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Effectiveness of the Phase Contrast Microscope in Dental Patient Motivation

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EFFECTIVENESS OF THE PHASE CONTRAST MICROSCOPE IN DENTAL PATIENT MOTIVATION

by

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ABSTRACT

EFFECTIVENESS OF THE PHASE CONTRAST MICROSCOPE
IN DENTAL PATIENT MOTIVATION

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The purpose of this investigation was to examine the effectiveness of the phase contrast microscope when used as an adjunct to a patient education program in motivating individuals to improve oral hygiene habits. A convenience sample with randomized groups was utilized to select sixty-five subjects. Subjects attended five appointments: one appointment for oral prophylaxis, three appointments for oral hygiene instruction and a three month recall. A phase contrast microscope demonstration was the independent variable. Plaque scores were measured at each appointment using a Modification of the OHI-S. No statistically significant difference existed between the groups at any coinciding appointments. Statistically significant increases in plaque were found within each group when comparing the pretest score with each posttest score. No significant difference was detected in patient motivation in a patient education program with a phase contrast microscope demonstration and an otherwise identical patient education program without a phase contrast microscope demonstration.

ACKNOWLEDGEMENTS

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Joanna Gentry, R.D.H., B.S., merits special mention for her participation as assistant investigator in the study by conducting the microscopic demonstrations to allow for

the double blind design, as well as for her consideration, faithfulness and encouragement throughout the investigation. The dental hygiene class of 1976, Old Dominion University, was invaluable to the conduct of the study by aiding in the performance of preventive prophylaxes services for all subjects.

Johnson and Johnson Dental Supply Company deserves recognition for the contribution of five gross of dental floss for distribution throughout the study. Semantodontics, Inc., Las Vegas, Nevada, generously supplied the phase contrast microscope, videocamera and monitor for utilization throughout the duration of the study.

Finally, the investigator wishes to acknowledge all members of the Department of Dental Hygiene, Old Dominion University, for contributions and suggestions essential to project completion.

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INTRODUCTION

Members of the oral health team have the responsibility of educating and motivating patients toward improved oral hygiene. The process of effective motivation becomes complex when the desired goal is behavioral change. Many motivational techniques have been studied in the search for an effective adjunct in improving oral health through plaque control. Literature suggests that utilization of the phase contrast microscope in patient education enhances patient motivation;[1] however, little research has been published to support this premise.

Education and motivation of the dental patient are mandatory in the prevention of dental diseases. Daily oral hygiene procedures should be performed effectively and routinely by the patient for maintenance of oral health.[2] The dental professional should, therefore, educate patients on the causes of dental diseases and the means of preventing

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[1] R. M. Lobene, et al., "How to Motivate Patients Toward Effective and Permanent Oral Health," Paradontology, XV (June, 1971), 58-9; R. A. Morrow, "Communication with Patients in a General Practice," Dental Clinics of North America, XIV (April, 1970), 241-250.

[2] D. A. Grant, et al., Orban's Periodontics (St. Louis, Missouri: C. V. Mosby Company, 1972), 684-686.

them. Discovery of an effective educational and motivational tool is desirable in order to enhance this process, and the phase contrast microscope has been utilized for this purpose.[3] A sample of bacterial plaque is taken from the patient's mouth and placed on a microscope slide in order to illustrate for the patient that organized bacteria actually exist in his or her mouth. This visual aid, along with an explanation of the nature and causes of the dental disease process, theoretically communicates a need for removal of these microcosms. Few research studies have been published to support or refute this contention.

A research project was completed by Dr. Jeremy Shulman entitled "Clinical Evaluation of the Phase Contrast Microscope as a Motivational Aid in Oral Hygiene."[4] The experiment included two groups of patients, using two separate visual aids in the educational process: the phase contrast microscope and the plane field microscope. The investigator recommended a follow-up study comparing the same educational programs with one group viewing the phase contrast microscope and the other group viewing no microscope at all for the purpose of comparing the phase contrast microscope group to a control group. This investigation

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[3]Lobene, pp. 58-9; Morrow, pp. 241-50; Swift Instrument Division, "Definitely Doctor." Form DDS-71-1, #8892, San Jose, California, 1971.

[4]Jeremy Shulman, "Clinical Evaluation of the Phase Contrast Microscope as a Motivational Aid in Oral Hygiene" (unpublished Master's Thesis, University of Michigan, 1973), 70 p.

was conducted in order to examine the effectiveness of the phase contrast microscope used as an adjunct to a patient education program for motivating individuals to improved oral hygiene by the control of bacterial plaque.

Statement of the Problem

When used in conjunction with a patient education program, is the phase contrast microscope an effective adjunct for motivating dental patients toward improved oral hygiene habits?

Hypothesis

There is no significant difference in dental patient motivation toward improved oral hygiene habits in a patient education program with a phase contrast microscope demonstration and an otherwise identical patient education program without a phase contrast microscope demonstration.

Definition of Terms

The following terms are defined for purposes practical to this study:

a. Patient education program is a series of three appointments at which time a dental patient is educated on dental disease, the causes of these diseases and methods of home care procedures for the removal of bacterial plaque (see Appendix A and Appendix B).

b. Motivation is an instance in which behavior change, in this case improved oral hygiene habits, is prompted in order to cause volition for action.

c. Improved oral hygiene habits are indicated by a reduction of bacterial plaque in the oral cavity from the use of effective and routine home care procedures.

d. Home care procedures are techniques used once daily by the patient for removal of plaque and includes brushing, flossing, and the use of disclosing tablets.

e. Bacterial plaque is a soft deposit of organized bacteria in a gelatinous film firmly adhering to the teeth and can be stained by a disclosing agent.

f. Oral physiotherapy instruction is defined as education of patients on methods of home care procedures by observed demonstration by the dental professional in the patient's mouth and repetition of the techniques by the patient until mastered (see Appendix B).

g. Disclosing agent is an erythrosin dye tablet, chewed and swished by the patient after cleansing of the teeth and gingiva in order to observe, by direct vision, areas of bacterial plaque present.

h. Oral hygiene instruction indicates education of the patient in any of the topics discussed in the patient education program or in oral physiotherapy instruction.

i. Modification of the Simplified Oral Hygiene Index (OHI-S) refers to a system of scoring six teeth as designated in the Debris Index by Greene and Vermillion.[5]

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[5]J. C. Greene and J. R. Vermillion, "The Simplified Oral Hygiene Index," Journal of the American Dental Association, LXVIII (June, 1963), 913-22.

The OHI-S is applied to six tooth surfaces in the oral cavity--four posterior and two anterior. The first fully erupted tooth distal to the second premolar on each side of the arch is scored posteriorly. Buccal surfaces are scored on the maxilla and lingual surfaces on the mandible. The maxillary right central incisor and mandibular left central incisor are scored anteriorly. The following criteria are utilized for scoring:

0 = No debris or stain present

1 = Soft debris covering not more than one third of the tooth surface being examined or the presence of extrinsic stains without debris regardless of surface area covered.

