Quality of Life of Endodontically Treated versus Implant Treated Patients: A University-based Qualitative Research Study

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Abstract

Introduction: Up-to-date studies comparing endodontic treatment versus implant-supported prosthesis have shown similar clinical outcome and survival rates. However, no data are available comparing both treatment modalities based on the patient’s perception of quality of life. This study was designed to qualitatively describe and compare the quality of life of patients with restored, single endodontically treated teeth versus patients with single implant-supported fixed prostheses.

Methods: Forty-eight patients agreed to participate in the study (n = 24 from each treatment modality). Of those, 37 actually participated in the study: 17 were endodontically treated and 20 had an implant-supported prosthesis. Patients in each of the two groups were randomly selected from the Graduate Endodontics and Graduate Periodontics Departments, respectively. Six focus group discussions (n = 3 per treatment group) were held and audio-recorded for subsequent thematic analysis. Data were analyzed to identify common themes within each category and compared to assess any differences in quality of life between the two treatments. Additionally, a quality of life survey, the shortened version of the Oral Health Impact Profile (OHIP-14), was given before the discussion group and the responses analyzed.

Results: The results obtained from this study show similar overall OHIP scores and show a high rate of satisfaction with both treatment modalities. Content analysis of the discussion groups revealed several themes and subthemes. The major themes were importance of overall health, financial implications of the treatments, perception of the treatments and its outcomes, time since treatment, and follow-up dental visits. Conclusions: The results help identify patients’ perception and concerns with each treatment modality and assist the clinician and patient in the selection of an optimal treatment for their given situation. In addition to the prognosis and outcomes, clinicians should consider patients’ perceptions and preferences as well as the influence each therapy may have on their quality of life, both short- and long-term. Overall, all the participants in this study were pleased with the treatment received and expressed a clear message to save their natural dentition whenever possible. (J Endod 2011;37:903–909)

Key Words

Endodontics, implants, Oral Health Impact Profile, quality of life, root canal

It is now a very common occurrence for a clinician and a patient to be confronted by the following treatment question: “Should a tooth be saved through root canal treatment and restoration or be extracted and replaced with a single implant-based supported prosthesis?” Every patient has a unique case prohibiting a perfect answer that fits everyone’s situation. Although the decision-making process is critical because of the irreversible consequence of losing a tooth, guidelines are lacking to assist the clinicians and patients in making an informed, evidenced-based decision (1–5).

Clinicians are ethically bound to inform patients of all reasonable treatment options, inform them of benefits and risk factors involving available treatment options, and obtain informed consent before initiating treatment. Clinical treatment decisions regarding endodontic or implant therapy must always be made in the best interest of the patient as well as based on the best, most currently available evidence.

Several factors should be considered when treatment planning whether to perform endodontic therapy or extract a tooth and place an implant (4). Among these are patient-related factors (ie, systemic and oral health, esthetic demands, and comfort and treatment perceptions), tooth- and periodontium-related factors (ie, pulpal and periodontal conditions, restorability of the tooth, color characteristics of the teeth, quantity and quality of bone, and soft-tissue anatomy), and treatment-related factors (ie, cost-benefit ratio, the potential for procedural complications, required adjunctive procedures, and treatment outcomes) (4–6).

It is also important to remember that there are multiple risk factors for both implant and endodontic treatment. For implant treatment, risk factors include smoking, diabetes, decreased estrogen levels in postmenopausal women, bone quantity and quality, and use of intravenous bisphosphonates (7–14). Risk factors for nonsurgical endodontic therapy include smoking, diabetes, apical periodontitis, and inadequate coronal restoration (14–16). These risk factors need to be taken into consideration when treatment planning for either treatment.

Several outcome studies have investigated both implant and endodontic therapy. Retrospective, meta-analysis, and systematic review studies have all shown similarly high success rates between the two treatment types (6, 17, 18). However, it is difficult to compare the two because studies vary considerably in design, success definition, assessment methods, operator type, and sample size (18). Outcomes of root canal treatment are usually assessed by stringent criteria including complete healing of periapical disease and clinical function without signs or symptoms. A tooth that has incomplete radiographic healing at the time of re-evaluation would not be considered a success by this definition, even if it was asymptomatic and fully functional (19, 20). Outcome criteria for implants have been primarily judged by the implants’
survival and functionality in the mouth. An implant with a draining sinus tract would be considered surviving. This leads to the important question, “Can endodontic and implant success rates really be compared?”

