CALIFORNIA STATE UNIVERSITY, NORTHRIDGE

A TECHNIQUE FOR DENTAL HEALTH EDUCATION

PROGRAMMED INSTRUCTION

A Project submitted in partial satisfaction of the requirements for the degree of Master of Science in Health Science

by

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July, 1975
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July, 1975
ACKNOWLEDGEMENTS

I wish to thank Dr. Seymour Eiseman and Dr. Goteti Krishnamurty for their patient and generous assistance as my project committee members. I sincerely appreciate the time they spent with me providing guidance and support.

I am also indebted to Mrs. Joyce Banzhaf and her Health Education students at Beverly Hills High School for their help in testing and aiding in the final revisions of the manual.

Finally, I wish to thank my husband, Dr. Dale Cooper, for his support during the months of planning and writing this project and for his special help in drafting some of the final drawings in the manual.
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ABSTRACT

A TECHNIQUE FOR DENTAL HEALTH EDUCATION
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by
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Master of Science in Health Science

July, 1975

Dental diseases affect a large segment of the population. Surveys and studies have shown that dental caries may begin during childhood, and if left untreated, may become severe during adolescence. Advanced periodontal disease, although rare in children and adolescents, may be the result of the chronic gingivitis highly prevalent in young people.

As a result of studies revealing a high incidence of dental disease in children and young adults, dental health was included as part of the health education curriculum. Many health professionals, including dental professionals and health education teachers, designed various dental education programs to bring about favorable changes in dental health behavior. Some dental education programs
utilized conventional lectures with audiovisual aids. Others have tried a behavioral approach encouraging classroom participation and practice of oral hygiene skills.

Behavioral techniques which involve student participation and continued reinforcement have typically shown the greatest success in changing behavior. Long term changes, however, are more difficult to obtain, particularly in older children and adults. In addition, dental health may be given little classroom time in the crowded semester.

Self-instructional materials, supplemented by classroom discussion and oral hygiene practice, offer the opportunity to provide essential background information and save valuable classroom time. Programmed instructional materials in the intrinsic (branching) form can allow students to receive self-instruction in areas of dental health in which their knowledge is lacking.

Students at a local high school were given a pretest to determine their level of dental health knowledge. The results showed that the students knew very little about preventive dentistry and plaque control.

In light of the need for dental health education, and the advantages offered by programmed instruction, a programmed manual was designed. The manual consisted of data concerning dental health and disease with an emphasis on dental caries and periodontal disease. Oral hygiene
instructions and some important preventive dentistry concepts were also included.
CHAPTER I

INTRODUCTION

It is widely recognized that virtually all people, age notwithstanding, are affected by dental diseases and disorders at some time during their lives. Consequently, 90 percent or more Americans will at some time require dental care (1).

Dental diseases may begin when the primary teeth erupt and then can soon affect the permanent teeth, which typically begin to appear at age 6 years. Some studies (2, 3) have reported that approximately 95 percent of school children will at some time experience dental decay and other forms of oral pathology, e.g., diseases of the supporting tissues, injuries to the teeth and gums, or malocclusion (2:47).

The National Health Survey (1971) reported that 0.3 percent of the population between the ages of 15 and 24 years was edentulous. This indicated that over 600,000 young adults in this country were totally without teeth. With increasing age, 25 to 34 years, the incidence jumped to 4 percent of the population. This represented over 8 million people. The numbers of edentulous persons rose steadily within older age groups (4:25).
The National Health Survey (1971) also reported that 34.1 percent of the population under age 17 years had never seen a dentist, although the percentage decreased to 4.1 percent between the ages of 17 and 24 years (5:25).

Dental Caries

The California Department of Public Health reported in 1966 that by age 6 years, 30 percent of the children in California had at least one permanent tooth affected by dental caries. By age 17 years, young people had an average of 12 permanent teeth affected by decay (6:63).

