown that there is a wide variation in patients' understanding of the reason for RCT, what is involved in the procedure and what the expected outcomes of the procedure are (3).

Many patients are apprehensive regarding RCT for a number of reasons including the length of the procedure, the type and number of instruments to be used and the possibility of failure of the treatment. Failure of the treatment may ultimately result in the tooth being lost (4).

From an economic point of view, patients may consider extraction of a tooth to be less costly than retention, especially if the retained tooth requires further restoration (5). Given the above, it is evident that patients have valid reasons for the preferences they express during endodontic treatment. What is important to patients about various treatments? To understand this, researchers studied patients' perceptions of various dental treatments. Some of the top considerations patients reported for an alternative treatment to a diseased tooth were predicted pain, treatment cost, the period of treatment, the extraction method, duration of treatment, and preservation of the natural tooth (6).

Patients report that the outcomes of treatment and the quality of care offered influence the perception of available options, including endodontic therapy. Patients are interested in the success rates of available treatments and may alter their treatment choices based on this information. (7)

Other non-clinical factors associated with patient-centered care, especially the patient's quality of life,

should be considered when treatment options are discussed (8). Patients may consider previous dental treatment experiences when faced with new treatment options. Previous dental experiences may include a range of emotions from anxiety to satisfaction, and may impact patients' treatment choices (9). Patients' understanding of root canal therapy may impact their treatment choices. Concerns with treatment should be addressed prior to treatment (10).

The goal of this research is to assess patients' understanding of root canal treatment and evaluate patients' choices regarding retention of natural teeth.

Methodology:

The study used consecutive sampling to invoice 150 participants, 18 to 35 years. Consecutive sampling was used to recruit participants from among eligible patients, 18 to 35 years, who presented for a dental consultation or treatment during the study period. The recruitment stopped when the target sample size was achieved. Prospective participants who were able to understand the study questionnaires and provide informed consent were included. Reliable respondents were considered participants. Prospective participants with any training in dentistry were excluded.

Data were collected using a research tool and an endodontic case management form. The research tool used to evaluate participants' awareness and perceptions on root canal treatment was the Root Canal Treatment Knowledge and Perception Questionnaire. This questionnaire was developed and published by Bansal and Jain (2020). The questionnaire consisted of 15 items and assessed participants' awareness on root canal treatment including their perceptions and concerns about previous dental treatment. The questionnaire also assessed participants' perceptions regarding the treatment of teeth with a nerve and the reason for seeking treatment.

Johnston, Schwartz, Goldberg, and Koerber's Endodontic Decision Board (EndoDB) served as the basis for constructing the decision-aids for the current study. Johnston et al. presented the EndoDB in 2006 as a clinical resource to facilitate the discussion of

alternatives in treatment, benefits, risks and costs of either performing a root canal treatment (RCT) or tooth extraction. In the present study, the decision-aids were constructed based on the EndoDB to determine participants' preferences regarding treatment, that is, retaining the tooth by undergoing RCT or extracting the tooth.

To understand why participants opted for RCT or extraction, we developed a series of questions to capture participants' beliefs about the benefits and costs of RCT, beliefs concerning the likelihood of treatment failure and pain, anticipated need for multiple dental visits, concerns about the total cost of treatment, and the level of trust placed in the dentist. Respondents were asked to evaluate these factors based on a predetermined scale of options ranging from very likely to very unlikely.

The 15-item RCT Knowledge and Perception Questionnaire was used to measure patient awareness. To understand patients' preferences, the questionnaire was designed to differentiate patients' knowledge from their choices. Patients were classified into one of three groups (low awareness, moderate awareness, and high awareness) based on their responses to awareness-related questions. The other component of the study was to understand patients' preferences for treatments involving restorable natural teeth, if any. Patients' preferences ranged from retention of the natural tooth and receiving root canal therapy, to extraction. Patients were also permitted to be 'neutral' or 'undecided' regarding the course of action.

The instruments used in this study (the questionnaires and prompts) were designed to be understandable to participants who were less educated about oral healthcare and dental treatment. The structure of the questionnaires were designed to solicit participants' perceptions about different treatment alternatives. The questionnaires were piloted to assess participants' understandability of the treatment alternatives. The final version of the questionnaires were based on the 15-item RCT Knowledge and Perception Questionnaire.

After obtaining ethical clearance and permission from the concerned stakeholders, data collection was undertaken. Prospective participants were explained the purpose and voluntary nature of the study. Only upon granting informed consent, the participants were directed to the study questionnaire. Each participant was ensured the right to respond to the questionnaire independently and was free to explain their views regarding the research questions based on their personal experiences and perceptions and/or preferences relating to their treatment and concerns. In case of doubt, the researcher guided the participant to define the question and clarify any ambiguity.