Both nonsurgical root canal therapy followed by an appropriate restoration and single-tooth implants are excellent treatment modalities for the treatment of compromised teeth (1,17). Although current studies have evaluated and compared outcomes of both procedures in a quantitative manner (ie, success rates) (6, 17, 18) and have evaluated risk factors associated with each treatment modality (7–15), no data are available comparing both treatment modalities in a qualitative manner. Evaluating patients’ perceptions and the psychosocial effect on their quality of life are likely critical to patients and therefore should be taken into consideration by the clinician (18).

Qualitative research can provide a deeper understanding of, or insight into, a particular problem (21). Focus group discussions are “interviews” with small groups of relatively homogeneous people with similar backgrounds and experiences. Participants are asked to reflect on the moderators’ questions, provide their own comments, listen to what the rest of the group has to say, and react to their observations. The main purpose is to elicit ideas, insights, and experiences in a social context in which people stimulate each other and consider their own views along with the views of others (22). The results obtained from qualitative studies help to identify and contextualize patients’ perceptions and concerns with each treatment modality and may assist the clinician and patient in the selection of an optimal treatment for their given situation. The purpose of this study was to compare the perceived quality of life of patients who received single-tooth endodontic therapy versus those that received single implant-supported prosthesis.

### Materials and Methods

#### Subject Recruitment and Inclusion Criteria

Patients treated at either the Graduate Endodontic Clinic or Graduate Periodontic Clinic were considered for this study. Patients’ charts were randomly selected from the database of the respective departments and screened for eligibility based on the predetermined criteria. No clinical or radiographic examination was conducted as part of this study.

Patients were telephoned using a detailed recruitment script and invited to participate in the study. Twenty-four patients in each treatment modality (single-tooth nonsurgical endodontic therapy vs single implant-supported prosthesis) were approached for participation. Patients who were willing to participate were asked to choose one of three focus group discussion dates. All study materials and approaches were approved by the University Institutional Review Board. Consent was obtained by all participants before their participation.

Inclusion criteria included the following: (1) patients who received one root canal therapy or a single implant-based rehabilitation, (2) patients with a coronal restoration with at least 1 year in occlusal function, (3) patients whose treatment was provided by clinicians with the same level of proficiency (ie, graduate students in the respective departments), (4) patients who were ≥18 years old, and (5) patients who were American Society of Anesthesiology I and II.

#### Quality of Life Assessment (Oral Health Impact Profile)

Immediately before the focus group discussion, all participants were asked to complete a quality of life survey, a shortened version of the Oral Health Impact Profile (OHIP-14) (23). The OHIP measures people’s perceptions of the social impact of oral disorders on their well-being (24). The aim of this index is to provide a comprehensive measure of self-reported dysfunction, discomfort, and disability arising from oral conditions. It is based on Locker’s adaptation of the World Health Organization’s classification of impairments, disabilities, and handicaps (25). In the World Health Organization model, impacts are organized linearly to move from a biological, to a behavioral, to a social level of analysis. Slade and Spencer (24) adapted this by proposing seven dimensions of impact of oral conditions on the patients’ well-being (7 items within each dimension for a total of 49 items: OHIP-49). The seven dimensions include the following: functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, and handicap. A shortened version (OHIP-14) was later developed based on controlled stepwise regression analyses that yielded a subset of 14 items (two items within each of the seven dimensions, $R^2 = 0.94$) (25). The short form of the OHIP was found to be valid ($P < .05$, associated with clinical oral status and sociodemographic variables) and reliable (Cronbach alpha = 0.88). Each item is scored on a five-point scale ranging from “never” (coded 0) to “very often” (coded 4). Table 1 lists the OHIP-14 dimensions and individual items.

### Focus Group Discussions

A semistructured discussion guide was constructed and used by the moderator during the focus groups. The guide included questions related to oral health quality of life, perception of oral health/teeth in general, and treatment experiences (Table 2). The same moderator and comoderator conducted all three discussion groups. The discussions were audio-recorded for data-analysis purposes using a digital recorder. The discussions lasted approximately 90 minutes for each group. All participants were provided food and beverages during the discussion and were compensated for their time and travel expenses.