2 = Soft debris covering more than one third but not more than two thirds of the exposed tooth surface

3 = Soft debris covering more than two thirds of the exposed tooth surface

The tooth surface is divided into gingival third, middle third, and incisal or occlusal third for scoring purposes. After all six teeth are scored, an average score is computed. The modification of the OHI-S refers to the use of a disclosing agent instead of an explorer for plaque detection.

Assumptions

The following assumptions were made:

a. Bacterial plaque is an etiological factor in dental diseases.[6]

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[6]Grant, et al., pp. 165-66; Genco, R. J., "Periodontal Disease as a Plaque Disease," Preventive Dentistry, ed. S. J. Moss (New York: Medcom, Inc., 1972), 20-22.

b. The methods of home care procedures taught to the patient (modified scrub toothbrushing technique, flossing and use of disclosing tablets) can effectively improve oral hygiene by reducing the bacterial plaque present on the patient's teeth.[7]

c. All patients received equal numbers of appointments, therefore an equal amount of patient education was given to all patients by the principal investigator in the form of a rehearsed dialogue (see Appendix A and Appendix B).

d. The principal investigator was a valid and reliable scorer. One group of thirty subjects was scored twice prior to the collection of data and a correlation coefficient was calculated at.987 (see Appendix E).

e. Patients did not receive additional patient education throughout the duration of the study.

Delimitations

a. All patients participating in the study were clinic patients at Old Dominion University Dental Hygiene Clinic.

b. All patients were adults (minimum of 18 years of age).

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[7]M. M. Ash, "Manual Toothbrushing and Use of Other Aids," Journal of the American Dental Hygienist Association, XXXVIII (Second Quarter, 1964), 78-81; S. S. Arnim, "The Use of Disclosing Agents for Tooth Cleanliness," Journal of Periodontology, XXXIV (May, 1963), 227-45; W. L. Davis, "The Use of Dental Floss in Oral Hygiene Procedures," Apex, V (November, 1971), 167-68.

c. All patients had a minimum of 20 teeth (ten on each arch).

d. Patients did not have mental or physical handicaps severe enough to interfere with the effectiveness of routine removal of bacterial plaque.

e. Patients were instructed not to receive any additional oral hygiene instruction for the duration of the study.

Limitations

a. No method of measuring previous amounts of oral hygiene instruction existed.

b. Personal contact introduced a variable since the patient education program was given by the principal investigator. An attempt was made to minimize the human element by the use of an audiovisual filmstrip for education on dental diseases, its causes, and the prevention of these diseases. Oral physiotherapy instruction was standardized by teaching identical procedures for toothbrushing (modified scrub), flossing (guided by the index fingers in a vertical motion) and the use of disclosing tablets. The presentation of this oral physiotherapy instruction was preplanned and rehearsed (see Appendix A and Appendix B). Questions were clarified by repetition of the filmstrip and rehearsed dialogue rather than by addition of information. This limitation was minimized by the principal investigator performing all instruction throughout the study in the form

of a rehearsed dialogue to insure that standard amounts of instruction were given throughout the duration of the study (see Appendix A and Appendix B).

d. Due to varying degrees of difficulty of prophylaxes for different patients, some patients needed reappointments for completion of oral prophylaxes by the student, adding additional exposure to the dental clinic environment. However, all prophylaxes were completed prior to the second appointment in the patient education program.

e. The selection of a convenience sample may have introduced bias since subjects had volunteered for preventive services.

Methodology

Each subject participated in five appointments. The first appointment included an initial scoring utilizing a modification of the OHI-S Debris Index, oral hygiene instruction, oral physiotherapy instruction, and a filmstrip (see Appendix A and Appendix B). At this time, all patients were issued one soft toothbrush, sixty yards of unwaxed dental floss and daily disclosing tablets. At the second appointment, all patients received a thorough oral prophylaxis. One week to ten days later for two successive appointments, the patient was reappointed for scoring and reinstruction by repetition of previously presented information. At each of these appointments, the experimental group received a

phase contrast microscope demonstration (see Appendix C), the control group did not. After three months, all subjects were reappointed for a final scoring.

Chapter 2

REVIEW OF THE LITERATURE

Topics pertinent to this research project include the relationship of plaque to dental disease, patient motivation, patient education and phase contrast microscopy in patient education.

Plaque and Dental Disease

Reports have been made indicating a relationship between bacterial plaque and oral diseases.[1] Epidemiological studies of periodontal disease strongly indicate that there is a direct relationship between the presence of plaque in the oral cavity and periodontal disease.[2] Plaque is composed of specific types of microcolonies surrounded by an intercellular substance derived from the microorganisms themselves. There is a sequence to the formation of plaque. Mandel states that bacterial colonization, even in

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[1]Grant, et al., pp. 165-66; Genco, pp. 18-22.

[2]J. C. Greene and J. R. Vermillion, pp. 913-22; A. Lovdal, et al., "Incidence of Clinical Manifestations of Periodontal Disease in Light of Oral Hygiene and Calculus Formation," Journal of the American Dental Association, XLX (January, 1958), 21-33.

the early stages, can be highly cariogenic.[3] Socransky further asserts that "bacteria amassed in the colonies we call plaque is the primary agent for producing caries.[4] As the plaque matures, the bacteria grow and multiply and new bacterial forms become incorporated. Mandel states that this mature plaque is responsible for the initiation of periodontal disease.[5]

Dental disease in the United States is epidemic. Richardson stated that "periodontal disease occurs in 60% of young adults, 80% of middle aged persons and 90% of those over 65 years old."[6] In addition, "dental caries affects 95% of all Americans."[7] These diseases are largely resultant from the bacterial activity of plaque.[8]

Patient Education and Motivation

With this knowledge of the pathological effects of bacterial plaque, the dental professional must focus on motivating and educating patients to remove these bacterial

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[3]Irwin D. Mandel, "New Approaches to Plaque Prevention," Dental Clinics of North America, XVI (October, 1972), 662.

[4]S. S. Socransky, "Dental Caries as a Plaque Disease," Preventive Dentistry, ed. S. J. Moss (New York: Medcom, Inc., 1972), 20-22.

[5]Mandel, p. 662.

[6]James L. Richardson, D.D.S., "Mechanical Plaque Control: A Review of the Literature," Journal of the American Society for Preventive Dentistry, V (March-April, 1975), 24.

[7]Richardson, p. 24.

[8]H. Loe, "Experimental Gingivitis in Man," Journal of Periodontology, XXXVI (May-June, 1965), p. 177; S. A. Leach, "Plaque Chemistry and Caries," Alabama Journal of Medical Science, V (May, 1968), 237.

deposits routinely. Several articles have been published discussing the importance of patient education and patient motivation.

Rosenstock, Hockbaum and Kegeles reviewed studies on determinants of health behavior. They present a theory that health behavior is directly related to a subjective evaluation of disease by the patient rather than an objective evaluation. The patient's concept of dental disease may be extremely different from that of the professional. For this reason, they conclude that patient education becomes an important precursor to motivation.[9] Shulman further states that "for behavioral change to occur, the subject must learn a means to produce the desired result."[10]

Other factors leading to patient acceptance of a preventive program have been stated by Kegeles.[11] He contends that a person must realize his susceptibility to the disease, the seriousness of the disease and the effectiveness of the measures to prevent the disease. In

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[9]I. M. Rosenstock, et al., "Determinants of Health Behavior," Working Party Paper Prepared for Golden Anniversary White House Conference on Children and Youth, 1968.

