Evidence-Based Patient Education: Knowledge Transfer to Endodontic Patients


Abstract: Evidence-based treatment is emphasized in oral health care, but there has been less focus on empirically demonstrating the effects of patient education. Attempts to educate patients must be empirically demonstrated in order to provide evidence-based guidance to practitioners and educators. We conducted two studies that assessed information acquisition during five-minute audiovisual films on oral hygiene procedures, endodontic procedures, and fear about pain during root canal therapy. A fifteen-item Dental Knowledge Questionnaire (DKQ), with three subscales each focusing on the content of one of the films, was developed and psychometrically evaluated. Study 1 included 268 undergraduates; study 2 involved 104 endodontic patients. Participants completed the DKQ, viewed one of the three films, and repeated the questionnaire. The effects of information on knowledge were assessed using 3 (film group) X 3 (subscale of the DKQ) X 2 (time) repeated measures ANOVAs. Scores improved in a content-specific fashion relevant to the film viewed among undergraduates, \( F(4, 263) = 211.33, p < .001, \) partial \( \eta^2 = .62 \) and endodontic patients, \( F(4, 99) = 87.22, p < .001, \) partial \( \eta^2 = .63 \). The results provide evidence for using brief informational film as an efficacious method to increase patient knowledge, at least in the short term. The DKQ is proposed as a tool to assess patient knowledge in the arenas of oral hygiene and endodontics.

Providing information to patients in oral health care settings can be helpful and can serve multiple functions if it is sensitively and appropriately presented, attended to, and processed by the patient, thus hopefully transforming it into patient knowledge. Information can assist patients in learning the importance of preventive health behaviors, in considering treatment options, and in deciding what interventions might be best and why. Also, information may increase knowledge about procedures and may reduce procedure-related distress, such as fear and anxiety. Providing oral health information to educate patients is important generally, but presenting information to patients with significant dental fear and anxiety, as well as high fear and anxiety associated with pain, may be crucial in clinical contexts so that treatment can be as comfortable as possible. In highly fearful and pain-sensitive groups, knowledge about what will occur during treatment may help to reduce anxiety and fear, so treatment can be received with minimal distress, particularly when patient characteristics are matched with the type of intervention. Therefore, widespread efforts have been made to find effective methods of conveying medical and oral health information to patients, as well as towards training providers about the best clinical practices based on those research efforts.

In clinical practice, information and education about treatment often come verbally, directly from the service provider or ancillary personnel, or may be presented in written form (e.g., brochures) or audiovisually (e.g., film in the form of DVDs). It is not common clinical practice, however, to use a standardized process of information provision or...
to systematically assess patient knowledge before or after such information is given. Furthermore, education about a health care procedure is not always designed to specifically increase knowledge about the procedure as much as it is designed to change expectations of outcome. For example, information on film can increase the accuracy of general expectations and “impressions of the recovery period” following an invasive health care procedure (p. 429). McGregor found that film-based information about prostate cancer helped improve patients’ general understanding of the disease. Other studies evaluating school-based interventions to increase knowledge, education about cardiovascular disease risks, and preparation of cancer patients and families for chemotherapy also have assessed knowledge after informational interventions. In a recent study, Wakimizu et al. found that giving pediatric patients and their families a videotape to take home and view along with an auxiliary informational booklet about herniorrhaphy surgery increased knowledge and decreased anxiety about the procedure. Nevertheless, a primary issue of concern is the psychometric properties of measures used to test for knowledge increase, as well as whether such measures are standardized and validated. Assessment devices constructed solely for a particular study that are not psychometrically tested yield little convincing evidence that the device is a valid measure of patient knowledge and therefore limits the extent to which results can be interpreted.

Use of an instrument with known psychometric properties, however, is an exception to the rule in clinical studies attempting to increase patient knowledge. Investigators more often than not fall short of either evaluating the efficacy in which selected methods of providing information actually increase knowledge or do not use a validated measure. A notable exception, however, is a study by Humphris et al. in which the use of oral cancer leaflets in primary care settings increased knowledge among patients who read the leaflets compared to those who did not. A compelling methodological detail is the inclusion of a previously validated measure of oral cancer knowledge.

