

# The Effects of Teaching Dental Students Brief Motivational Interviewing for Smoking-Cessation Counseling: A Pilot Study

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*Abstract:* The purpose of this research was to explore the changes that occurred in dental students' counseling techniques as a result of training in Brief Motivational Interviewing (BMI). A randomized pretest, posttest design was used with eleven students in each group. Baseline and posttraining measures of students' counseling techniques and the characteristics of the counseling session with standardized patients were made. The measures were: student behavior from videotapes, patient involvement in the treatment, establishment of good doctor-patient rapport, perceived efficacy in promoting patient change, and student confidence and interest in the task. MANOVA found significant differences between the trained and the untrained groups ( $F=4.019$ ,  $p=0.018$ ). Training resulted in sessions in which students used more BMI techniques and patients were more actively involved. No changes were seen in the other variables. Future studies must examine whether more experience will improve the students' ability to use BMI to enhance patient rapport, to increase their sense of competence and interest in doing counseling, and to determine the effectiveness of the counseling to encourage patient smoking cessation.

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Many oral diseases have significant behavioral risk factors. It is therefore important for dentists to be trained in counseling skills to help patients change their oral health behaviors. Dental schools recognize that students need training in patient education and counseling.<sup>1</sup> Important research has occurred showing that dental students and medical students can be effectively trained in communication and history-taking skills, often with the use of standardized patients.<sup>2-8</sup> Although several investigations have addressed the effect of training dentists and dental hygienists in smoking cessation on their attitudes and effectiveness in implementing smoking cessation in practice,<sup>9-12</sup> very few studies have looked at how training in counseling skills can change dentists' behavior (an exception is Tay et al.<sup>13</sup>).

Patient health behavior is one important factor in the pathogenesis of several oral diseases. Among these are oral cancer, which is strongly linked to tobacco and excessive alcohol use<sup>14</sup>; dental caries, which is related to use of fluoride and at least somewhat related to dietary habits<sup>15,16</sup>; and periodontal

diseases, which are related to compliance with recall and maintenance therapy and oral hygiene behavior.<sup>17</sup> Chronic pain may also be manifested orally; its management is related to patient coping skills.<sup>18</sup> Patient compliance with recommended treatment can be a significant oral health behavior issue as well. For example, Wilson et al. found that only 16 percent of 961 patients complied with recommended maintenance schedules, while erratic compliance was found in 49 percent, and 34 percent of patients never reported for any periodontal maintenance therapy.<sup>19</sup>

In order for dentists and dental students to help their patients change, a counseling paradigm is needed that fits within the frame of a dental appointment and is teachable within a school or continuing education setting. Brief Motivational Interviewing offers such a paradigm.

Motivational Interviewing and its derivative, Brief Motivational Interviewing (BMI), are patient-centered approaches that begin with the patient's goals and encourage the patient to choose ways to reach those goals. It can be used with adults, adolescents, or the parents of young children. The practi-

tioner facilitates change by establishing rapport with the patient, providing a structure to the interview (“setting the agenda”), assessing the importance of issues to the patient, and assessing the confidence a patient has in being able to change. The practitioner then encourages the patient to choose a behavior or behaviors that he or she feels able to do and encourages the patient to actively evaluate the consequences, good and bad, of that behavior. The process is driven by the patient’s goals and values. It uses only a minimum of patient education and avoids scolding, warning, or exhorting the patient to change. Instead, the dentist discovers and uses discrepancies that the patient identifies between his or her current behavior and his or her desired goals. The dentist then assists the patient in identifying ways to move toward the desired goals.