[10]Jeremy Shulman, "Current Concepts of Patient Motivation Toward Long Term Oral Hygiene: A Literature Review," Journal of the American Society for Preventive Dentistry, IV (November-December, 1974), 7-10.

[11]S. S. Kegeles, "Why People Seek Dental Care: A Test of Conceptual Formulation," Journal of Health and Human Behavior, IV (1963), 166-73.

agreement with these findings, Filip Cappa[12] states that the best treatment procedures are not sufficient for the control of dental diseases in the mouths of patients who are unaware of the causes of dental ills and the ways in which they can be prevented. This makes it seem imperative that the members of the dental profession educate and motivate patients in the prevention of dental diseases.

Weisenberg discusses motivation in terms of behavior modification.[13] Positive reinforcement could strengthen behavior. The dental professional is in a position to give this positive reinforcement to a patient. If the patient is successfully motivated to routinely practice proper oral physiotherapy techniques, positive reinforcement might continue in the form of praise from the educator, lowered costs of periodic dental care and eventually self-satisfaction. The patient could then become aware of the values of prevention. In a study conducted by Sandrew[14] on periodontal patients who had completed therapy and instruction, 90% of the patients felt that prevention in dentistry is the answer for the elimination of involved

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[12]E. F. Cappa, "Effective Patient Education and Communication in General Practice," Dental Clinics of North America, XIV (April, 1970), 251-258.

[13]M. Weisenberg, "Behavioral Motivation," Journal of Periodontology, XLIV (August, 1973), 489-99.

[14]Stuart Sandrew, "Summary of Patient Interpretation After Experiencing Periodontal Therapy," Journal of Periodontology, XLII (May, 1972), 237-40.

therapy. These patients had become aware of the value of prevention after extensive patient education and therapy.

Phase Contrast Microscopy

As a result of the awareness of the need for patient education and motivation, there has been a search for effective motivational tools. One possibility is the phase contrast microscope. The phase contrast microscope was developed by F. Zenike, a physicist at the University of Gronigen, Holland, in 1932.[15] It is unique in that bacteria can be viewed *in vitro* without differential staining. This has been considered beneficial in the process of patient education possibly because patients are able to view bacterial plaque from their own mouths.[16]

According to Briner,[17] the object of using the phase contrast microscope is to impress the patient with the living mass of bacteria present in his mouth. He feels that there is advantage in utilizing the phase contrast microscope rather than the regular light microscope. In order to visualize optical characteristics of plaque

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[15]Swift Instrument Division, "Phase Contrast: Who Cares?" San Jose, California, 1970.

[16]L. A. Wren, Understanding and Using the Phase Contrast Microscope (Boston, Mass.: Unitron, 1963), 8; E. F. Cappa, p. 254.

[17]W. W. Briner, "Use of Phase Contrast Microscopy to Demonstrate Oral Microcosms," Journal of the American Society for Preventive Dentistry, IV (January-February, 1974), 53-56.

bacteria, something must be done to enhance the contrast. Differential staining for this purpose kills the bacteria. This method, therefore, is undesirable since it is believed that the most salient feature in impressing the patient is viewing the live bacteria.

A study conducted by Shulman supports this contention. The two microscopes were compared in two controlled groups to evaluate their effect on motivation. The group using the phase contrast microscope showed a statistically significant improvement in reduction of bacterial plaque as compared to the plane microscope group.[18] Mittleman contended that the phase contrast microscope is "effective in overcoming neglect and apathy by engaging and activating patients' self-interest."[19] He stated further that patients seeing live bacteria in "frantic action" makes them more attentive to oral hygiene, and that a factual demonstration to the patient reinforces didactic education concerning the pathological effects of bacterial plaque. According to Kegeles,[20] the patient needs to realize his susceptibility to disease as well as the seriousness of the disease for

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[18]Jeremy Shulman, "Clinical Evaluation of the Phase Contrast Microscope as a Motivational Aid in Oral Hygiene," Journal of the American Dental Association, XCII (April, 1976), 759-65.

[19]Jerome S. Mittleman, "Getting Preventive Dentistry Through to Patients," Dental Clinics of North America, XIV (April, 1970), 313-14.

[20]Kegeles, pp. 166-73.

effective motivation to practice plaque control on a daily basis.

If the phase contrast microscope is used at successive appointments, it may demonstrate Kegeles' third need of the patient, i.e., belief in the effectiveness of daily measures to prevent dental diseases. Thornburg, et al. stated that "the key to motivating patients in concepts of home care is to provide incentives for preventive-type behaviors."[21]

The microscope can demonstrate to the patient the changes in the types of bacteria present in new plaque formation (gram positive and a few gram negative cocci)[22] versus mature organized plaque (fusiform, filamentous, spirochetes and spirilla)[23] which has not been removed for several days. Therefore, the patient is able to visualize the effects of improved oral hygiene habits. The phase contrast microscope demonstration then becomes a positive reinforcement for the patient to practice improved oral hygiene habits. As stated previously, positive reinforcement might strengthen desired behaviors by acting as a motivational strategy.

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[21]Ellen Thornburg, et al., "The Key to Success in Preventive Dentistry," Journal of the American College of Dentists, XLI (October, 1974), 230.

[22]M. A. Listgarten, "Dental Plaque: Its Structure and Prevention," Journal of Dentistry for Children, XIV (September-October, 1972), pp. 13-17.

[23]Listgarten, pp. 13-17.

Thornburg, et al. also applied theories of task motivation to the education of dental patients.[24] The dental professional could provide rationale for performing oral hygiene procedures (tasks) as a basis for motivation. Information gained from the phase contrast microscope demonstration might be utilized to provide the necessary rationale for performing a particular behavior, thus making the patient task conscious and, therefore, more strongly motivated to include such procedures (tasks) in his/her daily routine. "Habit based on rationale is likely to endure longer than habit based on mechanical behavior only."[25]

Summary

Prevailing research findings show that bacterial plaque is the etiology of dental diseases. Dental professionals have the responsibility to educate patients on the prevention of these diseases by the control of bacterial plaque. The search for effective motivational tools has resulted from the wareness of the need for dental patient education and motivation. Current literature suggests that the phase contrast microscope can be utilized for this purpose. It is the intent of this investigation to evaluate the effectiveness of the phase contrast microscope

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[24]Thornburg, et al., p. 231.

[25]Thornburg, et al., p. 233.

when used as an adjunct to a patient education program for motivating dental patients toward improved oral hygiene habits.

Chapter 3

METHODS AND MATERIALS

This study was designed to test the effectiveness of the phase contrast microscope for motivating dental patients toward improved oral hygiene habits, when used in conjunction with a patient education program.

Methods

All research was conducted at the Old Dominion University Dental Hygiene Clinic. The research design was double blind. The subjects in the study were not aware of their group status and the principal investigator was not aware of the patient's group status. All scoring and instruction was executed by the principal investigator in order to maximize standardization.