The problem of appropriate psychometrics in assessment instruments is an extremely important contemporary issue in educating dental patients. Indeed, the impetus for evidence-based assessment and treatment has spread throughout oral health care to ensure high standards of practice. The clinical needs of each patient are best met by utilizing methods, including patient education, that have been empirically tested and are supported by research. Goldstein discusses five important guidelines and principles of evidence-based dentistry and how they can be applied to practice: a) generate an answerable question, b) accumulate best evidence, c) evaluate the evidence, d) apply results of evidence to patients, and e) evaluate the outcome. Examples of research are available in which these guidelines for evidence-based practice have been practiced in dentistry and in general medical areas. Informing and otherwise educating dental patients should consistently be in line with the standards outlined by Goldstein. It is with this rationale that the current studies were conducted.

The two studies we conducted were designed to evaluate the effects of providing audiovisual information on endodontic knowledge, with oral hygiene knowledge as a control. The objectives of Study 1 were a) to develop a fifteen-item Dental Knowledge Questionnaire (DKQ) designed to measure knowledge of proper oral hygiene techniques, root canal procedures, and fear about potential pain during root canal therapy; b) to develop a five-minute film to help educate and dispel fear and other concerns about endodontic treatment; and c) to measure knowledge among college students before and after viewing this film and two other comparison films (i.e., oral hygiene instruction and endodontic procedures). This study was part of a larger study of psychological responding to pain during root canal therapy. Study 2 extended the investigation to a clinical sample of endodontic patients to measure knowledge before and after viewing the same three films used in Study 1. The second study also was part of a larger study of psychological responding to pain during root canal therapy as well as a study that examined cortisol reactivity associated with fear and pain during root canal therapy. Endodontic patients were selected as a target group due to the high degree of fear and anxiety frequently associated with the procedure. Undergraduate students were utilized in the first study, however, to develop and test materials and procedures prior to translation to a clinical population.

We hypothesized that a) the DKQ would be psychometrically sound and would be sensitive to change in knowledge resulting from viewing one of the three films; b) each of the three films would be equally as effective at increasing knowledge pertinent to its respective domain of the DKQ; and c) scores on DKQ subscales would increase in a content-specific
fashion such that improvement would be evident only on the subscale related to information covered in the film that participants viewed. Approval for both studies first was obtained from the West Virginia University Institutional Review Board, and all participants consented to participation.

Methods: Study 1

Audiovisual Films

A five-minute film titled “Taking Care of Your Teeth and Gums” describes oral hygiene information about proper tooth brushing and flossing techniques. Specifically highlighted are the proper angle to hold a toothbrush, the amount of dental floss to use, and how long one’s gums may be sore after flossing. To our knowledge, its efficacy in imparting knowledge has not been empirically tested prior to this study.

Entitled “Root Canal,” the second film—also five minutes in duration—describes procedural aspects of root canal therapy. Information presented includes why root canal therapy is performed, how pulp is removed from the pulp chamber, the approximate number of appointments required for treatment, and the percentage of successful root canal procedures. To our knowledge, this film also requires empirical demonstration of its efficacy to impart knowledge.

Also five minutes in duration, the third film is titled “Reducing Fear about Pain in Root Canal Therapy.” We developed this film for these studies to match the two films described above both in style and professional presentation, contrasting only in the type of information provided. As shown in Table 1, content analyses were performed on the two other films to determine the total running time, number of computer animations, and total time of animations. Information presented includes possible sensations experienced during administration of anesthesia, length of time for anesthesia to take effect, when the most discomfort typically is experienced in root canal therapy, where numbness occurs following the administration of anesthesia, and other sensations that may be experienced during root canal therapy.

Knowledge Questionnaire

The Dental Knowledge Questionnaire (DKQ) was developed to assess short-term changes in dental knowledge resulting from the educational films described above. It was designed to determine the degree of participants’ knowledge and to assess the amount of knowledge increase from the informational films.