The National Health Survey (1974) reported decayed, missing and filled estimates (DMF) for U.S. youths aged 12 to 17 years. The DMF index was found to be 6.2, with an average of 1.7 teeth decayed, 0.7 missing, and 3.8 filled per child. A steady rise in the DMF index from 4.0 for 12-year-olds to a high of 8.7 for 17-year-olds indicated an increased incidence of dental caries during the adolescent years (7:11).

In 1965 the American Dental Association sponsored a nationwide survey of dental health needs. The findings revealed that the need for fillings was highest among the 15 to 19 and 20 to 24-year-old age groups. The need for fillings was somewhat higher among females (8).

Routine dental care is thus a universal need during the period of adolescence. This need is supported by the above data and by scientific reports revealing an
increased vulnerability to caries during the years when the eruption of the permanent teeth is completed (8,9). This high attack rate of dental caries during adolescence is thought to be related to the immaturity of the permanent dentition, as the enamel and dentin are more permeable in recently erupted teeth. Should dental caries be delayed by at least a few years, the decay process tends to be much slower and far less destructive than if it occurs in early adolescence (9).

**Periodontal Disease**

The presence of periodontal disease in young adults should not be overlooked when their dental needs are considered (10:153). Although periodontitis (the most advanced stage of periodontal disease) has been quite rare in this age group, areas of periodontal pocket formation have been seen in as many as 3 percent of 15 to 19-year-olds in the United States (11:510). Other studies have estimated that one-fourth or more of children and adolescents may be affected by the condition ranging from gingivitis to severe tissue destruction (12, 13).

The National Health Survey (1974) reported that an estimated 5.8 percent of youths 12 to 17 years of age had chronic destructive periodontitis, although 68 percent had some form of periodontal disease, typically gingivitis (14:12).

The high incidence of gingivitis among children and
adolescents has been recognized as a possible precursor to the more serious form of periodontal disease occurring later in life (16,17).

Orban's Periodontics states:

Many dentists believe the condition [gingivitis] will resolve with the culmination of adolescence. In some cases, they may be right. Too often, however, chronic destructive periodontitis has its inception during puberty or earlier and, if left untreated, becomes progressively worse. (17:162)

Hence, the periodontal condition may worsen with age if this condition is not brought under control (17, 18).
CHAPTER II

LITERATURE RELATED TO DENTAL PLAQUE

This chapter deals with the relationship between dental plaque and dental disease. A rationale for the daily removal of plaque from the teeth is presented and has been termed "plaque control."

Dental Plaque

Plaque is a sticky polysaccharide film which adheres to vulnerable tooth surfaces. It has been shown in epidemiologic clinical research that accumulations of plaque are strongly related to the periodontal disease process and to dental caries (19,20,21,22).

Colonies of bacteria and its products are involved in the organization and constitute the destructive property of plaque. Once organized, the colonies or masses of bacteria, mostly streptococci, act upon polysaccharides within plaque to produce acids or toxins. These substances can initiate decalcification of the tooth enamel eventually leading to the development of a carious lesion (3:229). In addition, bacterial by-products are most likely responsible for producing gingival inflammation, the origin of periodontal disease. Arnim (23) observed that healthy gingival tissue responds to the presence of bacterial
masses with loss of connective tissue fibers and other inflammatory changes, leading to loss of the integrity of the tissue. Microorganisms have readily been observed in the lesions that develop.

It was demonstrated that plaque begins forming in a clean mouth (one in which all visible calculus and plaque have been removed) within 24 hours after eating. Within several hours after a meal, an initial pellicle forms containing salivary components and various types of cocci, the flora of early plaque. Later, rods, spirochetes, filamentous and other bacterial forms appear, although cocci still compose at least 50 percent of the plaque microorganisms (24,25,26).

The bacterial colonies in plaque become sufficiently organized within 24 to 48 hours to begin causing damage to the tooth and/or its surrounding structures (25). Plaque that is allowed to harden into calculus (tartar), further irritates the gingival tissue by causing mechanical irritation and harboring large amounts of bacteria. The accumulation of tartar can contribute significantly to the inflammatory process. The presence of significant amounts of calculus has been demonstrated in children as well as adults (27). Calculus, once formed, must be removed by a prophylaxis (scaling and polishing of the teeth performed by a dentist or dental hygienist) (22:1271).