The only independent variable manipulated in the study was the phase contrast microscope demonstration (see Appendix C). The dependent variable measured was the distribution of bacterial plaque as scored on the patient's teeth at each appointment. The phase contrast microscope demonstration was executed with the experimental group (PC) only by a registered dental hygienist with previous education and experience in utilization of the instrument. Control subjects (C) were not given a demonstration of the

phase contrast microscope; however, they were seen and spoken to by the hygienist in an attempt to control extraneous variables by spending equivalent time with the control subjects. All subjects received a total of one hour and fifteen minutes of instruction.

Subjects

Sixty-five subjects were chosen for the study and randomly divided into groups. A convenience sample with randomized groups was utilized. Subjects were selected from a list of patients already appointed to the Old Dominion University Dental Hygiene Clinic for prophylaxes and preventive services. A random table of numbers was used for group division. Subjects were numbered according to introduction into the study. Approximately ten new subjects a week were introduced, depending upon cancellations by the patients. New patients were read a consent form at the initial appointment (see Appendix D) and all successive appointments were arranged. The patients were aware of all appointments in advance and consented to their attendance in order to minimize subject mortality. Due to the loss of sixteen subjects (eight PC, eight C), the study was completed with a total of forty-nine subjects. Mortality is attributed to hospitalization, family illness, relocation, employment difficulties and contamination of experimental controls by additional oral hygiene instruction (see Appendix F). The experimental group (PC)

included twenty-two subjects and the control group (C) included twenty-seven at the conclusion of the study.

Experimental Design

A randomized groups, pretest-posttest design was utilized.[1] Subjects were assigned to PC and C randomly and given a pretest to measure the presence of bacterial plaque, the dependent variable. An experimental treatment, the phase contrast microscope demonstration, was given to PC only. The dependent variable was then measured again in both groups. Since equivalency of groups was achieved by randomization, extraneous variables were controlled. Pretest plaque scores as measured by the Simplified Oral Hygiene Index were utilized as an additional check for equivalency with t=.18 showing no significant difference between pretest scores of PC and C. History and maturation occurred in both PC and C and any change in the oral hygiene habits, as measured by the presence of bacterial plaque, cannot be attributed to these factors.

External validity is often threatened in this design due to sensitization of the subjects by the pretest. In this study the pretest was simply a scoring of stained plaque by the investigator prior to any instruction. Therefore, the subjects were not sensitized to the posttest.

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[1]Donald Ary, et al., Introduction to Research in Education (New York: Holt, Rinehart and Winston, Inc., 1972), pp. 244-46.

Experimental Treatments

Each patient was required to be present for a total of five appointments. A schedule of the subject matter and treatment in sequence of delivery at each appointment was arranged.

First Appointment (AA)

1. Initial scoring using a modification of the Simplified Oral Hygiene Index (OHI-S) for assessing oral debris[2] performed by the principal investigator.

2. Labelle audio-visual filmstrip cassette entitled "Preventive Control Program"[3] on the nature of plaque and dental disease and methods of disease prevention.

3. Standardized oral physiotherapy instruction including Modified-Scrub toothbrushing technique, flossing technique and the use of disclosing tablets (see Appendix B).

4. Distribution of one multi-tufted, soft toothbrush (Oral B 40), 60 yards of unwaxed dental floss (Johnson and Johnson) and seven to ten disclosing tablets.

5. Phase contrast microscope demonstration to PC only utilizing the patient's own plaque, in vitro (see Appendix C).

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[2]Greene and Vermillion, pp. 913-22.

[3]Labelle Filmstrip, "Preventive Control Program," A. V. Scientific Aids, Inc. (Los Angeles: Labelle Industries), Model #182,000B.

Second Appointment (BB)--Same day of AA or one to two days later.

1. Thorough oral prophylaxis without oral hygiene instruction.

Third Appointment (CC)--One week to ten days after BB.

1. Scoring using modified OHI-S.

2. Reinstruction on areas of remaining plaque or problems encountered by the patient in either PC or C by repetition of rehearsed dialogue without limitation on amount of reinstruction.

3. Distribution of seven to ten disclosing tablets.

4. Phase contrast microscope demonstration to PC only.

Fourth Appointment (DD)--One week to ten days after CC.

1. Scoring using modified OHI-S.

2. Any necessary reinstruction as determined by patient questioning or presence of plaque in any area.

3. Distribution of 90 disclosing tablets.

4. Phase contrast microscope demonstration to PC only.

Fifth Appointment (EE)--Three months after DD.

1. Final scoring using modified OHI-S.

2. Any necessary reinstruction as indicated by patient questioning and/or the presence of plaque in any area.

Materials

Each patient was issued one multi-tufted, soft, nylon toothbrush (Oral B 40), sixty yards of unwaxed dental floss (Johnson and Johnson) and seven to ten disclosing tablets (Amurol) at AA. Instruments and materials essential to the oral prophylaxis procedure at BB were also utilized. At CC, seven to ten additional disclosing tablets were issued to each patient. Ninety disclosing tablets were distributed to each patient at the DD appointment. The Swift Collegiate 400 phase contrast microscope with a Panasonic WV 200P video camera and CCTV monitor was also utilized at AA, CC and DD program appointments with PC only.

The research data collection began January 19, 1976. All plaque control program appointments (AA, CC, DD) were completed by March 24, 1976. Appointments for long-term scoring (three months) began April 26, 1976, and extended throughout June 22, 1976. The total length of the study was twenty-three weeks.

Budget

The following is an approximation of cost of the research project:

Item	Quantity	Total Cost
Oral B 40	70	$35.00
Johnson & Johnson Dental Floss	350 12-yd. dispensers	$43.75
Disclosing Tablets	110 per patient--7700	$9.25

Item	Quantity	Total Cost
LaBelle Projector	1	$300.00
and filmstrip	1	$75.00
Swift Collegiate 400 Phase Contrast Microscope with Panasonic WV 200P Video Camera and CCTV Monitor	1	$850.00
Total		$1,313.00

Statistical Analysis

In order to determine the significance in average changes obtained through the randomized groups, pretest-posttest design, between-group and within-group t-tests and analysis of variance were utilized for appropriate statistical analysis. An initial independent group t-test was calculated on the pre-test scores of the study groups with t=.18. No significant difference existed between PC and C upon entrance into the study, therefore, analysis of variance was chosen as the method for statistical analysis. Scorer error was also calibrated prior to the investigation through the use of a correlation coefficient with r=.987.

Chapter 4

RESULTS AND DISCUSSION

Plaque was measured using a modification of the OHI-S at four appointments (see Appendix G). A pretest score was computed for both PC and C prior to any patient education. Posttest scores were computed for both PC and C one week later, two weeks later and again after three months. Repeated Measures Analysis of Variance and a Neuman-Keuls multiple range test were utilized across the appointments for both PC and C to determine differences between the means at each scoring. Between group and within group t-tests were also employed for data analysis. Plaque scores were analyzed to determine if there is a significant difference between patient motivation toward improved oral hygiene habits in a patient education program with a phase contrast microscope demonstration and a patient education program without a phase contrast microscope demonstration.