BMI was developed from Motivational Interviewing, a model developed in the addictions treatment field,<sup>20</sup> which in turn was developed from the stages of change model<sup>21</sup> and patient-centered consultation models.<sup>22</sup> “Brief” Motivational Interviewing is designed for health care practitioners who have five to ten minutes to intervene with a patient. The patient-centered aspect of BMI emphasizes the importance of maximizing “the individual’s freedom to talk and to think about change in an atmosphere free of coercion and the provision of premature solutions.”<sup>23</sup> As described by Rollnick et al., the practitioner has two main tasks during the consultation process: first, to exchange information (during which the dentist learns about the patient’s attitudes and motivations, as well providing information), and second, to reduce resistance in the patient.<sup>23</sup> The effectiveness of Motivational Interviewing has been demonstrated in alcohol addiction,<sup>24-26</sup> diabetes,<sup>27</sup> diet control,<sup>28,29</sup> smoking-cessation,<sup>30-34</sup> and treatment of chronic pain.<sup>18</sup> Others have documented programs to train physicians,<sup>35</sup> medical students,<sup>36</sup> a diabetic treatment team,<sup>37</sup> and social work students<sup>38</sup> in motivational interviewing.

We conducted a pilot study to explore training dental students to use motivational interviewing in counseling standardized patients to stop smoking. The principal objective of the study was to determine whether training in brief motivational interviewing would alter the way in which dental students interacted with patients in a simulated tobacco counseling session, alter a standardized patient’s evaluation of the dental student, and alter important characteristics of the counseling session. A secondary objective was to explore the process of teaching

a counseling skill to dental students in order to develop an effective training method.

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## Methods

Twenty-two dental students volunteered as subjects from the junior and senior classes of a midwestern dental school. The limiting factor for the sample size was the number of students who volunteered. All subjects were paid for their time. The study was approved by the Institutional Review Board. No subjects dropped out during the study.

Prior to this study, all students had attended a two-to-three-hour seminar on the oral health effects of tobacco use and the principles of smoking cessation counseling given by one of the authors as part of the dental school curriculum. This seminar included information on the oral health effects of tobacco use and smoking cessation, and was based on a program developed by the Public Health Service, U.S. Department of Health and Human Services.<sup>39</sup> This program did not contain any information on BMI.

An experimental pretest, posttest design was used. The twenty-two dental students were randomly assigned to a Control Group or an Experimental Group. Students conducted smoking-cessation counseling sessions at baseline with standardized patients. Standardized patients are actors who have been trained to play a particular role with students for training purposes. They are used extensively in research and training<sup>2-6</sup> due to their ability to evaluate the student from the perspective of the patient and because they provide a standardized experience for each student.

For this study, two women were recruited from the Health Center pool of standardized patients to play the roles of the patients. The Experimental Group received training in BMI in three sessions over a one-month period. Both groups of students then conducted a second smoking-cessation counseling session with a different standardized patient.

The dental students were given a written description of the “patient’s” background and the clinical findings. Both standardized patients played the role of the same patient. With no further instruction, the dental students were asked to spend five to ten minutes counseling the patient to quit smoking. Each session was videotaped. The dental students and the standardized patients filled out questionnaires rating various aspects of each session. The standardized patients were blind to whether the dental students had been trained, but were aware that some

students had received extra training and others had not.

In this study, the baseline interview was conducted with the two standardized patients playing the role of a fifty-year-old woman who was one year past her first heart attack and suffered from moderate periodontitis. At the second and final session, the standardized patients were given a new role, that of a thirty-five-year-old female divorcee with discolored teeth and periodontitis.

Unfortunately, due to scheduling problems, students in each group were not assigned equally to the two actors. At Baseline, three of eleven students in the Control group saw Actor One playing Role One, and eight of the eleven students in the Treatment group saw Actor Two playing Role One. At the post-treatment session, students were given the actor they had not seen before, so the distribution was reversed. Both actors then played Role Two. Thus, bias could have been introduced if the actors rated the sessions differently.

All twenty-two students had been previously taught the U.S. Department of Health and Human Services' five-point method of smoking-cessation intervention<sup>39</sup> as part of the regular dental school curriculum in the third year. In addition, the Experimental Group received twelve hours of BMI training, while the Control Group received no training. The training of the Experimental Group was provided by a licensed clinical psychologist who was certified to teach Motivational Interviewing (MI) by the Motivational Interviewing Network of Trainers<sup>40</sup> and had experience training nurses and physicians in the method. Training consisted of three sessions of four hours each, occurring at one-week intervals. Figure 1 contains an outline of the BMI training provided.

