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Root canal treatment; Dental anxiety; Post-endodontic restoration; Prosthodontic prognosis; Patient experience; Restorative dentistry; Endocrowns

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Patient Experiences of Root Canal Therapy and Their Influence on Post-Endodontic Restorative Care: A Qualitative Study

Abstract
Objective: This study aimed to explore patient experiences during root canal treatment (RCT) and to evaluate how these experiences influence acceptance, timing, and completion of post-endodontic restorative and prosthodontic care. Methods: A qualitative descriptive study design was employed. Adult patients who had undergone RCT were recruited using a convenience sampling approach. Data were collected through a structured open-ended questionnaire addressing pre-treatment perceptions, intra-procedural experiences, pain and anxiety, post-treatment reflections, and attitudes toward definitive restorations such as crowns and endocrowns. Responses were analyzed using thematic analysis, with themes mapped to restorative decision-making pathways relevant to prosthodontic outcomes. Results: Patient experiences during RCT were found to significantly influence willingness to proceed with definitive restorative care. Positive experiences characterized by effective pain control, clear communication, and a supportive clinical environment were associated with timely completion of post-endodontic restorations. Conversely, negative experiences and heightened anxiety contributed to delayed or refused definitive restorations, potentially compromising long-term tooth prognosis. Patient understanding of restorative materials and perceived benefits further affected compliance with prosthodontic recommendations. Conclusion: Patient-centered management of anxiety and pain during RCT plays a critical role in optimizing post-endodontic restorative and prosthodontic outcomes. Clinical Significance: Enhancing communication, addressing patient concerns, and improving education regarding restorative necessity and material longevity may increase acceptance of definitive restorations and support long-term functional success of endodontically treated teeth.

1. Introduction
RCT is an essential intervention in the modern dental practice, the purpose of which is to retain teeth with pulpal pathology and retain their functionality in the oral cavity. RCT is not only successful because of the absence of infection but also because of the proper management of the post-endodontic procedure of the treatment, especially in connection with the restoration rehabilitation. Patient-related factors are crucial in dictating the overall success of dental treatment, particularly in instances where definitive restorations are not provided or delayed.[1] Dental anxiety has been singled out as one of the most significant impediments to treatment in relation to treatment acceptance and treatment completion. Dental phobia can affect the cooperation level of patients and perceived pain as well as lead to the avoidance of subsequent treatment. New methods, including teledentistry, have been considered in recent years to enhance patient education and engagement, especially in those areas where patient access to dental care or patient awareness is insufficient.[2]
Although there are improvements in terms of clinical methods and materials, dental phobia is a widely spread problem known to influence both general and specialised dental treatments. The management of anxious patients should be

efficiently undertaken to guarantee proper provision of care. Dental anxiety management schemes such as effective communication and patient-centred
schemes, have been highlighted as key elements of practice, especially when it comes to invasive dental procedures like RCT.[4] The construction of dental fear is complicated, and it includes emotional, cognitive, and behavioural aspects. Dental fear measurement has developed to include the dimensions of fear, as well as the intensity of fear, which may affect patient behaviour and the outcome of treatment. Proper evaluation of the situation will enable clinicians to adjust their practice and enhance the experience of their patients when visiting a dentist.[5]