#### Table 1. OHIP-14 Items

<table>
<thead>
<tr>
<th>During the last year, how often have the following occurred?</th>
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<tr>
<td>1. Functional limitation&lt;br&gt;Have you had trouble pronouncing any words because of problems with your teeth, mouth, or dentures? &lt;br&gt;Have you felt that your sense of taste has worsened because of problems with your teeth, mouth, or dentures?</td>
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<tr>
<td>2. Physical pain&lt;br&gt;Have you had painful aching in your mouth? &lt;br&gt;Have you found it uncomfortable to eat any foods because of problems with your teeth, mouth, or dentures?</td>
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<td>3. Psychological discomfort&lt;br&gt;Have you been self-conscious because of your teeth, mouth, or dentures? &lt;br&gt;Have you felt tense because of problems with your teeth, mouth, or dentures?</td>
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<tr>
<td>4. Physical disability&lt;br&gt;Has your diet been unsatisfactory because of problems with your teeth, mouth, or dentures? &lt;br&gt;Have you had to interrupt meals because of problems with your teeth, mouth, or dentures?</td>
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<tr>
<td>5. Psychological disability&lt;br&gt;Have you found it difficult to relax because of problems with your teeth, mouth, or dentures? &lt;br&gt;Have you been a bit embarrassed because of problems with your teeth, mouth, or dentures?</td>
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<td>6. Social disability&lt;br&gt;Have you been a bit irritable with other people because of problems with your teeth, mouth, or dentures? &lt;br&gt;Have you had difficulty doing your usual jobs because of problems with your teeth, mouth, or dentures?</td>
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<td>7. Handicap&lt;br&gt;Have you felt that life in general was less satisfying because of problems with your teeth, mouth, or dentures? &lt;br&gt;Have you been totally unable to function because of problems with your teeth, mouth, or dentures?</td>
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$0 =$ never, $1 =$ hardly ever, $2 =$ occasionally, $3 =$ fairly often, and $4 =$ very often.

http://endodontic.ws/
was completed, the content within each thematic code and subcode each type of treatment to a sufficient level of saturation. After coding
agreement. The transcripts were analyzed to identify common themes
vidual coded slightly less than 20% of the transcripts to compare
stance or research experience to the coding process. Coding of the tran-
approach using both inductive (eg, grounded theory) and a priori
ment were added to the coding scheme. As described by Bailey and
agreed-upon identified themes and subthemes, respectively. Further-
mutually resolved. Codes and subcodes were assigned for the mutually
any disagreements on the themes and subthemes were discussed and
were reviewed by two individuals to establish a thematic coding scheme;
all of the transcripts
an individual unaffiliated with the study. The resulting transcripts were
Digital recordings of the discussions were uploaded and transcribed by

The level of significance was set at alpha = .05.

Analysis of the discussion of the focus groups was transcript based.
Digital recordings of the discussions were uploaded and transcribed by
an individual unaffiliated with the study. The resulting transcripts were
reviewed for accuracy and analyzed for content. All of the transcripts
were reviewed by two individuals to establish a thematic coding scheme:
any disagreements on the themes and subthemes were discussed and
mutually resolved. Codes and subcodes were assigned for the mutually
agreed-upon identified themes and subthemes, respectively. Further-
more, other thematic categories that were identified during the coding
process were added to the coding scheme. As described by Bailey and
Jackson (26), analysis of the transcripts used a mixed-method
approach using both inductive (eg, grounded theory) and a priori
(eg, theory driven from the literature) procedures. This approach
was used because researchers' inevitability bring their prior theoretical
stance or research experience to the coding process. Coding of the tran-
scripts was performed by the principal investigator (DG). A second indi-
vidual coded slightly less than 20% of the transcripts to compare
agreement. The transcripts were analyzed to identify common themes
and subthemes within the discussion groups and compared with
each type of treatment to a sufficient level of saturation. After coding
was completed, the content within each thematic code and subcode

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Family/Peer Influence

Family or peers have a strong influence on what treatment patients elect to receive. Participants mentioned this as their reason to have certain treatments performed or how well they took care of their teeth at certain times in their lives. A few participants talked about family and friends who have lost their teeth and that they are “paying for it now.” This helped influence them to keep their teeth.

Oral Hygiene Prevention

Overall, most participants in both the implant and endodontic group seem to clean their teeth better and see the dentist more often for regular cleanings and checkups since the time of their treatment.