High patient involvement in the session, use of specific MI techniques, high proportion of patient talk compared to doctor talk, and good doctor-patient rapport have been identified in the Motivational Interviewing literature as goals of MI counseling.<sup>23</sup> The use of standardized patients precluded the ability to determine if patient change occurred after counseling, although this is another claimed advantage of MI counseling. In addition, we wished to determine if the students became more confident and interested in smoking-cessation counseling as a result of the training.

Five domains of outcome measures were chosen. First, specific behaviors that are part of the BMI method were measured. Second, the standardized patient's level of involvement during the session was

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- I. Session One—Four Hours
    - A. Basic Principles of Motivational Interviewing
      - 1. Stages of change
      - 2. Principles of good practice
        - a. Respect the patient's position
        - b. Exchange of information
        - c. Assess readiness to change
        - d. Attend to resistance
      - 3. Risky assumptions
        - a. Patient ought to change
        - b. Patient wants to change
        - c. Health is a prime motivator
        - d. Consultation is a failure if the patient decides not to change
        - e. Motivation is an all-or-none phenomenon
        - f. The patient will follow the expert's advice
    - B. Nature of Motivation
    - C. Basic Counseling Skills Exercises
      - 1. How not to do it—busy practitioner exhorts passive patient
      - 2. Open-ended questions
      - 3. Reflective listening
      - 4. Information processing
    - D. Reduce Resistance
    - E. Negotiating Change
  - II. Session Two—Four Hours
    - A. Establishing Rapport
      - 1. Introduce self
      - 2. Purpose of meeting
      - 3. Any question to help you understand patient
    - B. Setting the Agenda
      - 1. Single behavior/multiple behaviors to change
      - 2. Task: to assess and explore informally
    - C. Assess/Explore Readiness to Change
      - 1. Scoring importance and confidence
      - 2. Interpreting the scores
  - III. Session Three—Four Hours
    - A. Doing BMI in a 5-10 minute session
    - B. Exercises in:
      - 1. Exchanging information
      - 2. Reducing resistance
      - 3. Reassessing importance and confidence

**Figure 1. Brief Motivational Interviewing training curriculum**

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measured. Third, the degree of rapport between the patient and dental student was measured. Fourth, the perceived effectiveness in promoting patient change was measured. And fifth, the students' self-rating of confidence and intent to do smoking-cessation counseling was measured. The domains and the specific means of measuring them are listed in Table 1.

The methods of measurement are consistent with past research on communication skills, which have used checklists of whether the student engaged in a desired behavior and Likert-type scales to rate how effective a student was at doing certain tasks, such as using appropriate language or establishing rapport.<sup>2,4,38,41</sup> We used both checklists and Likert-scaled questions to evaluate student performance.

One author obtained all the "observer ratings" mentioned in Table 1. The three authors viewed sev-

**Table 1. Outcome variables used to measure effect of BMI training on smoking-cessation sessions in dental students**

Domain	Measure	Method
Student use of BMI techniques  Did the student:	Number of open-ended questions that student asks	Observer count
	Set the agenda	Observer score yes/no
	Assess importance of smoking cessation to the patient	Observer score yes/no
	Use the 10 point importance scale	Observer score yes/no
	Assess confidence of the patient in ability to quit	Observer score yes/no
	Use the 10 point confidence scale	Observer score yes/no
Patient is actively involved in the treatment	Number of questions asked by patient	Observer count
	Time and percentage time patient spent talking	Observer measurement
	Patient suggested ways to change	Observer measurement
Perceived effectiveness of encouraging patient change	Patient rated session as helpful to quit	Patient rating on 4 point scale
	Patient rated session as having effect on tobacco use	Patient rating on 4 point scale
	Student rated session as affecting patient's readiness to quit	Student rating on 4 point scale
	Student rated session as affecting patient's tobacco use	Student rating on 4 point scale
Good doctor-patient rapport is established	Would patient return to doctor?	Patient and student rating on 4 point scale
	Patient's feelings about session	Patient choice of "good" adjectives Patient choice of "bad" adjectives Patient's rating of enjoyableness of session on 4 point scale Observer rating of how positively the patient felt about the session on 4 point scale
	Student's understanding of patient point of view	Patient and student rating on 4 point scale
	Patient's understanding of student point of view	Patient and student rating on 4 point scale
	Session not shaming	Observer rating on 3 point scale (1=not shaming, 2=a little shaming, 3=shaming)
	Student competence and interest in task	Student feels confident and skilled in technique Student says will use the technique in future Student enjoyed the session Patient rated student as competent