Restorative and prosthodontic management of endodontically treated teeth is a difficult case. The teeth previously subjected to RCT tend to have significant tooth structure loss, which exposes them to fracture. Prosthodontic measures like the use of indirect restorations are thus required to restore the functionality and to preserve the remaining tooth structure.[6] The endocrown-based no post -no core! has been suggested as one of the conservative but effective methods of restoring severely damaged posterior teeth, and long-term clinical investigations serve to demonstrate the feasibility of its application. Retrospective clinical studies have shown that endocrowns are acceptable in terms of survival rates over long periods of follow-up and hence can serve as an alternative to conventional post and core restorations. The adhesive bonding and choice of material in these restorations are extremely dependent, which makes the compliance of patients and their acceptance of permanent restorative treatment very important.[7] The psychological factors of dental treatment cannot be disregarded because dental anxiety has been proven to affect the attendance rates, cooperation, and compliance with treatment. Causes related to dental anxiety are prior bad experiences, fear of pain, and not being in control of the treatment. These aspects might be specifically high in the procedures with numerous visits, including RCT and restorative rehabilitation.[8] Reports have been made in studies conducted on patients with irreversible pulpitis that there is a marked correlation between the level of anxiety and the perceived intensity of pain. This may adversely influence patient attitudes towards additional dental therapy, including acceptance of definitive restorations, hence influencing the prognosis of teeth in the long term.[9] The developments in digital dentistry have provided more opportunities in the field of restorative treatment of teeth that have undergone an endodontic treatment. All-ceramic crowns and endocrowns with good survival outcomes have been made possible through the chairside computer-aided design and computer-aided manufacturing (CAD/CAM) systems. These restorations have been proven to be reliable over time, however, in situations where adequate case selection and adhesive protocols are employed.[10] D dental anxiety does not occur in a uniform distribution among populations and cultures. Dental anxiety has also been noted to be a widespread issue among dental patients in Saudi Arabia, which applies to the planning and provision of care. It is imperative to understand which regions have high prevalence and which factors contribute to patients experiencing poor patient experiences and treatment outcomes to create specific interventions to enhance the patient experiences and the treatment outcomes. [11]

The long-term effectiveness of restorations applied to the endodontically treated teeth is based on the materials and prosthodontic perspective, which relies on the performance of the material used in the restoration and the compliance with the treatment procedure provided by the patient. Systematic reviews have also indicated the need to use relevant restorative designs, including endocrowns, in raising survival and functional outcomes. Patient acceptance of such restorative options is a major factor in clinical success.[12] The study aimed to investigate patient experiences associated with root canal treatment and also to determine how the experiences impact the acceptance, time, and follow-up use of post-endodontic restorative and prosthodontic treatment. The research also sought to determine patient-related issues that can potentially influence adherence to conclusive restorative treatment recommendations after root canal therapy.

2. Methodology

2.1 Study Design and Rationale

This research paper used the qualitative descriptive research design to investigate patient experience of root canal treatment (RCT) in the wider framework of comprehensive restorative and prosthodontic dentistry. The methodological strategy was strategically selected to record patient perceptions, feelings and decision-making mechanisms that have a direct impact on the fulfilment of post-endodontic restoration care, including the definitive restorations, crowns, onlays, and post-core systems. These experiential determinants are crucial to be understood by the prosthodontist and restorative clinicians because patient acceptance, compliance and timely restoration are the main determinants of tooth survival in the long run and prognosis in a prosthodontic restoration.

2.2 Study Setting and Participants

Adult subjects (18 years and above) who had received a root canal treatment before were eligible to participate. Special stress was laid on the selection of people who reached past the endodontic stage and were introduced to or counselled about the final restorative treatment after RCT. This inclusion criterion made sure that the participants were able to comment on the impact that their experience of the RCT had on future restorative decisions, such as whether they accepted or rejected crowns or other indirect restorations. Individuals not subjected to RCT were not included to ensure that the experiential data and downstream restorative outcomes were consistent. All the participants could read and comprehend Arabic or English and willingly agreed to take part.

2.3 Sampling Strategy and Recruitment

The convenience sampling method was used. The study involved the selection of participants using the online channels and dental service networks that are regularly

visited by patients who require restorative and endodontic treatment. Recruitment documents reinforced the research on the experiences of treatment and the following restorative planning as opposed to the endodontic procedures per se, which were in line with the reactions of the participants, which were consistent with the outcomes of the prosthodontic and restorative planning.

2.4 Data Collection Instrument

A structured, open-ended questionnaire of 20 qualitative questions with five thematic areas, namely (1) pre-treatment perceptions and anxiety, (2) intra-procedural experiences, (3) pain perception and emotional responses, (4) post-treatment reflections, and (5) attitudes toward definitive restorative care after RCT, was used to collect data. Particular items were about whether they understand the necessity of crowns or other indirect restorations, the perceived value of having the restoration timely done, readiness to have more restorative procedures done, and the experience with RCT had an effect on their trust in restorative materials and prosthodontic prescriptions. These domains were specifically arranged to chart out the patient experiences to restorative decision pathways in the context of planning prosthodontic treatment.