Table 1. Content analysis of the three films in this study

<table>
<thead>
<tr>
<th>Film Subject</th>
<th>Major Points</th>
<th>Total Running Time</th>
<th>Total # of Animation Scenes</th>
<th>Total # of Words Spoken by Narrator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral Hygiene</td>
<td>1. Proper angle to hold toothbrush</td>
<td>4m 08s</td>
<td>5 (1m 6s)</td>
<td>625</td>
</tr>
<tr>
<td></td>
<td>2. Final step when brushing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. How long gums will be sore once flossing begins</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Length of dental floss that should be used</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Frequency of replacing toothbrush</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Root Canal Procedure</td>
<td>1. Rate of success for root canal therapy</td>
<td>4m 33s</td>
<td>3 (1m 40s)</td>
<td>765</td>
</tr>
<tr>
<td></td>
<td>2. Reasons for root canal therapy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Total length of root canal treatment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Description of pulp</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Follow-up adherence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear of Endodontic Pain</td>
<td>1. Sensations during injections</td>
<td>5m 00s</td>
<td>3 (1m 36s)</td>
<td>662</td>
</tr>
<tr>
<td></td>
<td>2. Latency of anesthesia effects</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. When discomfort typically is experienced</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4. Where numbness occurs after injections</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5. Sensations during pulp removal</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A two-phase empirical test construction approach was used to develop the DKQ. First, content analyses were performed on the three films, and a transcript was developed for each, along with a description of each scene in the film. From the transcriptions, fifteen items were generated based on the information presented in each film (forty-five total items). The second phase of test construction involved the critique of each item by twenty-five independent reviewers. Those who reviewed the items were persons with education levels ranging from high school through postdoctoral training and from a broad range of professions, including office management, computer technical support, clinical psychology, general dentistry, and endodontics. Reviewers were sent the questionnaire items via electronic mail, answered the questions, made comments about wording, response options, and format, and returned the questionnaire. They did not view the five-minute films prior to reviewing the questionnaire. Following three cycles of wording and response option changes (i.e., feedback from reviewers and discussion among authors), fifteen of the original forty-five items were selected for retention and slightly modified if necessary based on the reviewers’ comments, resulting in the final version.

The questionnaire assesses dental knowledge across the three domains that correspond to the films: oral hygiene, root canal procedures, and fear about endodontic treatment. For each of these three domains, there are five multiple-choice items, each with four possible answers, only one of which is correct.

### Participants and Procedure

Undergraduate students were approached at either the beginning or the end of psychology classes and informed about the study, told that declining participation would not affect their status in the class, informed that they would receive extra credit in their course if they participated (other forms of extra credit also were available through the course instructor), asked if they wished to participate, and included if they agreed to take part. Approximately 290 students were approached and asked to participate in a total of seven classes. Between zero and four students declined to participate per class. Ultimately, a total of 268 undergraduate students (153 females and 115 males) agreed to participate. See Table 2 for additional demographic information.

All seven classes were shown one of the three films; the film to be shown was randomly assigned prior to entering the class. Before watching the film, participants completed a brief demographic questionnaire and a pre-test of the DKQ. Next, participants viewed their assigned film in a group format with a large projection screen television at the front of the classroom. There were seventy-seven students who viewed the oral hygiene film, ninety students who watched the root canal procedure film, and 101 students who saw the film about fears about endodontic pain. Students were not permitted to discuss the questions from the DKQ, the film, or possible answers to questions on the DKQ before they completed the DKQ for a second time, as a post-test, immediately after watching the film. Afterwards, students were told about the nature of the study, given course extra credit, and thanked for their involvement.

### Results: Study 1

In assessing psychometric properties of the DKQ, including its subscales and items, item-total correlations were calculated for each item in relation to the three subscale scores, both for the pre-test and post-test. As shown in Table 3, all items correlated positively and significantly with their corresponding subscale score. Additionally, an item difficulty index was calculated, which is a ratio of the number

### Table 2. Demographic summary for participants in Study 1, by number and percentage of total respondents (N=268)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Percentage (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>57% (153)</td>
</tr>
<tr>
<td>Male</td>
<td>43% (115)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>Mean [SD]</td>
<td>19.9 [3.9]</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>92% (246)</td>
</tr>
<tr>
<td>African American</td>
<td>2% (6)</td>
</tr>
<tr>
<td>Asian American</td>
<td>2% (5)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1% (2)</td>
</tr>
<tr>
<td>Other</td>
<td>3% (9)</td>
</tr>
<tr>
<td>Prior History of Root Canal</td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>9% (23)</td>
</tr>
</tbody>
</table>
of respondents who answered the item correctly to the total number of respondents, for both the pre-test and post-test. On the post-test, between 32 percent and 78 percent of the respondents answered each item correctly.