It is imperative that plaque is removed at least
once every 24 hours. Clinical studies (22,23,24,28) have shown that when effective plaque removal is accomplished, significant reduction in the incidence of gingival inflammation and possible reduction in dental caries occurs.

Arnim (23) reported great success with his patients in arresting the periodontal disease and caries process when a regimen for complete plaque removal from all tooth surfaces was routinely followed.

Ripa (29) reported a study in which 384 children aged 9 to 13 years were examined to determine their oral hygiene, gingival, and dental caries status. All were residents within a fluoride deficient community. Ripa noted a gradual rise in the incidence of dental caries in 10 to 13-year-olds, although this rise did not correlate significantly with low oral hygiene scores in the examination. Other factors such as diet, anatomy of the teeth involved (certain children have pits and fissures that may be more resistant to decay), and contact between adjacent teeth, are all factors that would have to be further investigated. In addition, plaque tends to form most heavily in areas less susceptible to caries such as the gingival margin.

There is no doubt that plaque is related to caries (9:410). Studies seem to show a more direct relationship between gingival inflammation, more severe periodontal disease, and the presence of dental plaque (21, 24:347, 28). Data from the above studies indicated a strong correlation between poor oral hygiene and gingivitis
Suomi, et al. (21) conducted a three year controlled study utilizing a total of 1,248 volunteers aged 18 to 40 years. The study, completed in 1968, tested the hypothesis that gingival inflammation and destructive periodontal disease are retarded when high levels of oral hygiene are maintained:

Persons who received frequent oral prophylaxis and personal oral hygiene instruction on a regular basis had cleaner teeth, less gingival inflammation, and a slower rate of attachment loss* than control subjects who did not receive such benefits. (21:662)

A follow-up examination 32 months later revealed that a significant number of former study participants who had received preventive care and oral hygiene instruction continued to show less incidence of gingival inflammation than the group who had not received such care (28).

In a comprehensive review of the literature, Suomi (22) further concluded that maintenance of good oral hygiene, coupled with adequate dental care including removal of calculus, is effective in reducing and controlling periodontal disease. The effect of other factors such as nutrition and smoking, and the effect of various plaque and calculus reducing agents on the periodontal disease process were, in his opinion, still inconclusive.

*Loss of attachment of the gingival tissue surrounding the teeth defines a form of periodontal pocket formation in which the inflammation of the disease process can then easily spread to the underlying connective tissue and bone. This can lead to loosening of the teeth.
Dietary considerations have been studied by researchers such as Clark, Cheraskin and Ringsdorf (30,31), and Carlsson (32), who have reported some success in reducing gingival inflammation, tooth mobility, and plaque formation by controlling the diet of patients and volunteers in controlled clinical trials. Dietary regimens utilizing protein or vitamin supplements and/or dietary sucrose reduction were tested. Other authors (22,24) feel that the effects of diet on the periodontal disease process will require further clarification.

**Plaque Control**

The credit for publicizing the methods shown by research to be effective for plaque removal is most commonly given to Robert F. Barkley (33). He is responsible for coining the phrase "plaque control," which refers to the procedure that has since become a part of preventive dental instruction in many areas throughout the United States.

The plaque control method involves the use of a specifically prescribed toothbrushing technique developed by C. C. Bass, some forty years ago. This technique was virtually ignored until research within the last ten years proved its effectiveness (34). Disclosing tablets or solution, a dye which stains areas of plaque accumulation, is typically utilized to aid patients in applying the Bass Technique for toothbrushing. Dental floss, to remove
plaque from between the teeth, is an essential part of the method. The goal of plaque control is the complete removal or disorganization of the bacterial masses within plaque at least once every day (24,25).