2.5 Restoration-Related Variables

In cases where available, the participants were requested to indicate the kind of definitive restoration that had been suggested or had been administered after RCT (e.g., direct restoration, crown, post-core and crown) and the date of restoration completion. The qualitative answers in regards to acceptance, delay, or refusal of the prosthodontic treatment were assessed as the determinants of the outcome in regard to the connection between patient experience and the success of restorative treatment.

2.6 Data Collection Procedure

The survey took place electronically with the help of an online survey. The mean time of completion was 10-15 minutes. There was no analysis of any identifying information. Participants were also asked to enter contact information in another field, which is not linked to prevent any confidentiality or data leakage.

2.7 Data Analysis

The data analysis was done through thematic analysis in an iterative, inductive-deductive process. Preliminary coding was informed by a framework of restorative dentistry, with specific focus placed on the impact of patient experiences on the production of compliance with the prosthodontic recommendations and the acceptance of restorative materials. Codes were then narrowed down inductively to reflect on new themes that came out in communication, anxiety management, pain control, and restorative decision-making. Themes were then cross-tabulated to clinical restorative pathways, noting the influence of factors related to experience on the prognosis of prosthodontics, the duration of retention of restoration, and the completion of treatment. The line of analysis made sure that the research results were directly applicable to clinical practice in the field of restorative and prosthodontics.

3. Results

3.1 Participant Characteristics and Restorative Status

Fifty participants who had received root canal treatment (RCT) were used to complete the questionnaire. The sample of respondents was fairly diverse in terms of age, education, and place of treatment. Significantly, all the respondents were at the post-endodontic stage, either having a definitive restoration or recommended to receive additional restorative or prosthodontic treatment. The respondents indicated different restorative courses of action after RCT, such as direct placement of definitive restorations, deferral of restorations or partial restorative therapies. The mentioned differences offered a significant understanding of the impact of patient experience during RCT on adherence to prescribed restorative regimes, which play the key role in the long-term prognosis of prosthodontics. The demographics and the post-endodontic restorative condition of the participants are in Table 1.

Table 1. Demographic characteristics and post-endodontic restorative pathways of participants

Variable	Category	n (%)
Age group	18–30 years	14 (28)
	31–45 years	21 (42)
	46–60 years	11 (22)
	>60 years	4 (8)
Gender	Male	24 (48)
	Female	26 (52)
Education level	Secondary or below	9 (18)
	Undergraduate	27 (54)
	Postgraduate	14 (28)
Post-endodontic restoration	Direct restoration only	13 (26)
	Crown without post	21 (42)
	Post–core and crown	12 (24)
	No definitive restoration yet	4 (8)

3.2 Pre-treatment Perceptions, Anxiety, and Anticipated Restorative Burden

Participants were likely to cite a substantial level of anxiety before RCT, which was mainly instigated by the fear of pain, the experience of poor treatment in the past, and the misleading beliefs about the complexity of the treatment. In addition to the expressed fear of the very endodontic procedure, several respondents were eager to express the fear of the expected necessity of further restorative treatments, such as crowns or post-core restorations. Some of the participants viewed RCT as a lengthy treatment process but not a one treatment process, which raised their apprehensions of cumulative pains, expenses, and numerous visits related to a conclusive restoration. Such impressions had an impact on the original readiness to devote oneself to comprehensive restorative treatment, with the pre-treatment communication being the factor that determined the patient to agree with the proposed treatment plan with prosthodontics. Figure 1 describes the correlation between the levels of anxiety before the treatment and the levels of expected acceptance of definitive restorations.