eral of the tapes together in order to train the rating author (the rater) in the measurement desired. The rater was blind to whether the students had received training. The rater rated all the tapes on the eleven "observer rating" variables listed in Table 1, plus length of session. The rater then rated ten of the twenty-two tapes twice at a two-week interval to establish reliability. The average Kendall's tau reliability coefficient of the twelve measures was 0.885.

## Analysis and Results

The variables were grouped into domains according to the construct they were intended to measure. For each domain, the measures were summed to create a scale value. If the measures were not comparable (could not be added) or, if removing the measure improved the Cronbach's alpha, the measure was

not included in the scale but was analyzed separately. Cronbach's alpha is a measure of how well variables in a scale correlate with each other (internal reliability). A high alpha (optimally, over 0.7) indicates that items belong together in a scale, while a lower alpha may suggest the items should be analyzed separately. The sample size of this pilot study would not allow analysis of all the items separately, so in spite of low alpha values, some variables were maintained as scaled variables. The Cronbach's alpha is reported below each table. Since the measures were made at two times (before and after training), two alpha scores are listed for each variable.

Table 2 shows the frequency with which students used specific BMI techniques. The target behaviors were scored as yes/no and added together to produce a scaled variable: Number of Target Behaviors. The number of open-ended questions asked by the student was treated as a separate variable. In the

**Table 2. Comparison of use of BMI techniques between the control and experimental groups at baseline and during final smoking-cessation sessions**

	Control		Experimental	
	Baseline	Final	Baseline	Final
Number of students doing the target behavior out of 11				
Explained agenda	9	6	10	9
Asked about importance	2	1	0	5
Had patient rate importance	2	1	0	5
Asked about confidence	5	5	6	9
Had patient rate confidence	2	1	2	4
Summary variables				
Number of target behaviors (mean, sd)*	1.8 (1.5)	1.3 (1.0)	1.6 (0.9)	2.9 (1.3)
Number of open-ended questions asked by student (mean, sd)*	0.8 (0.9)	0.3 (0.5)	0.4 (0.7)	2.5 (1.6)
Cronbach's alpha t1 of target behaviors=.6325, t2=.5788				
*Significant in the MANOVA				

overall analysis, the number of target variables and the number of open-ended questions improved with training.

Table 3 shows the measures of patient involvement. Two of these, “percent of patient talk” and “number of questions asked by patient,” were separate variables in the overall analysis. “Time patient spent talking” was not used in the overall analysis, since it is subsumed in the “percent of patient talk” variable. In the overall analysis, training increased both the proportion of patient talk and the number of questions asked by the patient.

Table 4 compares the Experimental Group with the Control Group on the measures of perceived efficacy in promoting patient change. See Table 1 for the individual measures that were added to produce the Change Scale. None of these variables were affected by BMI training.

Table 5 compares the Experimental Group and the Control Group on the rapport variables. The Empathic Scale was created by summing the students’ and actors’ ratings of how well they understood each other, their ratings of whether the patient would return to the student, the patient’s ratings of enjoyment of the session, and the observer’s ratings of how positively the patient seemed to feel. The Negative Empathy Scale summed the number of “bad” adjectives chosen by the standardized patient plus the observer rating of shame. None of the Doctor Patient Rapport variables were significant in the overall analysis.