Financial Implications of Procedure/Cost of Treatment

The financial aspect and cost of dental treatments guides people in their treatment decisions. Most participants in both groups felt that the cost of their respective treatment was expensive. Many participants in both groups chose to come to the dental school for treatment because it was less expensive than outside the dental school. In the implant group, a few individuals commented on the fact that when they were younger and could not afford certain treatments, they just had teeth extracted. Later in life, finances still influence their treatment decisions, Most participants in both groups felt that the cost of their respective treatment was expensive. Many participants in both groups chose to come to the dental school for treatment because it was less expensive than outside the dental school. In the implant group, a few individuals commented on the fact that when they were younger and could not afford certain treatments, they just had teeth extracted. Later in life, finances still influence their treatment decisions, but they are more likely to do things like get implants because they can afford them now. The issue of cost came up as the rationale to protect the implant or clean it better, or led to the feeling that “they better hold on to it for a long time.” The endodontic group also weighed the financial aspect of treatment before deciding on getting endodontic treatment and keeping a tooth.

Insurance Coverage

Whether a treatment is covered by insurance or not plays a key role as to whether patients will get a certain dental treatment. Almost all participants that have dental insurance in the implant group stated that their insurance does not cover the cost of an implant. Participants in the endodontically treated group who had insurance stated that insurance covered most of the cost of their root canal and crown. Although many in the endodontically treated group thought treatment was expensive, those that had insurance said it really helped.

Additional Costs

Several participants from both groups mentioned that they were surprised about additional costs on top of the initial price quoted to them for their implant or root canal. Some endodontically treated participants stated that their insurance does not cover as much of the crown as the root canal. One individual stated, “The cost was a big thing when I got into it. The crown, even with insurance…I don’t think the root canal was that bad with our insurance but the crown portion

<table>
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<th>TABLE 3. Commonly Mentioned Remarks within the Endodontically Treated Root Canal Therapy (RCT) Group, Implant-treated Group, and within Both Groups</th>
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<td>-----------------------------------------------</td>
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<tr>
<td>Patient with preoperative pain are happy</td>
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<tr>
<td>with little or no pain during and after</td>
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<tr>
<td>treatment</td>
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<tr>
<td>Complain of having to open mouth a long</td>
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<td>time</td>
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<tr>
<td>Surprised of less pain with procedure than</td>
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<td>what they had heard from other people</td>
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<tr>
<td>The worst pain during treatment was</td>
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<tr>
<td>from the anesthetic injection</td>
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<tr>
<td>Follow-ups are short appointments</td>
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<tr>
<td>Peace of mind that infection is gone</td>
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<tr>
<td>Tooth feels &quot;numb&quot;; no sensitivity to hot</td>
</tr>
<tr>
<td>or cold</td>
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<tr>
<td>Satisfied overall with treatment</td>
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was just...the copay was a lot...and I only had one. I can’t imagine if you had a lot more than that.”

Perception of Treatment and Its Outcome

Keeping the Tooth/Implant. Most participants were very happy with the implant treatment and its outcome. Even participants that experienced minor problems during the procedure or after including pain were still pleased with the overall outcome.

In the endodontic group, keeping the tooth in question was a primary reason for most of the participants to get endodontic treatment as well as the reason for their satisfaction with the treatment. All participants were happy at the overall outcome of their treatment, even if there were mishaps along the way. It was not uncommon to get comments like, “I was delighted to have that opportunity to save the tooth.”

Physical Pain. Two participants within the implant discussion groups said they had pain after the implant placement, after crown placement, and still continue to have pain in the area although the implant is functional. It seemed as though the postoperative pain the participants described was more of a dull, nagging pain. Some participants described their pain as coming from the bone or jaw, and a couple of people stated that they had pain in the gingival tissue next to the implant. Some said they also noticed some numbness in certain areas of the mouth and face for some time after the procedure. A couple of individuals in the endodontic discussions also commented that they can still feel “sensation” or “sensitivity” at times but that it is not painful.

Physical Pain of Procedure. Although most individuals in the implant group agree that there is only minor pain during the procedure, an overwhelming number of participants stated that the worst pain of the whole procedure was the extraction of the tooth before implant placement. A few participants classified the pain during the procedure as more than mild, and a couple participants mentioned postoperative swelling. Some participants made comments about pain medications helping reduce their pain after the procedure.