Mean pre-film and post-film subscale scores, specific to the film seen by each film group, are as follows: Oral Hygiene Film Group (pre-score=2.2, SD=1.0; post-score=4.7, SD=0.6); Root Canal Procedure Film Group (pre-score=2.0, SD=1.1; post-score=4.2, SD=1.0); and Fear of Endodontic Pain Film Group (pre-score=2.1, SD=1.2; post-score=4.5, SD=0.7). The effects of information on dental knowledge across time were assessed by conducting a 3 (film group) X 3 (DKQ subscale) X 2 (time) repeated measures analysis of variance (ANOVA); Tukey’s Honestly Significant Different (HSD) tests at the .05 level followed significant effects, as appropriate. A significant three-way interaction was found among film groups, DKQ subscales, and time, \( F(4, 263)=211.33, p<.001, \text{ partial } \eta^2=.62 \). There also was a significant film group by DKQ subscale interaction, \( F(4, 263)=77.89, p<.001, \text{ partial } \eta^2=.37 \); however, there was no film group by time interaction, \( F(2, 265)=.79, p=.45, \text{ partial } \eta^2=.01 \), nor a DKQ subscale by time interaction, \( F(2, 265)=.13, p=.87, \text{ partial } \eta^2=.00 \). There was a significant main effect of film group, \( F(2, 265)=5.59, p<.01, \text{ partial } \eta^2=.04 \). There was not a significant main effect of DKQ subscale, \( F(2, 265)=1.62, p=.18, \text{ partial } \eta^2=.01 \); however, there was a main effect of time, \( F(1, 266)=388.81, p<.01, \text{ partial } \eta^2=.60 \). Tukey’s HSD analyses at the .05 level confirmed significant within-subject effects, as illustrated in Figure 1.

**Discussion: Study 1**

The results of Study 1 indicate all films were effective media in providing dental-related information and increasing knowledge in the short term as measured by the DKQ for a sample of undergraduate students, but only in the domain in which the film provided information. Furthermore, the DKQ was

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### Table 3. Dental Knowledge Questionnaire psychometric information for participants in Study 1 for the pre-test and post-test

<table>
<thead>
<tr>
<th>Item</th>
<th>Oral Hygiene Information Subscale</th>
<th>Root Canal Procedure Subscale</th>
<th>Fear of Endodontic Pain Subscale</th>
<th>Item Difficulty Index</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Item-Total Correlations with Subscale Scores</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>.50**/.59**</td>
<td>-.09/-13*</td>
<td>.07/-11*</td>
<td>58.6/73.1</td>
</tr>
<tr>
<td>6</td>
<td>.48**/.55**</td>
<td>.09/-15*</td>
<td>.07/03</td>
<td>71.3/77.6</td>
</tr>
<tr>
<td>8</td>
<td>.44**/.70**</td>
<td>-.20**/-20**</td>
<td>-.01/-22</td>
<td>34.0/50.0</td>
</tr>
<tr>
<td>10</td>
<td>.40**/.75**</td>
<td>.09/-23**</td>
<td>.09/-23**</td>
<td>23.1/39.6</td>
</tr>
<tr>
<td>14</td>
<td>.45**/.64**</td>
<td>.003/-12</td>
<td>.06/-07</td>
<td>35.4/47.8</td>
</tr>
<tr>
<td>2</td>
<td>-.01/-13*</td>
<td>.46**/.67**</td>
<td>.02/-26**</td>
<td>28.0/32.8</td>
</tr>
<tr>
<td>3</td>
<td>-.004/-14*</td>
<td>.47**/.66**</td>
<td>.05/-26**</td>
<td>32.5/48.9</td>
</tr>
<tr>
<td>7</td>
<td>-.03/-04</td>
<td>.48**/.69**</td>
<td>-.01/-44**</td>
<td>35.1/48.9</td>
</tr>
<tr>
<td>11</td>
<td>-.02/-15*</td>
<td>.50**/.44**</td>
<td>.14/-09</td>
<td>59.3/76.9</td>
</tr>
<tr>
<td>15</td>
<td>-.06/-35**</td>
<td>.48**/.51**</td>
<td>.01/-07</td>
<td>55.2/78.7</td>
</tr>
<tr>
<td>4</td>
<td>.07/-15*</td>
<td>.15/-02</td>
<td>.57**/.54**</td>
<td>62.7/77.2</td>
</tr>
<tr>
<td>5</td>
<td>.13**/-14*</td>
<td>-.05/-17**</td>
<td>.41**/.64**</td>
<td>48.5/65.3</td>
</tr>
<tr>
<td>9</td>
<td>.10/-14*</td>
<td>.08/-25**</td>
<td>.55**/.64**</td>
<td>33.6/62.7</td>
</tr>
<tr>
<td>12</td>
<td>.03/00</td>
<td>.05/-18**</td>
<td>.48**/.55**</td>
<td>44.0/47.0</td>
</tr>
<tr>
<td>13</td>
<td>-.02/-19**</td>
<td>-.03/-29**</td>
<td>.48**/.76**</td>
<td>21.3/48.9</td>
</tr>
</tbody>
</table>