Table 6 compares the Control and Experimental groups on the student self-assessment of skill, interest in doing smoking-cessation counseling in the future, whether the student enjoyed the task, and the standardized patient’s rating of the student’s compe-

**Table 3. Comparison of patient involvement variables between the control and experimental groups at baseline and final smoking-cessation sessions**

	Control n=11		Experimental n=11	
	Baseline Mean (SD)	Final Mean (SD)	Baseline Mean (SD)	Final Mean (SD)
Time patient spent talking (min.)	1.1 (.5)	0.9 (.6)	0.8 (.5)	2.5 (1.0)
Percent of patient talk*	18 (10)	19 (13)	17 (8)	35 (12)
Number of questions asked by patient*	1.9 (1.6)	0.3 (0.5)	0.8 (1.5)	1.6 (2.1)
Patient-initiated change talk	0	0	0	0

\*Significant in the MANOVA

**Table 4. Comparison of perceived efficacy in promoting patient change variables between the control and experimental groups at baseline and during final smoking-cessation sessions**

	Control N=11		Experimental N=11	
	Baseline	Final	Baseline	Final
Change scale	9.4 (1.3)	9.6 (2.2)	9.5 (2.3)	10.0 (2.1)
Student rating of effect on pt likelihood to quit	2.6 (.5)	2.7 (.7)	2.3 (.5)	3.0 (.5)

Cronbach's alpha of the Change Scale: t1=.6020, t2=.7363  
No variables significant in the MANOVA

**Table 5. Comparison of doctor-patient rapport between the control and experimental groups at baseline and during final smoking-cessation sessions**

	Control N=11		Experimental N=11	
	Baseline	Final	Baseline	Final
Empathic scale	25.7 (2.3)	24.9 (4.6)	24.3 (5.0)	25.2 (5.4)
Number of "good" adjectives checked by patient	3.6 (1.5)	3.2 (2.4)	2.7 (2.0)	3.8 (2.4)
Negative empathy scale	2.5 (1.6)	2.4 (2.0)	2.9 (2.0)	4.2 (2.4)
Cronbach's alpha for empathic scale: t1=.8288, t2=.8748				
Cronbach's alpha for "good adjectives": t1=.8288, t2=.8748				
Cronbach's alpha for negative empathy scale: t1=.6135, t2=.7839				
No variables significant in the MANOVA				

**Table 6. Comparison of student competence and interest in task variables between the control and experimental groups at baseline and during final smoking-cessation sessions**

	Control N=11		Experimental N=11	
	Baseline	Final	Baseline	Final
Student rating of student comfort with task	2.5 (.7)	2.1 (.8)	2.6 (1.0)	2.8 (.6)
Student competence scale	12.5 (1.8)	12.6 (1.9)	12.4 (2.2)	13.5 (1.7)
Cronbach's alpha = .6606 t1, t2=.7169				
No variables significant in the MANOVA				

tence. The students' ratings of their skill lowered the Cronbach's alpha when included, so it was analyzed separately. None of the competence and interest variables were significant in the overall analysis.

The values of the dependent variables from the first session were subtracted from the values of the variables in the second session in order to obtain values for change in each dependent variable. A MANOVA was run on all the variables, with Group

as the independent variable and eleven dependent variables. The overall F was significant at  $p=0.018$ . The significance of individual dependent measures is listed in Table 7. The training increased the patient involvement variables and the variables measuring use of BMI technique, but the effect on the other variables was not significant.

Student evaluations of the training were positive, but students felt the twelve hours of training were excessive.

**Table 7. Results of MANOVA of changes in outcome variables occurring between baseline and final smoking-cessation sessions**

	Sig.
<i>Student use of BMI techniques</i>	
Number of target behaviors	.010
Number of open-ended questions asked	.001
<i>Patient actively involved</i>	
Percent of patient talk	.001
Number of questions asked by patient	.007
Patient-initiated change talk	—
<i>Perceived effectiveness of encouraging patient change</i>	
Change scale	.762
Student rating of patient's likelihood to quit	.109
<i>Rapport</i>	
Empathy scale	.486
Number of good adjectives checked by patient	.273
Negative empathy scale	.223
<i>Student competence and interest in task</i>	
Student competence scale	.212
Student rating of student comfort	.211

The significance values are the within-subjects contrasts calculated with the SPSS repeated-measures MANOVA function between trained and untrained students. The overall  $F(11\&10df) = 4.019$ ,  $p=0.018$ .

The Control Group was more likely than the Experimental Group to see Actor Two at the second interview, due to scheduling difficulties. Therefore the standardized patient ratings may be biased by rater differences. The two domains measured by the observer were significant in the analysis, while the domains measured by ratings of standardized patients and students were not significant.