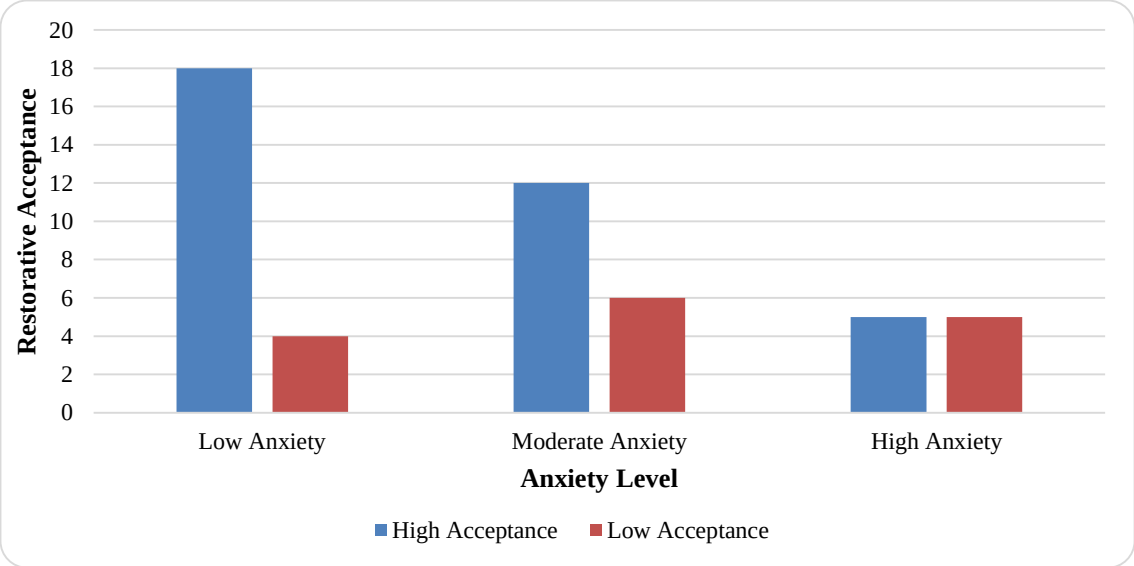

Figure 1. Conceptual framework linking pre-treatment anxiety with anticipated compliance to post-endodontic restorative recommendations

3.3 Intra-procedural Experience and Trust in Restorative Recommendations

RCT experiences were quite heterogeneous and directly influenced patient trust in the following restorative advice. Subjects who reported successful pain management, effective communication, and a relaxed clinical atmosphere stated that they had more confidence in their dentist's recommendations of the type of restoration (crown, onlays, or indirect) they needed. On the contrary, participants who felt uncomfortable, underwent long procedures or had a poor explanation during RCT stated that they are reluctant to undergo subsequent treatment. In certain instances, poor intra-procedural experiences caused definite restorations to be delayed or refused, even though they were known to be necessitated by clinical reasons. These results highlight the role of chairside endodontic experiences on downstream restorative decision-making. Table 2 entails important experiential variables in RCT and how they are reportedly affecting the acceptance of the prosthodontic treatment.

Table 2. Intra-procedural experiences during RCT and their influence on acceptance of definitive restorative care

Intra-procedural factor	Patient-reported experience	Impact on restorative acceptance
Adequate local anesthesia	Comfortable, pain-free procedure	Increased acceptance of crowns
Clear procedural explanation	Feeling informed and reassured	Willingness to proceed with restorative care
Calm clinical environment	Reduced anxiety	Improved compliance with follow-up visits
Prolonged treatment duration	Fatigue and discomfort	Hesitation toward additional restorative visits
Pain during procedure	Negative experience	Delay or refusal of crowns or post–core restorations

3.4 Post-treatment Reflections and Completion of Definitive Restorations

After RCT, the bulk of the respondents stated that they experienced alleviation of pain and enhancement of oral functioning. Good results strengthened faith in restorative prescription and encouraged prompt performance of conclusive restorations, especially full-coverage crowns. Nevertheless, a subgroup of respondents reported unremitting pain or dissatisfaction, and this adversely impacted adherence to post-endodontic restorative treatment. Some participants chose to have temporary crowns or delayed crowns regardless of the advice of the professionals, which may negatively affect the survival of the tooth and the results of the prosthodontic treatment. The patient-reported pathways to experience of RCTs to completion, delay, or refusal of definitive restorations are shown in Figure 2.