*p<.05; **p<.01.

Note: N=268. Items are grouped according to the subscale to which they belong. Values to the left of the slash are for the pre-test; those to the right of the slash are for the post-test.
consistent with the population demographics of the clinic (SD from the private clinic were older than patients from the university-based clinic, (1, 103)=6.35, p=0.01, indicating that patients from the private clinic were older (M=47.1 years; SD=14.5) than patients from the university-based clinic (M=39.4 years; SD=15.3). This difference is consistent with the population demographics of the communities in which the two offices are located. The university-based clinic, while serving a broad range of individuals including those from rural areas, is utilized somewhat more by college students, faculty, and staff, who are likely to be younger than the population at large, given their student or employment status. There were no differences between participants at the two clinics in terms of gender distribution, education, ethnicity distribution, or history of root canal therapy. Additional patient sociodemographic information is presented in Table 4.

A total of 143 patients were approached in the clinics prior to root canal treatment to determine their willingness to participate. Of the 104 patients who agreed, eighty-three were scheduled patients and twenty-one were emergency patients. There were fourteen patients from the private clinic and twenty-five from the university-based clinic who declined participation. Patients were told that their involvement would not affect their treatment, that they could learn about clinical research, and that they would receive $10.00 for their time in the study.

After patients agreed to hear more about the investigation, the purposes of the study were fully explained and informed consent was obtained. Measures and film were identical to those used in Study 1. Patients first completed a brief demographic questionnaire and a pre-test of the DKQ. They were randomly assigned to view one of the three films, then individually viewed it on a 9 in (or 23.9 cm) screen TV/VCR unit in a private room, and immediately completed the DKQ again as a post-test. Patients were not permitted to discuss the film or questionnaire with anyone before or after viewing the film. Next, patients received treatment, were debriefed afterwards, given payment for their participation, and thanked for their involvement.

Results: Study 2

For Study 2, mean pre-film and post-film subscale scores, specific to the film seen by each group, are as follows: Oral Hygiene Film Group (pre-score=1.94, SD=1.0; post-score=4.2, SD=0.9); Root Canal Procedure Film Group (pre-score=2.7, SD=1.1; post-score=4.5, SD=0.6); and Fear of Endodontic Pain Film Group (pre-score=2.2, SD=1.1; post-score=4.7, SD=0.6). As in Study 1, dental knowledge across time was assessed using 3 (film group) X 2 (DKQ subscale) X 2 (time) repeated measures ANOVAs; Tukey’s HSD tests at the .05 level followed significan-
Figure 1. Mean scores (standard deviations) on DKQ subscales among 268 undergraduate students in Study 1