Summary

Clinical research has shown a strong association between dental plaque and dental diseases, particularly periodontal disease. The relationship between plaque and dental caries has been less clear-cut; however, research has demonstrated a probable correlation between the presence of dental plaque and carious lesions. The plaque control method has been accepted by many dental practitioners as effective in helping to control the dental disease process.
CHAPTER III

DENTAL HEALTH EDUCATION

This chapter presents studies conducted by health professionals which attempts to justify dental health as an essential component of the school health program. Information concerning various methods of dental health education, to include behavioral techniques and self-instructional materials, is also presented.

Dental Health Education in the School Curriculum

After plaque control had gained acceptance by most of the dental profession, various programs to teach plaque control techniques in the public schools were developed (34,35). Plaque control added a new dimension to what had been a traditional part of health education.

Dental health is considered by many health educators an essential content area of the health education curriculum. Oberteuffer recommended a school dental health program consisting of dental health instruction and dental health services where necessary, offering a unified, total approach to dental needs (1:368-378). Gutman (37) suggested a program by which parents may become involved in aiding implementation of good dental health practices in
the home as well as in school. Rayner and Cohen (38), in their comprehensive position statement, supported educational programs utilizing sound behavioral techniques for motivating students towards maintenance of good dental health.

Moore (39) emphasized the teacher's role in implementing a school dental health program. He stressed a "systems approach," in which teachers are provided the materials in addition to inservice training to provide a comprehensive dental health educational program within the classroom setting.

The Framework for Health Instruction in California Public Schools (40) includes Oral Health, which is offered at both the primary and secondary levels. Concepts and suggested content relevant to the age and knowledge of children are presented as a guide for planning instructional materials and learning opportunities.

Oberteuffer advocated a sequential curriculum in dental health also utilizing the conceptual approach. He recommended that children be given the opportunity to practice dental health at school (1:368-378). He suggested:

What better way to establish the importance of tooth care than to allocate classroom time to do a good job of oral hygiene. What lesson could be more negative than to teach children that dental health is so unimportant that it deserves no time in the school schedule. (1:374)
Studies mentioned previously have shown that personal instruction and classroom reinforcement of oral hygiene procedures can be successful in achieving improved oral hygiene, decreased levels of gingival inflammation, and other benefits.

Clark et al. (35), reported a study in which two groups of sixth graders were observed to compare behavioral change after oral hygiene instruction. One group received five consecutive one-hour training sessions plus five consecutive days of plaque removal practice within the classroom. Disclosing tablets were utilized to demonstrate the presence of unremoved plaque. During the following six months, ten minutes a week was allotted to help students with brushing if staining revealed that more instruction was required. A control group received a one-hour lecture covering the same content and were given the same equipment (toothbrush, dental floss, and disclosing tablets), but no further activities to reinforce plaque control behavior were utilized.

Results showed that after eight months, the control group demonstrated only slightly higher levels of plaque than the trained group. However, six months after the instructional plaque removal program had terminated (after 14 months total), the experimental group had mouths relatively free of plaque, while plaque levels were only slightly lowered (as compared to original screening results) in the control group. The authors concluded,
"Instruction plus sustained motivation paralleled a substantial lowering in scores for plaque . . . the data suggest that good oral habits were maintained once they were established soundly." (35:74)

Meier (36) obtained similar results with sixth graders in a controlled study. The plaque reduction obtained by the use of conventional films, lectures, and diagrams was compared with that obtained by the addition of toothbrushing practice to the above techniques. It was found that the addition of toothbrushing practice (Bass Technique) caused a significant reduction in levels of plaque accumulation and gingival inflammation (36:53). The author doubted whether these results would continue as long term behavior, as one month after termination of the program, a check on several students revealed an increase in the level of plaque accumulation (36:58).

Pyke (41), a dental health educator, suggested that continued evaluation of the long term results of plaque control is needed. After examining several school plaque control programs, she concluded that more research is needed to determine the cost-benefits to the public in terms of long term results, both in children and adults.