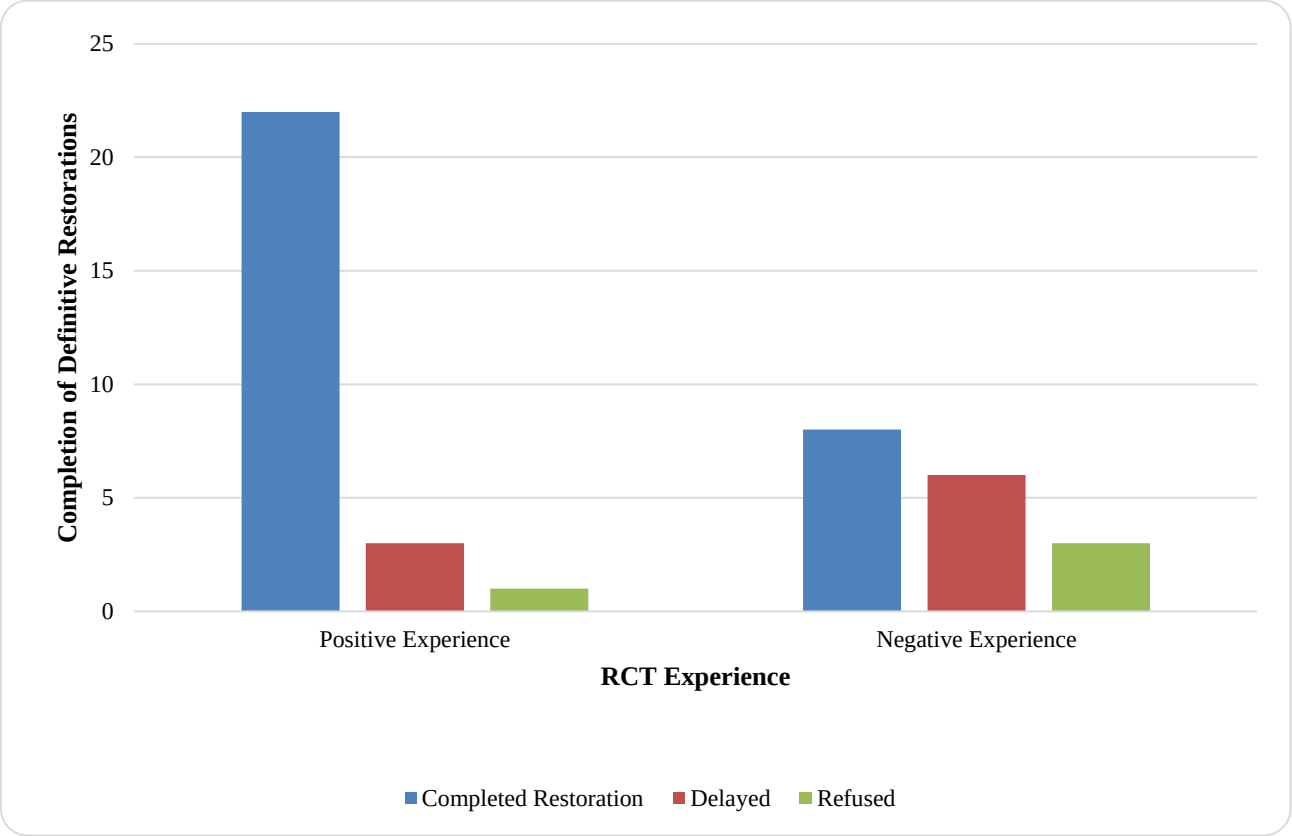

Figure 2. Patient-reported pathways linking RCT outcomes to completion or delay of definitive restorative treatment

3.5 Perceptions of Restorative Materials and Prosthodontic Prognosis

The respondents indicated different degrees of knowledge on restorative materials and the role of the materials in safeguarding endodontically treated teeth. Individuals who were given clear explanations regarding the choice of material to use, durability and long-term outcomes of using crowns or adhesive restorations gave greater expressions of acceptance and satisfaction. Conversely, little knowledge of restorative materials was linked to the mistrust of prosthodontic recommendations and the desire to use minimal intervention. Such perceptions had a direct effect on restorative decisions and made patient education a significant factor that maximises the prosthodontic prognosis. Table 3 presents the results of the patient perception of restorative materials and the perceived effects on the choice of treatment they make.