Results

Repeated measures analysis of variance was used to determine difference between the mean scores of each group at individual appointments. Statistically significant F ratios were found for both groups with PC=51.72 and C=95.73 (see Tables 1 and 2).

Table 1

Summary of Analysis of Variance in Plaque Scores Across All Appointments for the Experimental Group (PC)

Source of Variance	SS	df	MS	F	Level of Significance
Between Group	9.46	21			
Within Group	39.10	66			
Treatment	27.94	3	9.31	51.72	.001
Residual	11.16	63	.18		
Total	48.56	87			

Table 2

Summary of Analysis of Variance in Plaque Scores Across All Appointments for the Control Group (C)

Source of Variance	SS	df	MS	F	Level of Significance
Between Group	6.94	26			
Within Group	42.88	81			
Treatment	31.60	3	10.53	95.73	0.01
Residual	11.28	107	.11		
Total	49.82	107			

Since a significant F-ratio was found, a Neuman-Keuls multiple range test was employed to compare differences between pairs of means. Significant differences were discovered at the 0.01 level of significance between the pretest score and each posttest score in both PC and C. No significant difference was found between any pair of posttest means for either group. Tables 3 and 4 exhibit the differences between pairs of means in PC and C, respectively.

Table 3

Neuman-Keuls Difference Between Mean Plaque Scores for Experimental Group (PC)

Pair of Appointments	Value Needed	Value Obtained	Level of Significance
1st-2nd	0.3399	1.30	0.01
1st-3rd	0.3869	1.39	0.01
1st-4th	0.4140	1.16	0.01
2nd-3rd	0.3399	0.09	NS
2nd-4th	0.3869	0.14	NS
3rd-4th	0.3399	0.23	NS

Table 4

Neuman-Keuls Difference Between Mean Plaque Scores for Control Group (C)

Pair of Appointments	Value Needed	Value Obtained	Level of Significance
1st-2nd	.2361	1.27	.01
1st-3rd	.268	1.30	.01
1st-4th	.2871	1.16	.01
2nd-3rd	.2361	0.03	NS
2nd-4th	.268	0.11	NS
3rd-4th	.2361	0.14	NS

Between group and within group Student's t-tests were also utilized for additional analysis of the plaque scores.

No significant differences were found between PC and C at any coinciding appointments. Table 5 illustrates the comparison of sample means by utilization of between group t-tests.

When considering differences between the means within each group, significant differences were discovered between the pretest score and each posttest score for both PC and C at the .01 level of significance. Plaque scores for the third and fourth appointments of PC showed a negative significance when $\alpha=0.05$, depicting an increase in the distribution of plaque. Plaque scores at these same appointments for C also showed a negative difference,

indicating increased plaque at the 0.10 level of significance. Tables 6 and 7 represent all within group t-test analyses.

As indicated by the Neuman-Keuls multiple range test and the between group t-tests, no significant difference exists between the means of PC and C. Table 8 and Figure 1

Table 5

Between Group t-tests of Plaque Scores at Coinciding Experimental (PC) and Control (C) Appointments

Coinciding PC-C Appointments	t-value
1st-1st	0.18
2nd-2nd	0.28
3rd-3rd	0.19
4th-4th	0.42

Table 6

Within Group t-tests of Plaque Scores for Experimental Group (PC)

	PC Appointments			
	1st	2nd	3rd	4th
1st	-	9.38**	8.30**	7.05**
2nd		-	1.23	1.54
3rd			-	-2.47*
4th				-

*Indicates significant t value with α=0.05
**Indicates significant t value with α=0.01

Table 7

Within Group t-tests of Plaque Scores for Control Group (C)

	C Appointments			
	1st	2nd	3rd	4th
1st	-	9.49**	9.36**	9.72**
2nd		-	0.90	-1.65
3rd			-	-2.01
4th				-

**Indicates significant t-value with α=0.01

Table 8

Comparison of Mean Values of Plaque Scores for Experimental (PC) and Control (C) Groups

Appointment	PC Mean	C Mean
1st (pretest)	1.58	1.46
2nd (1st week)	0.28	0.19
3rd (2nd week)	0.19	0.16
4th (3 month)	0.42	0.30

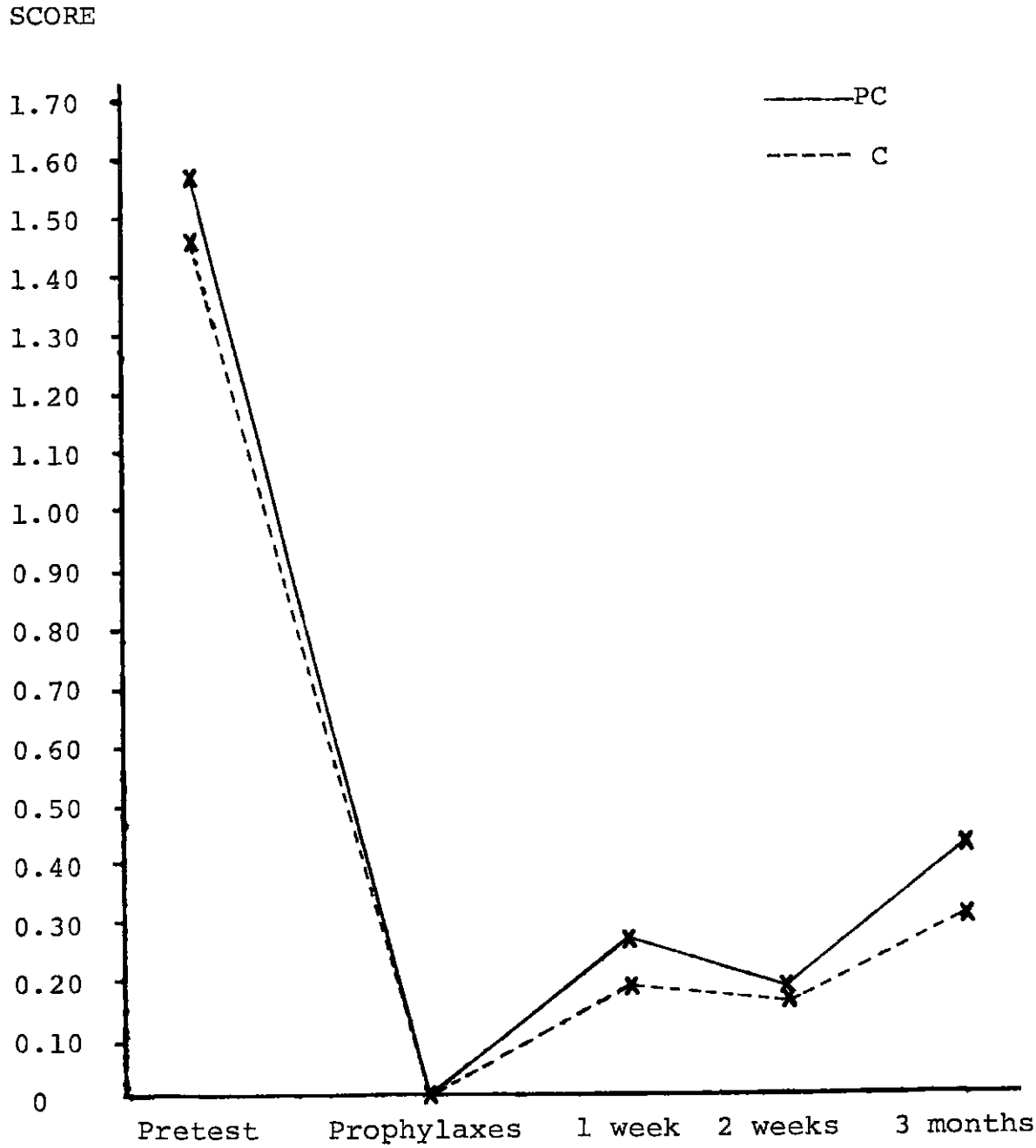

Figure 1

Comparison of Mean Values of Plaque Scores for Experimental (PC) and Control (C) Groups

illustrate the means for each study group at all appointments. The means were slightly lower at each scoring for C; however, no statistical difference was found.