For older children and adolescents, plaque control programs may not be successful in producing long term changes in behavior. Eiseman (42) concluded after his study of junior high school students, that educational
programs at the junior high school level can result in a significant increase in knowledge. However, behavioral changes leading to improved dental health practices may not be as easily obtained. Inputs leading to attitudes about dental health are often gained in childhood, and it is difficult to alter these attitudes and produce long term behavioral changes in older children. Consequently, plaque control programs for older children and adolescents present special problems for the health educator.

The health education curriculum at the senior high school level is crowded with areas of instruction to be introduced during an academic semester. If an entire school curriculum is articulated well with all grade levels in which health is offered, much of the content in the dental health area, such as suggested by the American Dental Association (43) and the Framework for Health Instruction in California Public Schools (40), can be offered. There is, however, never really enough time at any grade level to teach everything of value that might be taught (1:87). In light of the many content areas of importance for high school students (who will likely never receive any further organized instruction in health), dental health may be given little classroom time. Straightforward techniques such as lecture may be utilized rather than the more time consuming behavioral practice of oral hygiene skills.
The importance of dental health education has been established. As an alternative to the educational programs described, self-instructional materials may offer a partial solution to the problem of inadequate classroom time.

Statement of the Problem

The purpose of this project was to design an intrinsically (branching) programmed instructional manual to introduce plaque control and preventive dentistry for the senior high school student. The manual was designed as home study to supplement classroom instruction.

Self-Instructional Materials

The dental literature reported examples of success in producing favorable behavioral change utilizing self-instructional materials (44,45). Such materials can never replace the valuable feedback that personal or classroom instruction can provide. However, materials for self-teaching can be utilized as a source of basic information or background data that an individual can learn at his or her own speed. At a later time, such instruction may be supplemented where needed with classroom lecture or individual attention to answer questions and add pertinent information (1:154:43).

Zaki and Bandt (44), reported success in improving manual skills for plaque control, and consequently observed improved oral hygiene in adult patients utilizing a self-
teaching manual. The booklet, "Clean Teeth Brighten Your Smile," was developed by the University of Minnesota. This booklet consisted of twenty-four pages with photographs and diagrams, and was designed for a lay audience. It was hoped that the booklet would stimulate interest in preventive dentistry while offering instruction in plaque control procedures.

The authors concluded that the success shown has important implications for use in the dental office where oral hygiene instruction may often be given in a very abbreviated form, if at all (44:495).

Another self-teaching method for patient education was described by Weiss and Fox (45). The system, "Self-Learning Audio-Visual Education" (S.A.V.E.), combined a self-teaching booklet and tape cassette into an educational package that could be administered in four dental office appointments of 30 to 45 minutes in length. Diet and oral hygiene skills were emphasized. Patients received some counseling by a trained nondental educator to supplement the instruction. Over 400 patients of varying ages (approximately 160 were under 20 years of age), completed the program.

Results showed that significant improvement in both knowledge and plaque control skills occurred, particularly in the more frequent use of dental floss. The authors suggested that the S.A.V.E. method offered a low-cost, efficient, and time-saving method for patient education.
Self-instruction in the school setting may take the form of programmed instruction to take advantage of the qualities offered by self-teaching materials.

**Programmed Instruction in Health Education**

Hurt (46) presented a rationale for the use of programmed instruction in health education. He compared the relative merit of conventional versus programmed instruction in developing self-instructional materials for health education.

The conventional model, as described by Hurt, does not require the development of precise instructional objectives. This fact is the central weakness of the model as the lack of specific objectives can lead to narrowly-based and unsystematic planning of learning activities. The conventional model also may not utilize valuable aids such as pretests to determine the prerequisite skills the learners will need.