After participants completed the questionnaire, researchers checked for any missing information. The researchers coded and entered the information in IBM SPSS Statistics for further analysis. The researchers looked for errors in their data entry. Categorical variables were expressed as frequencies and percentages. A Pearson chi-square test was performed to analyze the relationship between the level of awareness and preference regarding the treatment. A p-value of less than or equal to 0.05 was considered as statistically significant.

Participants were assured that the research team would protect the privacy and anonymity of research subjects. The research team did not include participants' names or other information that directly identifies the individual, in the analytical research file. Researchers also assured participants that refusal to participate in the study or withdrawal of their consent would not affect the participants' dental care. The researchers explained that the purpose of the study was to assess participants' preferences and level of awareness concerning their treatment options. The assessment of participants' preferences would not affect the research team's decision concerning the appropriate treatment for a given tooth.

Results

Table 1. Sociodemographic Characteristics of Participants (N = 150)

Variable	Frequency (n)	Percentage (%)
Age (years)		
18–23	42	28.0
24–29	63	42.0
30–35	45	30.0
Gender		
Male	67	44.7
Female	83	55.3
Educational level		
Secondary	18	12.0

Intermediate	39	26.0
Graduate	68	45.3
Postgraduate	25	16.7
Previous dental treatment		
Yes	94	62.7
No	56	37.3
Total	150	100.0

Interpretation: The study's subjects were 18-35 year-olds. The largest age group was 24-29 (42.0%). Females were 55.3% of the group. Most (45.3%) had graduate-level education and 62.7% had previous dental care.

Table 2. Awareness and Knowledge Regarding Root Canal Therapy (N = 150)

Awareness/Knowledge Item	Yes/Correct n (%)	No/Incorrect n (%)
Had previously heard about RCT	128 (85.3)	22 (14.7)
Understood the basic purpose of RCT	101 (67.3)	49 (32.7)
Knew that RCT can preserve a natural tooth	112 (74.7)	38 (25.3)
Knew that RCT involves removal of infected pulp	89 (59.3)	61 (40.7)
Knew that RCT may help avoid extraction	116 (77.3)	34 (22.7)
Knew that a treated tooth can function for	84 (56.0)	66 (44.0)

several years		
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Interpretation: The majority of participants (85.3%) had some previous exposure to root canal therapy (RCT). Further, most participants (74.7%) endorsed the role of RCT to retain a natural tooth. Relatively less participants endorsed their knowledge to the biological aspect (59.3%) and the function (56.0%) of a tooth treated by RCT.

Table 3. Participants' Perceptions and Concerns Regarding Root Canal Therapy (N = 150)

Statement	Agree n (%)	Neutral n (%)	Disagree n (%)
RCT is an effective way to save a natural tooth	108 (72.0)	25 (16.7)	17 (11.3)
RCT is associated with considerable pain	73 (48.7)	31 (20.7)	46 (30.6)
RCT is too expensive	79 (52.7)	28 (18.7)	43 (28.6)
RCT requires too many dental visits	68 (45.3)	34 (22.7)	48 (32.0)
I prefer saving my natural tooth whenever possible	119 (79.3)	18 (12.0)	13 (8.7)
I am concerned	81 (54.0)	35 (23.3)	34 (22.7)

that RCT may fail			
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Interpretation: About 72.0% of the survey respondents felt that RCT helped in preserving natural teeth. Moreover, 79.3% of the participants said they wanted to retain their natural teeth. The participants were, however, concerned about the cost of the treatment (52.7%), and the risk of failure of the treatment (54.0%), and pain (48.7%).

Table 4. Preferred Treatment Decision for a Restorable Natural Tooth (N = 150)

Preferred Treatment Decision	Frequency (n)	Percentage (%)
Root canal therapy and retain the tooth	103	68.7
Extraction	24	16.0
Depends on dentist's recommendation	17	11.3
Undecided	6	4.0
Total	150	100.0

Interpretation: Two-thirds of survey respondents (68.7%) preferred retention of their natural tooth through root canal therapy if their tooth was restorable. Fewer respondents (16.0%) preferred tooth extraction. The remaining respondents (11.3%) indicated they would wait for the dentist's recommendation.