Table 3. Patient perceptions of restorative materials and influence on prosthodontic treatment acceptance

Restorative material perception	Common patient belief	Effect on treatment decision
Crown protects treated tooth	Prevents fracture and failure	High acceptance of full-coverage restorations
Post reinforces weakened tooth	Improves longevity	Acceptance of post–core systems
Adhesive restorations are conservative	Preserve tooth structure	Preference for bonded restorations
Crowns are costly or unnecessary	Temporary restoration is sufficient	Delay or refusal of definitive restoration
Limited understanding of materials	Uncertain long-term benefits	Reduced compliance with prosthodontic advice

3.6 Patient Recommendations for Optimizing Restorative Outcomes

The study members cited communication, reassurance and demonstration of a clear explanation of restorative necessity as essential after RCT. It was suggested by

many that clinicians should clearly articulate the topic of definitive restorations as a way to increase the longevity of teeth, their functional stability, and fracture prevention. Follow-up communication following RCT was also important in the eyes of patients to reaffirm the need to restore in a timely manner. These suggestions are patient-centred interventions towards enhancing patient compliance with restorative and prosthodontic rehabilitation plans. Figure 3 provides a summary of the patient-recommended measures to enhance the completion of post-endodontic restorative care.

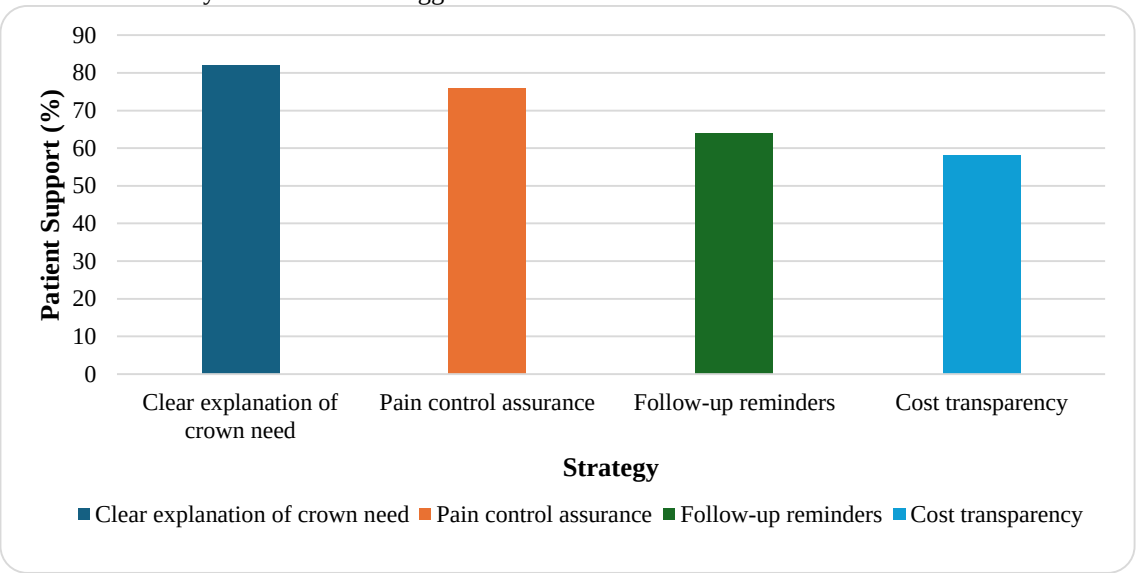

Figure 3. Patient-recommended strategies to enhance compliance with definitive restorative and prosthodontic treatment

Figure 4 illustrates the patient experience–driven pathway identified in this study, demonstrating how perceptions and experiences surrounding root canal treatment influence post-endodontic restorative outcomes. Pre-treatment anxiety and expectations shape initial attitudes toward care, while intra-procedural experiences during RCT play a central role in building trust or distrust in clinical recommendations. These experiences inform post-treatment interpretation, including satisfaction, pain relief, and understanding of restorative necessity, which in turn guide patient restorative behavior. Timely completion, delay, or refusal of definitive restorations ultimately affects long-term prosthodontic prognosis, including tooth survival, fracture resistance, and functional longevity. This framework highlights the cumulative impact of patient-centred factors across the endodontic–restorative continuum.