Discussion

The repeated measures analysis of variance was used to find differences between the mean plaque scores of each group. Significant F ratios at the 0.01 level of significance were computed for both groups with PC=51.72 and C=95.73. This significance indicated the utilization of the Neuman-Keuls multiple range test to establish where these differences existed. Statistically significant differences were found between the pretest scores of both PC and C and all posttest scores at the 0.01 level of significance. The pretest scores were computed on all patients prior to any patient education by the investigator.

All subjects exhibited significantly improved plaque scores at one week, two weeks and three months following the initial scoring and instruction. However, no significant improvement in oral hygiene habits, as measured by plaque scores, was found at the second, third, and fourth appointments. Therefore, the differences found between the means in both PC and C might be attributed to the patient education program itself.

Between group t-test analyses also showed no significant differences between PC and C at coinciding appointments. The improved plaque scores may not be attributed to the utilization of the phase contrast

microscope since PC did not improve significantly greater than C. PC received microscopic demonstrations at the first three appointments. These demonstrations were the only independent variable manipulated between the groups. If the phase contrast microscope had been an effective adjunct to the patient education program, as current literature states, PC would have exhibited lower plaque scores than C at the posttest appointments.

When considering the within group t-test analysis, significant differences were again found between the pre-test plaque scores and all posttest plaque scores for both PC and C. This finding is in agreement with the analysis of variance and Neuman-Keuls multiple range test analyses. Significant differences were also determined between plaque scores at the third and fourth appointments. PC showed a negative significant difference at the 0.05 level of significance during this three-month time interval with $t=-2.47$. This increase in plaque may be due to the time period between these appointments. While the patients were returning weekly for scoring and instruction, improvement in mean plaque scores was attained. Between the third and fourth appointments patients were not scored or instructed for a three-month period. C also showed an increase in plaque during this time interval to the 0.10 level of significance with $t=-2.01$. These control subjects also received no scoring and instruction during this three-month period. Although it appears that PC may have increased

mean plaque scores significantly greater than C, additional statistical analysis contradicts this contention. The between group t-test depicts no significant difference between PC and C at the third or the fourth appointments. The Neuman-Keuls multiple range test also shows no significant difference between these two appointments in either PC or C. It is concluded, therefore, that both groups exhibited an increase in plaque between the third and fourth month appointments. However, this increase was not statistically significant when utilizing more sophisticated statistical tests to minimize Type I error that might have been present in the t-test analysis. No statistically significant difference existed between PC and C during this time interval. Again, the increased mean plaque scores may be ascribed to the three-month time frame between appointments as well as to the absence of weekly scoring and reinstruction by the investigator.

Finally, when comparing the mean values for PC and C, the means were found to be slightly lower at each appointment for the control group (C). As indicated by the between group t-tests, this difference was not statistically significant. However, the phase contrast microscope demonstrations as an adjunct to the patient education program did not affect the mean values of plaque scores for the experimental group (PC).

All of the statistical analyses show no significant difference in plaque scores between PC and C. Both groups

improved significantly to the 0.01 level of significance after the initial scoring and instruction. Several factors may have influenced the results of the study. The fact that all subjects volunteered for the study may have an effect on relating the sample findings to the population of interest since these individuals might have been previously more motivated, better educated or more interested in dental health. Subject mortality (eight PC and eight C) was not random and might have also produced an effect on the internal validity of the study since results could have varied with these excluded subjects. A larger sample might also influence results since more accurate and precise data is more likely.

Certain characteristics of the patient education program might have also influenced the findings of this investigation. The total length of instruction per patient (one hour and fifteen minutes) was abnormally long. Most dental practices do not allow this amount of time for patient education. The possibility exists that the abundance of didactic information presented to the patient inhibited the effectiveness of the phase contrast microscope as an adjunct to the patient education program. The filmstrip, which was shown to all patients, may have also increased motivation. Finally, the length of the investigation could be a determinant in the effectiveness of the phase contrast microscope. Long-term motivation might not have been measured adequately by the three-month recall

appointment, as indicated by the increase in plaque at that appointment. However, plaque scores remained lower at the three-month recall appointment than at the pretest scoring for both groups. The study should be continued to examine plaque scores at a six-month recall appointment. An alternative hypothesis is resultant: a patient education program will improve oral hygiene habits. From the results of this investigation, only the null hypothesis can be accepted. There is no significant difference between patient motivation in a patient education program with a phase contrast microscope demonstration and an otherwise identical patient education program without a phase contrast microscope demonstration. This finding has been shown to have statistical significance, however, clinical significance has not been documented. The oral health status of the patient was not measured by the OHI-S. Findings do indicate a decrease in the distribution of bacterial plaque which is an etiological factor in dental disease.

Chapter 5

SUMMARY

Dental disease is epidemic among the population of the United States. Research findings indicate that bacterial plaque is an etiologic factor in dental disease. As a result, it becomes mandatory that members of the oral health team educate and motivate patients toward improved oral hygiene habits for the routine removal of bacterial plaque. The process of effective motivation becomes complex when the desired goal is behavioral change. Consequently, many motivational techniques have been studied in the search for an effective adjunct to a patient education program. Current literature suggests that the phase contrast microscope can be utilized to enhance dental patient motivation. This investigation was conducted to examine if there was a difference in dental patient motivation toward improved oral hygiene habits in a patient education program with a phase contrast microscope demonstration and a patient education program without a phase contrast microscope demonstration.

Summary

Sixty-five subjects were chosen from appointment lists at the Old Dominion University Dental Hygiene Clinic and randomly assigned to groups. All subjects attended a total of five appointments including one appointment for

oral prophylaxis, three appointments for oral hygiene instruction and a three month recall appointment. The only existing independent variable was the phase contrast microscope demonstration to the experimental group at the three oral hygiene instruction appointments. The study was conducted on a double-blind basis. A two group pretest-posttest research design was utilized. Plaque scores were computed at each appointment using a modification of the Simplified Oral Hygiene Index.