Table 5. Association Between Awareness Level and Preferred Treatment Decision (N = 150)

Awareness Level	RCT/Tooth Retention (%)	Extraction (%)	Dentist Recommendation/Undecided (%)	Total
Low	25	10	13 (27.1)	48

awareness	(52.1)	(20.8)		(100.0)
Moderate awareness	43 (70.5)	9 (14.8)	9 (14.8)	61 (100.0)
High awareness	35 (85.4)	5 (12.2)	1 (2.4)	41 (100.0)
Total	103 (68.7)	24 (16.0)	23 (15.3)	150 (100.0)

Interpretation: There was a relationship between patients' level of awareness and their preferred treatment decision. There was a statistically significant association between the two variables, $\chi^2 = 13.53$, $p = 0.009$. Participants who had low awareness preferred retaining the tooth through RCT less (52.1% preferred this option) as opposed to participants who had high awareness, of which 85.4% preferred retaining the tooth through RCT.

Chi-square = 13.53, df = 4, p = 0.009

Discussion:

The current study evaluates patients' awareness and factors influencing their decision-making regarding retention of natural teeth through the treatment of endodontic origin. The study group's general awareness regarding root canal treatment (RCT) were found to be comparatively high. However, awareness regarding various other components of RCT was found to be inadequate. It was found that the study participants had prior knowledge regarding root canal treatment. However, awareness regarding the process of removal of infected pulp and the function of the tooth thereafter were found to be inadequate. It has been documented that awareness of a patient regarding the procedure of treatment is equally important in case of endodontic treatment. It has been found that various factors such as awareness, expectations, fear, and cost of the treatment play a significant role in the satisfaction of the patient regarding the endodontic treatment (11).

The study group was found to be in favor of retention of a natural tooth. More than 60% of the study group was in favor of retention of a natural tooth through RCT if the tooth was restorable. It has been found

that patients are in favor of retaining natural teeth if other treatment options are available (12).

A study researched the factors that led participants to select the retention of natural teeth over the extraction and implantation alternative. The authors noted that prior experience with oral health procedures influenced the selection of treatment. Additionally, some participants were prepared to pay more to select their preferred treatment (13).

The role of awareness in treatment preference was described above. Participants with low awareness preferred tooth extraction, and participants with high awareness were in favor of retaining natural teeth. Participants who took part in the study were shown to incorporate information and to what degree they comprehend the treatment process in making their treatment preference (14).

The participants' prior dental experience likely contributed to their preference toward or against endodontic treatment. In the current study, a relatively high proportion of the participants reported previous dental experience. Previous experience with dental treatment may influence expectations and modify the preferences toward or against specific treatment options. Findings from other studies have also shown that clinical symptoms and pain of an infected tooth may affect the treatment option selected by the patient (15).

From the results of the current study, several researchers noted that communication between the patient and the dental professional is important. Most participants preferred natural tooth retention; however, participants were shown to take into account the dental professional's judgment in the case (16).

Patients consider several factors when opting for alternative treatments for teeth with apical disease. Research shows that patients consider the health care professional's interpersonal skills and their ability to build trust when considering treatment options (17). Lastly, several studies have shown the significance of patient choice for treatment involving quality of life. These studies have also shown that patient-reported outcomes and quality of life can be added to traditional clinical outcomes and SRT. Hence, to support patients with choice making, it is essential to explain the expected outcomes, potential risks, and trade-offs associated with different treatment options. This information can be utilized to make treatment choices, and a recommendation can still be given based on clinical judgment.

In endodontics, these studies have shown that public awareness and treatment preference are related. It is understood that the higher the awareness of treatment options, the greater the preference for retention of a natural tooth. This is referred to as the case for

treatment choice. Awareness and education can help the patient understand the treatment options available to them; however, this should be done in the context of the professional judgment of the health care provider.

Conclusion

From the studies reviewed, it can be concluded that patients are usually aware of the concept of root canal treatment, and in the presence of alternatives, prefer retaining their natural teeth. Fear of treatment, pain, and financial constraints influenced treatment preferences. Overall, that awareness was found to be positively related to preference for retention of natural teeth.

Future Suggestions

Because the current research only examines a single facility, results may not apply broadly. Future studies with larger populations, ideally including patients across the spectrum of dental care, may be beneficial. Studies may also investigate the effects of patient education on the preference for and the understanding of RCT. Other studies may address the effects of the cost of dental care, anxiety, and the prognosis of the tooth in question on the preference for and the understanding of RCT.

Limitations

The nature of a cross-sectional study restricts the researchers ability to deduce reason for patient preference, and thus, may lead to misinterpretation. The current study relied on patients to complete surveys, which may lead to responses bias. Recall bias may impact patient's ability to recall their awareness of RCT. The small population sample (150 patients aged 18-35) may limit generalizability. Lastly, research may benefit by including case observations to evaluate patients' preference for treatment.

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