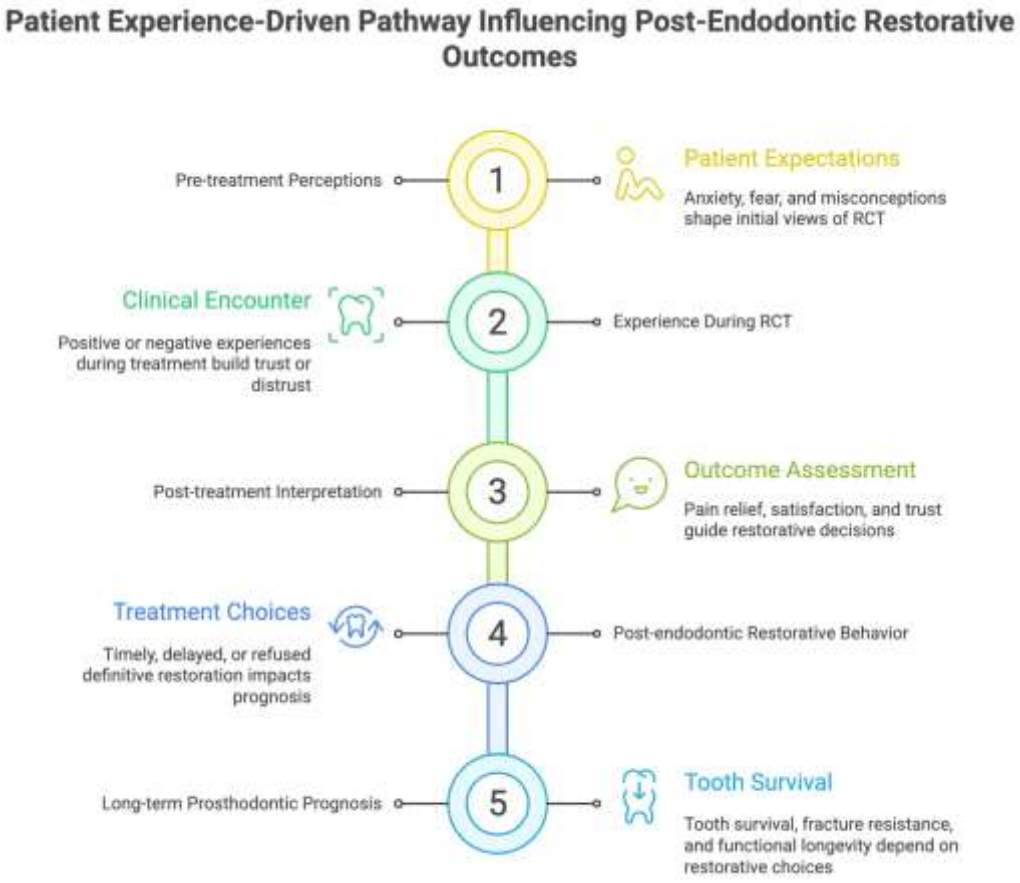

Figure 4. Patient experience–driven pathway influencing post-endodontic restorative outcomes

4. Discussion

The current paper shows that the patient experiences of root canal treatment (RCT) are closely associated with quality restorative and prosthodontic outcomes. Although the technical success of endodontic therapy is necessary, post-endodontic restorative management and patient compliance are crucial in the long-term survival of teeth. The development of restorative material has empowered clinicians to restore endodontically treated teeth using improved biocompatible and adhesive material, which has improved periodontal compatibility and clinical survival. Polymer-impregnated ceramic network materials, such as those, have shown good responses by the cells, indicating their usage in indirect restoration after RCT.[13]. Structured findings have revealed that the anxiety associated with the nonsurgical root canal treatment may have adverse implications on patient cooperation, pain perception, and general experience of treatment. The mentioned could later affect the willingness of a patient to perform conclusive restorative treatments that are essential in shielding endodontically treated teeth against fracture and breakdown.[14]