Analysis of variance and the Neuman-Keuls multiple range test, between group t-tests and within group t-tests were utilized for data analysis. No statistically significant difference was found between the groups at any pair of coinciding appointments. Within group analysis demonstrated a significant difference to the 0.01 level of significance between the pretest score and all post-test scores for both groups. The pretest score was computed prior to any patient education by the investigator. No significant difference was found between the post-test scores of either group. As indicated by the significantly lowered plaque scores after the first appointment, the improved plaque scores might be attributed to the patient education program itself. As a result of the findings of this investigation, the null hypothesis which states that there is no difference in dental patient motivation toward improved oral hygiene habits in a patient education program with a phase contrast

microscope demonstration and a patient education program without a phase contrast microscope demonstration was accepted.

Recommendations

When considering the discussion and limitations of this investigation, the following recommendations are made:

1. Control subject mortality by insuring that no additional patient education is given.

2. Utilize the phase contrast microscope demonstration (see Appendix C) with a more concise patient education program of approximately thirty minutes so that effects of the microscopic demonstration are not overridden by excessive didactic information.

3. Investigate long term motivational effects of the phase contrast microscope by increasing the length of the study to one year.

4. Utilize only audio-visual presentations for patient education in substitution for the rehearsed dialogue.

5. Incorporate a control group to be scored within the same time frame without any oral hygiene instruction in order to test the alternative hypothesis.

6. Utilize a bleeding point index to measure possible effects of the patient education program clinically.

Few research studies have been conducted to evaluate the effectiveness of the phase contrast microscope in dental patient motivation when used in conjunction with a patient education program. Due to the eomplexities of motivation, the search for motivational tools should be continued.

APPENDICES

APPENDIX A

PLAQUE CONTROL PROGRAM
REHEARSED DIALOGUE

Principal Investigator: "Do you have any questions on the filmstrip?"

(All questions answered by repetition of information given in filmstrip)

Principal Investigator: "As the film pointed out, the bacteria in plaque colonize and become organized every twelve to twenty-four hours. Once in an organized state, the bacteria give off harmful waste products causing dental decay and gum disease. Therefore, it becomes essential that we clean the mouth thoroughly once a day in order to disorganize the bacteria, therefore reducing harmful waste products (e.g., acids) in order to prevent dental disease. What I would like for you to do is thoroughly remove all of the plaque from your teeth every day. This can be done by brushing, flossing and using a staining tablet, just as the filmstrip showed you. It is very important in the prevention of dental disease, that we do these things thoroughly once every twenty-four hours. Floss first, then brush, then check yourself with this staining tablet to reveal any areas of plaque that might still be

remaining. If any areas should stain, you know you have not removed the plaque thoroughly there, and you will need to go back and brush or floss that area again until it is gone. This way you can feel assured that you are removing all of the plaque from your teeth once every twenty-four hours. Do you have any questions?"

(Again, all questions are answered by repetition of filmstrip and rehearsed dialogue.)

APPENDIX B

ORAL PHYSIOTHERAPY INSTRUCTION

Principal Investigator: "Okay, now let's review the methods for effective removal of that plaque."

(Give patient disclosing tablet.)

Principal Investigator: "Please chew this up, swish it around in your mouth for thirty seconds and spit it out; then, you may rinse."

(Patient follows instructions.)

Principal investigator and the patient now point out all areas of stained plaque and the patient's debris is scored by the investigator.

Principal Investigator: "Let's begin with the brushing technique. It is very important that you brush in a sequence so you are sure you are reaching every surface of every tooth. Begin on the outsides of the bottom teeth all the way around the arch. Continue with the insides of all the bottom teeth all the way around the arch. Repeat the same procedure for your top teeth. Then, brush all of the biting surfaces of the teeth.

Angulate the toothbrush at the gum line and use a gentle vibration or a gentle scrub back and forth

so that you can feel the bristles entering that crevice between the tooth and the gum that the filmstrip talked about."

(Principal investigator will be demonstrating during all explanations of technique.)

Principal Investigator: "Then roll the toothbrush up the side of the tooth three or four times like this. Move to the next area on the arch and repeat. Do you think you understand?"

(Patient responds.)

Principal Investigator: "Okay, you try it."

(Patient demonstrates technique in mirror. Any difficulties are cleared by repetition of dialogue.)

Principal Investigator: "Good! Now let's try the floss. Take a piece of floss about as long as your arm. Wrap a little bit around one middle finger and the rest around the other middle finger. Insert the floss between the teeth like this using a see-saw motion to get it past the contacts. Then, wrap the floss tightly around the tooth like this, guiding it down between the teeth into the crevice between the tooth and the gum. Scrape the floss up and down the side of the tooth in order to gain friction to disorganize that plaque bacteria. Wrap the floss

around the adjoining tooth in the same way and repeat. Do you understand?"

(Patient responds and demonstrates technique himself. Principal investigator will repeat instructions until flossing technique is mastered by the patient.)

Principal Investigator: "Good, now I will give you these materials to use every day at home. Remember, floss first, then brush, then check yourself with the staining tablet. If any areas stain red, go back and remove them."

(Patient is given materials and dismissed.)

APPENDIX C

REHEARSED DIALOGUE FOR PHASE CONTRAST MICROSCOPE DEMONSTRATION

There are various forms of bacteria in your mouth all of the time. These bacteria serve various purposes, for example, some of them fight off diseases. It is normal for bacteria to live in your mouth. However, when these bacteria colonize on your teeth, forming dental plaque, they become very dangerous. They are responsible for the decay and gum disease found in your mouth.

If you were to clean your teeth with a brush and floss so that no plaque remained on them, new bacteria would re-attach themselves to the tooth surface after only a few hours. If you were to take some plaque from your mouth and examine it under a microscope you would see that the bacteria are round, with a lot of fluid between each bacteria. This plaque colony is at its most immature form, having very little structure.

Now if you were to examine the same colony 2-4 days later you would find that a new kind of bacteria had entered the colony. This bacteria is elongated, shaped somewhat like a rod. It moves more than the round bacteria. You would also notice that the colony has become more structured, with less fluid between each bacteria.

The most mature form of plaque is found after 5-7 days. This plaque is very structured with no visible fluid between the bacteria. The bacteria are so close together that it is hard to pick out one and identify it unless the colony is broken up. There is also another kind of bacteria present: a spiral shaped bacteria. This bacteria moves very rapidly; so rapidly that it is sometimes difficult to see.

As the colony becomes more organized, it becomes more capable of doing damage to your oral health. This is a phase contrast microscope. It was designed specifically to allow patients to see their plaque. I am going to take a sample of dental plaque from your mouth, so that we can see what characteristics the plaque in your mouth has.

APPENDIX D

CONSENT FORM

OLD DOMINION UNIVERSITY
DEPARTMENT OF DENTAL HYGIENE

You have been selected as a possible member of a group participating in a research project. This project will test a method for more effective control of tooth and gum diseases. The method involves an explanation of dental disease, its causes and education in home care for the prevention of these diseases.

The project calls for you to come for five appointments, starting with a visit of approximately two hours at which time you will have your teeth cleaned thoroughly. Aside from this you will attend an appointment of approximately thirty minutes at which time you will receive oral hygiene instructions and materials. Following this, you will be required to return for fifteen minute appointments once a week for two weeks at which time your progress will be evaluated and reinstruction will be given as needed. The final evaluation will be at three months from the initial appointment at which time we hope to find improvement as to the effectiveness of your home care.