The "systems approach model," credited by Hurt to Banathy (47), can improve upon the conventional approach in the following six ways:

A. A clear definition of purpose  
B. Statement of precise performance objectives  
C. Development of criterion test for preassessment and evaluation of terminal performance  
D. Identification of learning tasks  
E. The design of the self-instructional system  
F. Assessment of the efficiency of the system (46:543).
Further explanation:

A. The definition determines the entire self-instructional package.

B. Precise performance objectives allow the student to know exactly what is expected of him.

C. A criterion test helps the writer identify the skills the learners already possess. It can also be compared to posttests after the material has been developed and utilized.

D. Identification of learning tasks (task analysis) requires that the programmer carefully consider prerequisite behaviors needed and construct a realistic body of terminal objectives to meet the purpose of the program.

E. The design of the system may be summarized:

1. task analysis
2. sequencing of content from simpler to more complex concepts, with periodic reinforcement
3. programming materials and arranging them in sequence with narrative and self-testing sections
4. checking for accuracy--this can be done by using health specialists in the field of study and by student feedback.

F. To determine efficiency, small groups of students may be tested, and then larger classes. A final revision may be necessary (46).

Programs may be designed in the linear or intrinsic model. In the linear model, information is presented in frames with a few steps or points of information presented
at a time. This model relies on conditioning the learner to make the correct responses by various cues. Self-testing follows each group of frames, and the program proceeds in a straight progression from simple to complex, as in a regular textbook (47).

The intrinsic model presents information in the "scramble book" fashion, as described by Hurt:

The student is presented the first unit of information and the first multiple choice question. Each of the alternatives to the question is identified by a different page number. The student then selects what he believes to be the correct answer and turns to the indicated page. If his choice is correct, a new problem is posed incorporating the learned material. If his choice is incorrect, he reads the additional information which is presented for the purpose of helping him to understand his error, and he is referred back to the original question to select the correct answer. The pages of a book patterned after the intrinsic model are randomly assigned. This does not permit the student to ignore a question and pass on as is the case in the books patterned after the linear model. (46:546)

The intrinsic model has other advantages as well. In helping a student understand an error, the programmer can include information that the teacher would provide in the formal classroom when such an error is made. The intrinsic approach offers a chance for a student to decide whether supplemental material is needed, and if not, the student can leave out the extra material and not be needlessly bored. With this model, the student is also less likely to look at an answer prematurely, as is possible in the linear model. Hurt summarized:
The intrinsic model of programming is recommended because of its built in ability to provide a variety of different amounts and kinds of materials for students and its ability to get students to utilize internal processes in arriving at concepts rather than the operant theory of conditioning that appears to be characteristic of the linear model. (46:547)

Shevlin (48) reported success in utilizing an intrinsically programmed unit on alcohol education at the secondary level. In this study, a control group of students received traditional classroom instruction while an experimental group received the same material in the form of intrinsic (branched) programmed instructional materials. Results showed that the programmed instructional materials were highly effective in improving knowledge, and in this case, the experimental group learned significantly more than the control group.

Another study by Glass and Campbell (49), utilized three groups of students to test results of a programmed instructional unit concerning venereal disease. One group was given the programmed learning manual which they read during the class period, and they received no supplemental information. The second group was given a series of lectures covering similar material but were also shown a film. The third group was given the programmed manual to read at home but were also given the opportunity to ask questions in class. In addition, this group received some of the lecture material in class and the film.

It was found that all three methods produced a
significant gain in knowledge. However, retention of knowledge as measured by a retention test given eight weeks later showed the third group to have retained somewhat more information and at a higher level (more students had higher scores).

The authors observed that less classroom time was needed for the combined approach than for the conventional instruction. There was more time left over for questions and discussions, and the programmed instructional manual provided the background for discussions to take place.

**Dental Health and Programmed Instruction**

Bratthall (50) reported a controlled study in which an experimental group of army recruits in Sweden were given a programmed manual (linear) for self-instruction in oral hygiene. Both the control and experimental groups were given a toothbrush and dentifrice, but the control group received no instruction.

It was found that knowledge increased significantly in the experimental group. Levels of dental plaque and gingival inflammation were also lowered. The authors noted that these results were obtained with a minimal amount of personnel and time and that the programs were successful even among recruits with a relatively low educational level (elementary school only).