Restoratively, the material and clinical placement of restorations on endodontically treated teeth are factors that determine the life of the restorations. Clinical analyses of resin composite restorations conducted over a long period have shown a satisfactory survival rate in cases where restorations are done in ideal circumstances. Nevertheless, endodontically treated posterior teeth are still at a higher risk of structural failure than vital teeth, which supports the idea of using definitive restorations and compliance with suggested treatment guidelines in patients.[15] The relationship between dental anxiety and intraoperative pain during RCT is significant as a result of clinical studies carried out. Suffering from increased pain can cause negative attitudes towards dental care, resulting in delayed or avoided restorative care in patients, and this can undermine the long-term prosthodontic outcomes.[16]

Another important factor of restorative planning is the structural integrity of endodontically treated teeth. There is some evidence in support of the principle that coronal tooth cluster preservation and adequate ferrule are more important factors in tooth survival than post placement itself. Systematic reviews have underscored that restorative design must consider biomechanical stability, especially with posterior teeth, which are prone to high occlusiveness.[17] Endocrowns have come up as a conservative form of restorations that address structural as well as biomechanical issues relating to teeth subjected to endodontics. Systematic reviews have proven that endocrowns present positive survival and clinical outcomes, particularly when adhesive strategies are observed very attentively. Though these benefits exist, patient acceptance of endocrows can be subject to past experiences of treatment and the knowledge of restorative benefits.[18]

Whether to perform direct or indirect restorations after an RCT has been a controversial issue in restorative dentistry. There is indicative evidence that indirect restorations have better protection in the posterior teeth

that have experienced a great extent of structural loss, especially in comparison to direct restorations used in isolation.[19] As a result of these findings, the role of clinician-patient communication in the justification of restorative decisions and their effects on long-term tooth prognosis has been reinforced by comparative studies on endocrown restorations on molars and premolars in terms of their clinical feasibility. According to systematic reviews and meta-analyses, endocrowns can obtain a comparable level of survival in case of an adequate indication, as compared to conventional crowns. Nevertheless, the good results are based on the adherence of patients to treatment advice and submission to conclusive restorative interventions after RCT.[20]

There are also psychological issues that make the provision of holistic dental care even harder, including dental phobia. It has been proposed that dental phobia might have some similar features to blood-injection-injury phobia, which may increase the level of fear in invasive treatments. These psychological reactions can affect the actions of the patient at several levels of treatment, such as restorative rehabilitation after endodontic treatment.[21] The anxiety about dental injections also contributes to forming patient behaviours and attitudes to dental services. The research has shown that anxiety when administering local anaesthetics may enhance perceived pain and discomfort, which may support the negative views towards dental treatment. These experiences can lead to the prevention of additional restorative procedures, and hence, long-term prosthodontic outcomes are compromised.[22]

On the whole, the results of the current paper indicate that the patient-centred approach should be incorporated into endodontic and restorative treatment. Anxiety management, pain management, and communication could be an improvement of the endodontic stage, thereby increasing patient acceptance of definitive restorations and contributing to the success of long-term treatment. In the context of a prosthodontic understanding, good restoration of endodontically treated teeth should not only be based on good clinical practice and choice of materials to be used, but also a patient involvement in the entire treatment process.

5. Conclusion

The experiences of patients in root canal treatment are vital factors that influence acceptance, time, and outcome of post-endodontic restorative treatment. As the results of this research prove, dental phobia, perception of pain, and the quality of communication during the endodontic step are not limited to immediate results of the given procedure but it has a direct impact on patient adherence to final restorative, and prosthodontic prescriptions. Encouraging experiences will lead to the development of trust and promotion of early restorations, whereas negative experiences will lead to delayed or refusal of treatments, which would culminate in poor survival of teeth in the long term. Restoratively and prosthodontically, however, the endodontically treated teeth may not be as successful as they should be because it is not only technically executed, but also the patients are actively involved in the process of treatment. To maximise the restorative results, it is necessary to manage anxiety effectively, explain the necessity of the restorative process, educate patients about the choice of materials, and provide a long-term prognosis. The inclusion of patient-centred communication plans in the endodontic treatment potentially enhances definitive restoration adherence to crowns and endocrowns, thus the functional survival and structural soundness of restored endodontic teams. These data also emphasise the need to have a more in-depth interdisciplinary strategy that can integrate endodontic treatment with restorative and prosthodontic planning and ensure long-term clinical success.

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