A follow-up study may be conducted six months following the initial appointment for a final evaluation.

At this time, you may be requested to return to the Dental Hygiene Clinic.

I consent to participate in this research project and to return to the Dental Hygiene Clinic for the three evaluation appointments, the first two at one week intervals and the last at three months. I am also aware that a follow-up study may be conducted at which time I will be recalled.

_____
Signature of Patient

PLEASE PRINT

Name _____ Home Phone_____

Address _____ Business Phone _____

APPENDIX E

TABLE 9

CALIBRATION OF SCORER ERROR

Patient Number	First Scoring	Second Scoring
1	1.33	1.17
2	.50	.50
3	1.17	1.17
4	1.17	1.17
5	.17	.17
6	.50	.50
7	.33	.33
8	1.17	1.33
9	.33	.33
10	1.00	1.00
11	1.83	1.83
12	.50	.50
13	1.17	1.17
14	.17	.17
15	.83	.83
16	.83	1.00
17	.33	.33
18	.17	.17
19	1.33	1.33

Table 9.--Continued.

Patient Number	First Scoring	Second Scoring
20	1.33	1.50
21	0.00	0.00
22	.33	.33
23	.17	.17
24	.67	.67
25	.33	.33
26	.17	.17
27	.33	.33
28	2.00	1.83
29	.17	.17
30	1.00	1.00

r = .987

APPENDIX F

TABLE 10

SUBJECT MORTALITY

Subject Number	Group Designation	Reason for Subject Mortality
7	PC	Hospitalized--multiple fractures**
8	C	Husband of #7
9	C	Contamination with additional oral hygiene instruction*
15	C	Surgery--benign tumor in mandible**
16	PC	Employment difficulty
21	PC	Relocated in Wisconsin
26	C	Contamination with additional oral hygiene instruction*
30	C	Contamination with additional oral hygiene instruction*
39	PC	Contamination with additional oral hygiene instruction*
50	PC	Long-term illness**
51	C	Contamination with additional oral hygiene instruction*
53	PC	Alcoholic
56	PC	Relocation in Florida
57	C	Contamination with additional oral hygiene instruction*
64	PC	Chicken pox**

Table 10.--Continued.

Subject Number	Group Designation	Reason for Subject Mortality
65	C	Never returned

*Senior dental hygiene students were instructed not to discuss dentally related topics with the patients; however, some patients received oral hygiene instruction accidentally. These patients were excluded from the study to avoid contamination of findings.

**Any illness of long enough duration to interfere with the normal time frame between appointments constituted sufficient reason for elimination from the study.

APPENDIX G

TABLE 11

RAW PLAQUE SCORES FOR PC

Patient Number	Pretest	First Appointment	Second Appointment	Third Appointment
1	2.67	.67	.67	1.00
4	2.83	1.00	0	.50
10	1.33	0	.17	0
11	1.83	.33	.17	.33
14	2.83	.50	.33	2.17
18	1.00	.50	.33	.50
19	1.67	.17	.33	0
22	.67	0	0	.50
23	.67	0	.17	.17
27	1.00	.33	.17	.33
28	1.33	0	.33	.17
33	2.00	.50	0	.67
34	2.00	0	0	0
37	1.12	0	.33	.33
38	1.17	0	0	.33
41	.67	0	0	.17
43	.67	.33	.33	1.00
45	2.83	0	0	0
48	2.33	.83	0	.33
49	.83	.33	.33	.33
55	1.00	0	0	0
59	2.33	.67	.50	.50

APPENDIX H

TABLE 12

RAW PLAQUE SCORES FOR C

Patient Number	Pretest	First Appointment	Second Appointment	Third Appointment
2	1.17	.50	0	.33
3	2.50	.33	.17	.33
5	1.67	.17	0	0
6	2.50	0	0	.33
12	2.67	.33	.17	1.00
13	1.50	.50	.17	1.17
17	1.00	0	0	0
20	1.67	0	0	.67
24	1.67	.33	0	0
25	.67	0	0	.33
29	.50	.33	.33	.17
31	1.67	0	0	0
32	.67	0	0	0
35	1.00	0	.33	.33
36	1.17	0	0	.67
40	1.17	0	.17	0
42	0	0	0	0
44	1.00	.67	.67	.33
46	2.67	.17	.17	.17
47	1.67	.17	0	.33
52	.83	.17	.33	.17
54	2.33	0	0	.33
58	1.33	.33	.33	.17
60	2.00	.17	.83	.83
61	1.50	0	0	0
62	2.00	.83	.67	.17
63	.83	0	0	.17

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Certificate of Dental Hygiene, May, 1975--Old Dominion University
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Experience:

Group Practice Dental Assistant--June-August, 1973.
Private Practice Dental Hygienist--June-October, 1975
Graduate Assistant, Dept. of Dental Hygiene, O.D.U.--September, 1975-May, 1976 (teaching experience in Dental Anatomy, Preventive Dentistry, Principles in Dental Auxiliary Education, and Oral Medicine and Research)
Substitute Dental Hygienist--May-August, 1976

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Honors, Awards and Prizes:

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Community Service:

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Professional Service:

1. Chairman, Financial Committee, Junior American Dental Hygienists' Association, O.D.U.--Sept. 1974-May 1975

2. Banding and Graduation Committee, Jr. American Dental Hygienists' Association, O.D.U.--Jan. 1975-May 1975.

3. Liaison Committee, Tidewater Dental Hygienists' Association/Junior American Dental Hygienists' Association, O.D.U.--Sept. 1976 to present

University Service:

Secretary, Resident Student Association--1972-73
Dental Hygiene Accreditation Committee--Sept. 1975-Dec. 1975 (Departmental)
Library Committee--Sept. 1975-present (Departmental)
Academic Advisor--Sept. 1975-May, 1976
Admissions Committee--Spring Semester, 1976

Research in Progress:

Phase Contrast Microscopy as an Adjunct to Patient Education--Sept. 1975-July 1976 (Principal Investigator)

Talks to Local Community

In-Service to Aids at Campen's Nursing Home, Norfolk, Virginia, 1975

Professional Conferences Attended:

Sept. 1974--Virginia State Dental Hygienists' Assn. Annual Session, Roanoke, Virginia
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Sept. 1975--Virginia State Dental Hygienists' Assn. Annual Session, Hampton, Virginia

Professional Conferences Attended (continued):

Sept. 1973 to Present--All Component Sessions

Curriculum Development:

Developed and produced the following videotapes:
Application of Topical Fluorides--Jan. 1976
Production of a Videotape--October 1975
Use of the Panorex--October 1975
Designed Module on Systemic and Topical Fluorides--February 1976
Designed Module on Application of Sealants--April, 1976

Consulting Activities:

Michele L. Darby, R.D.H., M.S., principal investigator; Denise M. Bowen, assistant principal investigator; May, 1976-August, 1976; "Eliminating the Mystique of Research in Dental Hygiene."