A central weakness of the above study was the lack of a comparison of results obtained from the manual to
results achieved with some alternative form of instruction. However, in light of the success that has been shown utilizing programmed instruction in health education, programmed instruction is often indicated, particularly at the senior high school level.

Programmed instruction in dental health offers the advantage of providing pertinent information in an organized manner according to specific predetermined objectives. Studies have shown programmed instruction to be an effective means of improving knowledge in a format that can be interesting as well as informative for the student. It can provide an efficient, time-saving method for introducing dental health and plaque control techniques within the crowded senior high school health curriculum.

Summary

Plaque control instruction and practice is an effective means of contributing to an increase in knowledge about dental health and is related to a decrease in dental disease, particularly gingival inflammation.

A programmed self-instructional manual in dental health can provide data concerning plaque control and preventive dentistry, and when assigned as homework prior to the beginning of the dental health unit, can contribute to the more effective use of valuable classroom time.
CHAPTER IV

TARGET POPULATION AND ENTERING BEHAVIORS

Description of the Population

The population for which the manual was designed was senior high school students. Ages ranged from 14 to 18 years, although the average age of a student enrolled in "Health Education" at the 10th grade level was 15 years.

The author assumed that the students had at least an average senior high school level reading ability, enabling them to comprehend the concepts, instruction, and directions given in the book.

Entering Behavior

Upon surveying the dental health knowledge of senior high school students in a selected high school, it was found that a great majority knew very little about plaque control and preventive dentistry. Sixty-three pretests were given to four separate health classes. Students answered an average of 41 percent of the questions correctly (range: 20 to 80 percent).

From the testing and classroom discussion that followed, it was concluded that students would benefit from background information and instruction concerning:
1. Teeth and related supporting structures
2. Dental plaque
3. Caries and periodontal disease
4. Use of toothbrush and dental floss
5. Preventive dentistry for children and adults
CHAPTER V

THE MANUAL

Introduction

The manual is designed as a homework assignment to introduce plaque control and preventive dentistry. It is not intended as a comprehensive book covering the entire area of dental health.

With the background information and instruction provided by the manual, the classroom teacher will be able to cover the basic essentials of preventive dental care for children, adolescents, and adults while answering questions concerning the data presented in the manual. Supplemental information, if desired by the teacher or students, may be included in the one or in an additional classroom session.

Format

The major portion of the manual is programmed in the intrinsic (branching) model. Some of the material may be a review for some students; they will be able to omit the material or pass through the section rapidly. Supplemental information is provided for problems the students may have with the more difficult concepts or instruction. The manual is organized into four sections:
1. The Tooth and Its Supporting Structures
2. Dental Plaque and Dental Diseases
3. The "Plaque Control" Method
4. Some Preventive Dentistry Concepts

Behavioral Objectives

The following objectives were utilized in the selection of material and in the organization of the manual:

The student will be able to:

1. Describe the components of the teeth and supporting structures.
2. Define dental plaque.
3. Define dental caries and periodontal disease.
4. Demonstrate the correct use of the toothbrush and dental floss according to the "plaque control" method.
5. State at least 3 relevant concepts of preventive dentistry as it relates to children and adults.

Materials Needed

Ideally, the school may provide a toothbrush, small container of dental floss, and 3-4 disclosing tablets for each student. If the resources to purchase these materials are not available, they may be obtained gratis from various dental professional organizations, the PTA, or other organization.


APPENDIX A

TEXT OF THE MANUAL
AN INTRODUCTION TO PLAQUE CONTROL
AND PREVENTIVE DENTISTRY

Judith E. Cooper
INTRODUCTION

This manual is designed to give you a brief introduction to preventive dentistry through an understanding of dental health and disease. Information concerning care of the teeth is also presented.