In summary, the measures of use of BMI technique and the measures of patient involvement improved with training, but the measures of facilitating patient change, rapport, and student feelings about the task did not change.

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## Discussion

This is the first study to test the effectiveness of teaching BMI in a dental school setting. This addresses the tobacco-cessation research agenda identified by Horowitz and Ogwell.<sup>42</sup> In this pilot study we explored the effect of BMI training on student technique and on characteristics of smoking-cessation counseling sessions. Clinically and statistically significant improvements were found in sessions conducted by dental students after the BMI training compared with dental students who had no training. The trained students were more likely to use the identified BMI techniques and were able to elicit more patient involvement in the sessions. We did not find training effects in this study for rapport, perceived efficacy, or confidence/likelihood to do smoking-cessation counseling in the future.

The effect of the training on the rapport domain is of interest. Although not significant, the training showed a trend to increase both the “good adjectives” checked by the patient and the “negative empathy” variable. If this pattern is found to be robust in future studies, then patients may have stronger feelings—both negative and positive—about the practitioners who use BMI. This would be important information to clarify, both to help the practitioner handle the patients’ reactions and to determine the effectiveness of BMI. Another explanation for this possible effect is confounding by the standardized patients who rated the students: students in the experimental group were more likely to have the final session with Actor One than with Actor Two, and vice versa for the Control group. If Actor Two were more critical, she could have confounded the results.

Several factors must be taken into account that could have reduced the ability of this study to find differences. First, this study included no clinical training (only role-playing was used; there was no contact with real patients), and the students gained only a beginning level of experience in using the technique by the end of three sessions of training. Second, all students had received some training in tobacco-cessation counseling. Third, the students who volunteered for the study may have been more interested in smoking-cessation counseling and more skilled at counseling than the average dental student. Finally, the students in the Experimental Group may have discussed the training with the students in the Control Group. All these biases would have the effect of reducing the training effect and lowering the power of the study. In addition, the sample size was small, with only eleven students in each group and only two standardized patients. We would expect even more training differences to be revealed with a larger sample size and more opportunity for students to practice the techniques.

It may be that improvements in confidence and rapport variables will only happen with some practice and experience for the practitioners. Doherty et al.<sup>37</sup> did a qualitative study of teaching MI to a treatment team and found that considerable effort needed to be expended over a year’s time for acquisition of many of the individual competencies that are part of MI. It is reasonable to expect that, in the initial phases, students would acquire the more concrete procedures of a method, while the improved patient outcomes may only result after practice and the assimilation of the more subtle aspects of the MI paradigm. It is possible that introducing BMI techniques in the freshman/sophomore years in the context of an overall prevention program in teaching students how to motivate patients would allow for more complete development of BMI approaches by the time the students reach the clinical setting.

Smoking-cessation counseling is part of the clinical curriculum in the host school in the third year. The students are taught the oral health effects of tobacco use and the principles of smoking-cessation counseling. A packet that includes educational material, information on nicotine replacement therapy, and information on local group therapy counseling sessions is made available to each student, as well as being available in all the clinics for students to use to promote smoking cessation. BMI techniques taught in the earlier years could make use of the smoking cessation program more effective in the clinic.

BMI is potentially useful to oral health professionals in many areas of health behavior in addition to tobacco cessation counseling. The patient-centered aspect of the method could enhance the cultural sensitivity of a dentist's counseling because the method emphasizes the patient's point of view over the practitioner's. The BMI approach has been applied to many areas in medicine, and its potential for use in dentistry is equally wide. This method could be used to improve patient compliance with oral hygiene regimens, infant nursing practices, dietary habits, medication adherence, and postoperative care.

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## Conclusions

Training in Brief Motivational Interviewing was found to alter dental student counseling techniques, which was associated with more active patient involvement in sessions. Future studies with larger sample sizes and control for confounding factors are needed to demonstrate the ability of BMI training to improve student counseling skills and improve dentist-patient rapport. Training programs should be examined that provide more extensive student practice with BMI, such as beginning student training in the first two years of dental education. If BMI continues to show promise, then the research agenda should include clinical trials in order to demonstrate improved patient outcomes.

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