Some participants in the endodontic treatment category stated having sensation during the procedure but no pain. Some stated having a little pain during or after the procedure, but they said it was manageable. One person even stated they were surprised at the “lack of pain” during the procedure. The issue came up that root canal treatment has somewhat of a bad rap, and participants stated that they always heard about the procedure, but they were still uncomfortable. A few participants commented that their jaw was sore or that it was hard to close after the procedure. Another concern that came up was that the crown took a couple of appointments after the endodontic treatment.

Length of Treatment

Open Mouth in Chair Process. Within the implant groups, there was a common complaint of how long it took to get everything completed, including the crown placement. Most participants recall at least a 3- to 6-month gap between the time of implant placement and receiving their crown. Those that had bone grafts done before the implant placement had to wait an extra 4 months after the bone graft to get the implant. Others said they had a tooth extracted and had to wait a few months for their site to be ready for an implant. For the actual length of the implant placement procedure, most felt it took a long time. Overall, the general consensus was that participants felt the overall process took a long time. However, it seems that patients are happier when they know what to expect beforehand.

For the endodontic groups, the most common complaint was the length of time they had to spend with their mouth open. One participant commented that “The only thing I think that I didn’t feel very comfortable about, you have to keep your mouth open for a while.” Some commented that if a bite block was used to help them stay open it did help, but they were still uncomfortable. A few participants commented that their jaw was sore or that it was hard to close after the procedure. Another concern that came up was that the crown took a couple of appointments after the endodontic treatment.

Time Since Treatment. The time since treatment in the implant group varied from 1 to 6 years. The time since treatment in the endodontic group varied from 1 to 3.5 years. Overall, the average time since treatment was longer in the implant group than in the endodontic group.

Esthetics. Many participants got their implants in order to improve the esthetics of their mouth and/or to keep other teeth from shifting or moving in their mouth. In some cases in which participants were missing a tooth or had a broken tooth in the site of the implant, they were happy to have a “tooth” again. One participant stated, “Well after going around with no tooth, you’re in a position where you can talk and smile again. It was wonderful.” Some also said that the implant and crown added some fullness to their face where they noticed a concavity where their tooth was missing. Other participants said that they open their mouth more, smile more, and feel more confident. Some participants were positively surprised how much their implants looked like their natural teeth.

The position of the implant in the mouth also seemed to dictate how satisfied patients were with the esthetics of their implant. Patients...
with posterior implants seemed less aware of esthetic changes compared with those who had implants placed in the anterior area. Also, in one case, the participant got a full gold crown because it was recommended by the restoring dentist, and he was not happy with how much it stood out. A few others commented on the fact that there is a dark area near the gum line that stands out when they look in the mirror and in pictures. A few participants also noted a concavity or recession of their gingiva around their implants.

All participants in the endodontic group either thought that the endodontic treatment either had no effect on their appearance or made it better. Some stated that considering the alternative of losing the tooth, it made a considerable effect on their appearance, no matter whether the tooth was in the anterior or posterior. Others thought that because their root canal was in the posterior, it had no effect on esthetics. One participant stated they were pleased the root canal could be done through their previous crown and that they did not have to remove it before their root canal was performed.

**Functionality**

**Eating/Drinking.** The functional aspect of implant placement is one of the most commented aspects of implant placement. In many cases, participants were happy that they could return function to the area of the mouth where the implant was placed. Many commented that their implant functioned like a real tooth. A few participants said they still chewed on the opposite side out of habit or because they are trying to protect the implant. A common complaint was that they get food stuck between the implant and the teeth next to it. A few participants mentioned not eating hard foods such as carrots or not biting directly into an apple because they were told to by their doctor who placed the implant, or they just wanted to protect it.

Many endodontic participants stated that they started using the tooth to eat again or started chewing on that side of their mouth again. Some stated the endodontic treatment had no effect on their eating and drinking.

**Psychological Discomfort.** Many individuals in the implant group mentioned trying to protect the implant or being more careful with it because of its cost or because they are afraid they might break it or lose it. Others mention that it feels different or looks different, but it might just be psychological. Some individuals who had bone grafting mentioned the fact that the bone was from a pig or cow. They did not like the thought of having animal or foreign material in them.