Note: N=268. Superscripts indicate significant differences, p<.05 (a=no significant difference among subscale score means with the same superscript, and b=no significant difference among subscale score means with the same superscript; subscale score means with superscript a are significantly different from subscale score means with superscript b). Means and (standard deviation) scores are displayed above or within each bar.
cant effects as appropriate. A significant three-way interaction was revealed among film groups, DKQ subscales, and time, $F(4, 99)=87.22, p<.001$, partial $\eta^2=.63$. There was a significant film group by DKQ subscale interaction, $F(4, 99)=27.32, p<.001$, partial $\eta^2=.35$. There was neither a significant film group by time interaction, $F(2, 101)=1.57, p=.21$, partial $\eta^2=.03$, nor a DKQ subscale by time interaction, $F(2, 101)=.89, p=.37$, partial $\eta^2=.02$. There was no main effect of film group, $F(2, 101)=.79, p>.45$, partial $\eta^2=.02$. There was, however, a main effects of scale, $F(2, 101)=11.24, p<.001$, partial $\eta^2=.18$, and time, $F(1, 102)=166.96, p<.001$, partial $\eta^2=.62$. Tukey's HSD analyses at the .05 level confirmed significant within-subject effects, as shown in Figure 2.

Discussion: Study 2

These results are virtually identical to those in Study 1. The findings confirm the efficacy of these oral health informational films to increase knowledge in the short term in a clinical endodontic sample and have these changes in knowledge captured by the DKQ. The increase in knowledge in root canal therapy patients immediately prior to endodontic therapy is noteworthy given the negative impact of fear and anxiety on treatment among endodontic patients, as well as the role that pain-related concerns have on dental fear and the potential that information type has on these factors. Information presented in a way that increases knowledge about pain control during root canal therapy may help to increase patients’ comfort with treatment and increase the accuracy of their expectations about discomfort. Such films may help enhance treatment acceptability as patients decide among different options (e.g., root canal therapy versus extraction) that are presented to them by their oral health practitioners. Future research, however, is needed to test whether increases in knowledge are associated with control of anxiety and fear, with which types of patients, and in what oral health situations.

It can be argued that the knowledge changes measured in Study 2 likely are only short-term ones and not long-lasting; without further strengthening, such information may be forgotten. For potential endodontic patients, however, readily accessible knowledge may be most critical in the short term, during the time when they are making decisions about treatment options. Such decisions typically are made close in time to diagnosis and recommendation for treatment. Consequently, it may be most important to educate (or re-educate) potential endodontic patients close in time to their treatment decision.
Figure 2. Mean scores (standard deviations) on DKQ subscales among 104 endodontic patients in Study 2

Note: N=104. Superscripts indicate significant differences, p<.05 (a=no significant difference among subscale score means with the same superscript, and b=no significant difference among subscale score means with the same superscript; subscale score means with superscript a are significantly different from subscale score means with superscript b). Means and (standard deviation) scores are displayed above or within each bar.
General Discussion and Clinical Implications

The present findings support the use of these films as media to provide information and increase short-term dental knowledge; data from both Study 1 and 2 support the use of the DKQ as an effective method of measuring knowledge change with these films. The DKQ also appears to be a psychometrically sound tool for assessing oral health knowledge among patients and other lay people in the areas of endodontics and oral hygiene.

The importance of preparing patients for health care procedures is well established. Different modalities have been effective at providing patients with information about treatment and expectations after treatment, including booklets, leaflets, and a combination of booklets and videotapes, as well as, to some degree, films. It is uncommon, however, that studies report results on knowledge before and after receiving information in studies of oral health education. It is equally uncommon for studies to use validated measures of knowledge. Such methodological limitations prevent conclusiveness and generalization of results. Merely providing written materials or asking a patient to sit and view films does not ensure that presented information will translate into knowledge.

There are a myriad of possible impediments, including patients’ level of attention, comprehension of the information, decay of information or forgetting, or the patient being distracted by fear, anxiety, or pain, among other potential factors. In some cases, insensitively presented facts or certain kinds of information actually may heighten anxiety and fear. High levels of anxiety or fear associated with the clinical experience have effects on memory and future expectations of procedures. Later, anxious patients recall the dental experience as much more aversive than their actual experience during the procedure. Information presented in a way that increases knowledge about pain control during root canal therapy may have the potential to increase patients’ comfort with treatment and increase the accuracy of their expectations about discomfort. Such films may help enhance treatment acceptability as patients decide among different options (e.g., root canal therapy versus extraction) that are presented to them by their oral health practitioners.