With any treatment, there is a psychological aspect to consider. Addressing this, one endodontic participant stated, “It’s really important for me to keep my teeth. It always has been. It’s kind of a combination of things, the psychological aspect; these are body parts of mine I’ve had my whole life. I’m kind of attached to them, and there’s the emotional side too. I wouldn’t want to lose a finger or a toe if I could help it.” Others commented that they feel more confident now that they saved their tooth and smile more. Some stated they were glad to have the infection or abscess gone.

**Physical Disability.** As mentioned earlier, there were participants in both groups who said they either protect their tooth or implant by trying to eat in other areas of their mouth or by eating slower.

**Cleaning/Maintenance.** Most participants in the implant group take better care of their teeth and get their teeth cleaned more often since their implant because they do not want to lose any more teeth. They also brush and floss around the implant more to keep food from getting caught or because they want to take good care of it. Some even mentioned using a toothpick or proxibrush to get between their implant and the teeth next to it. Others mentioned using an electric toothbrush now. A few mentioned that with their new crown, it is harder to floss between their teeth and that floss gets stuck there. Similar to the implant group, endodontic participants also have not changed their oral hygiene habits or they have improved them. Some say they floss more often, and a couple of people talked about the floss getting stuck between their new crown and the teeth next to it.

**Comparison to Other Teeth.** Some participants mentioned that their implant felt different than their other teeth. One example of this was, “It doesn’t feel real for me. I mean, like, I know which one it is. It operates the same way and it doesn’t bother me, but I don’t know, I can tell it’s not my tooth when I touch it.” A couple of people mentioned that it used to feel different to them, but over time they have gotten use to it and it feels more natural now. Those who were missing a tooth for a while before the implant was placed thought that the implant was kind of sticking out and pressing against their tongue and felt wider than normal. A few others mentioned that their implant feels very “strong” and feels like a natural tooth.

Most participants in the endodontic group agree that the tooth feels the same as their other teeth and does not feel any different. A couple of people think it feels stronger. A few people said they notice it sometimes; they do not have pain but rather sensation. Others said they no longer feel hot or cold in the tooth, but they like that.

**Permanency of Treatment.** Several participants in the implant group stated that they were afraid their crown may come off or that the implant may fail. Others were surprised to hear that their treatment may not be permanent and that problems could ensue in the future. Some just thought once they got it, it was permanent and nothing could happen. Similar to the implant group, the endodontic group seemed to not really know much about the permanency of treatment or how long the tooth would last in their mouth.

**Follow-up Dental Visits.** In the implant group, no follow-up visits for maintenance issues or problems were mentioned other than regularly scheduled follow-up visits and visits for crown placement. Similarly, most participants in the endodontic group said the follow-up visits consisted of getting the permanent restoration or crown and/or normal recall appointments. Some went to their normal recall visits, but some said they did not go to their scheduled recalls because they were not in pain.

**Discussion**

Endodontic therapy and single implant-based supported prosthesis are viable treatment options for compromised teeth. Both treatment modalities enjoy high clinical success rates and favorable long-term outcomes supported by evidence-based quantitative research (6, 17, 18). This study provides qualitative data showing a high rate of patient satisfaction with both treatment options. It is important to realize that implant therapy and endodontic therapy are two different treatment modalities with their own unique indications and contraindications; therefore, they should not be in competition with each other.

When analyzing the comments and concerns raised by the participants, we should weight them based on how their severity and duration will affect the quality of life of our patients. The most common themes raised by the participants were transient and had a short-term effect on their quality of life. For example, opening the mouth for a long period was a common concern for both groups. Although important, this concern will cause minimal or no effect on the patient’s quality of life. Moreover, because this study was conducted on patients attending the graduate student clinics, it may not be as much of a concern in the private sector where practitioners have more experience and may be more proficient during treatment than in a university-based setting.

The data presented in this study provide a very unique insight into our patients’ feelings and perceptions and should be considered by the
providers when evaluating different treatment options. In addition to the prognosis and outcomes, clinicians should consider patients’ perceptions and preferences as well as the influence each therapy may have on their quality of life, both short- and long-term. Overall, all the participants in this study were pleased with the treatment received and expressed a clear message to save their natural dentition whenever possible.

Acknowledgments

The authors deny any conflicts of interest related to this study.

References