Another impediment to information transfer to knowledge is found in the literature on patients’ desire for and experience of (“felt”) control in dental settings. A mismatch between the amount of information provided and the amount received may be distressing to the patient. Miller’s conceptualization of “monitoring” and “blunting” coping styles, with more information desired by the former style and less by the latter, is consistent with these ideas. Krohne proposes two processes to be central to coping: cognitive avoidance and vigilance. Avoidant copers are characterized by turning away from threat cues to minimize emotional distress, whereas vigilant copers are those who are particularly troubled by unexpected aspects of a situation and therefore oriented towards information that increases predictability. Matching control and predictability variables in dental settings with the type of coping style or cognitive coping preferred by an individual seems to be an important clinical consideration. Matching coping style with the appropriate type of strategy has been discussed previously among patients with various types of anxiety, as well as among patients with dental anxiety and fear specifically. It should be noted, of course, that there are minimum amounts of information that must be provided for ethical and legal reasons, as part of the consent for oral health care.

Results from Study 1 are consistent with previous research that examines the effects of health information provision on knowledge among different populations. Study 1 extends previous research by showing that dental knowledge was increased among undergraduate students after watching one of three five-minute dental films. Study 2 replicated this finding with root canal patients. Thus, appropriately constructed films can be an effective method of providing dental patients with information to increase knowledge, which is important given evidence that suggests, in certain contexts, information presented in film format leads to greater memory retention than information presented in audio or print format, especially for older adults.

While there is some evidence that supports the use of multiple forms of information over several days to increase knowledge and improve treatment experiences among patients, this strategy does not seem to be practical for some endodontic procedures. From a clinical standpoint, it seems more feasible for practitioners to increase patient knowledge about dental procedures while they await services. Having films available to play on television monitors, for example, is one way to efficiently expose patients to this information. Another method clinicians could use would be to identify specific patients awaiting
As stated above, important guidelines have been developed to help practitioners in evidence-based dentistry.53 We believe that the studies presented follow the suggested guidelines. An answerable question was generated (“Do carefully constructed informational films increase dental knowledge?”); evidence to answer this question was accumulated and evaluated in an undergraduate population. Data then were collected with a clinical population, and results were extended to that group of endodontic patients; the outcomes of both studies were integrated to determine how clinical practitioners might benefit from these results and apply new strategies towards their treatment of patients.

These two studies provide an evidence basis for the delivery of certain kinds of information to educate dental patients, so as to better prepare them to participate in treatment decisions and to have them more informed while experiencing those procedures. Data from the present studies extend findings from previous research to another mode of learning information (i.e., films) and another health care population (i.e., endodontic patients) and, most importantly, to demonstrated gains in knowledge after viewing educational films. Anecdotally, it already is assumed that knowledge changes measured in Study 2 likely are only short-term ones and not long-lasting; without further strengthening, such information may be forgotten. For potential endodontic patients, however, readily accessible knowledge may be most critical in the short term, during the time when they are making decisions about treatment options. Such decisions typically are made close in time to diagnosis and recommendation for treatment. Consequently, it may be most important to educate (or re-educate) potential endodontic patients close in time to their treatment decision. A final limitation is that there was no naive control group used in either Study 1 or 2 that completed the DKQ after watching a five-minute film unrelated to dentistry. Using a control group that views a film on an irrelevant topic would strengthen findings in future research. This method also would fit well with additional psychometric information that is needed on the DKQ, particularly that regarding reliability. Use of a naive control group and no film or an unrelated film would allow for the assessment of test-retest reliability. Another recommendation for future research would be to utilize the reducing fear in endodontic film with patients who are in the process of deciding about whether to pursue root canal therapy.

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that films are an efficacious means of conveying information to patients; however, these two studies provide an important evidence basis.

In sum, this investigation lends support to previous assumptions that providing dental information can increase patient knowledge. Given the importance placed on empirically supported interventions within dentistry, these studies provide data to empirically support certain educational activities with dental patients. Future studies also should provide empirical evidence for the use of other patient materials that may enhance treatment. In doing so, both researchers and clinicians can be more confident that the methods used for clinical outcome research and treatment are valid and reliable means for improving patient experiences in dentistry. Consequently, the overall well-being of patients’ oral health and their satisfaction with treatment will be maximally enhanced.

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