You will find that this manual is different than an ordinary textbook in that you will have some choice in the order it is to be read and in the material you will need to cover. After each few sentences of information you will be asked to answer a question about the information by filling in blanks. The answers to these questions will usually appear right below the question and you may wish to cover the answers with a piece of paper. The questions are designed to help you learn.

Please read all directions carefully and the manual will be easy to follow. Enjoy this book at a comfortable pace; it will be easier and go faster than you might expect.

Proceed to Section I, Page 1
SECTION I

THE TOOTH AND ITS SUPPORTING STRUCTURES
DENTAL HEALTH AND DISEASE

Directions: Compare the two teeth above. Circle the word that represents the most accurate description of each tooth.

<table>
<thead>
<tr>
<th>Structure</th>
<th>Tooth #1</th>
<th>Tooth #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enamel</td>
<td>Continuous/Broken</td>
<td>Continuous/Broken</td>
</tr>
<tr>
<td>Dentin</td>
<td>Continuous/Broken</td>
<td>Continuous/Broken</td>
</tr>
<tr>
<td>Pulp</td>
<td>Penetrated/NotPenetrated by decay treated</td>
<td>Penetrated/NotPenetrated by decay treated</td>
</tr>
<tr>
<td>Root</td>
<td>Abscess at/No Abscess end</td>
<td>Abscess at/No Abscess end</td>
</tr>
<tr>
<td>Bone Level</td>
<td>High/Low</td>
<td>High/Low</td>
</tr>
<tr>
<td>Gingiva (gum) Level</td>
<td>High/Low</td>
<td>High/Low</td>
</tr>
</tbody>
</table>

Turn to next page for correct answers...
Correct answers:

<table>
<thead>
<tr>
<th></th>
<th>Tooth #1</th>
<th>Tooth #2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enamel</td>
<td>Continuous</td>
<td>Broken</td>
</tr>
<tr>
<td>Dentin</td>
<td>Continuous</td>
<td>Broken</td>
</tr>
<tr>
<td>Pulp</td>
<td>Not Penetrated</td>
<td>Penetrated</td>
</tr>
<tr>
<td>Root</td>
<td>No Abscess</td>
<td>Abscess</td>
</tr>
<tr>
<td>Bone Level</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Gingival Level</td>
<td>High</td>
<td>Low</td>
</tr>
</tbody>
</table>

It is evident that Tooth #1 is structurally sound and Tooth #2 has been affected by dental disease.

The following section provides a brief description of tooth structure. This information is a necessary background for an understanding of the dental disease process which will be presented in the sections to follow.
Label the following diagram

Write your answers here:
1.
2.
3.
4.
5.

Next page...
Correct answers:

1. Enamel
2. Dentin
3. Pulp
4. Crown
5. Root

Did you miss any?  

Yes - Turn to page 5  
No - Turn to page 6
Observe the tooth below:

![Diagram of a tooth with labeled parts: Enamel, Pulp, Dentin]  

Label the diagram below:

![Diagram of a tooth with labeled parts: Enamel, Pulp, Dentin]  

Now go back to page 3 and correctly label the diagram.
The crown of the tooth is covered by ___. Underneath is ___, which is harder/softer, and consequently more vulnerable to decay.

(enamel, dentin, softer)

Nerves and blood vessels are contained in the ____. The presence of the pulp gives the tooth the quality of being ___.

(pulp, alive)
The root of the tooth is surrounded by the hard _____, which acts as a supporting structure. Bands of fibers attach the tooth to the bone and are collectively called the periodontal ligament (or membrane). These fibers, although softer than bone, also aid in the _____ of the tooth.

(alveolar bone, support)

The visible covering that surrounds and attaches to the base of the crown is called the _____.

(gingiva)
An important property of the gingiva is the fact that it surrounds the base of the crown in such a way that a cuff is formed creating a trough around the tooth. This trough is called the gingival sulcus, and will be further mentioned as we discuss the health of the gingiva.

The adult dentition (set of teeth) is normally composed of 32 teeth. Four types are generally present. They include incisors, cuspids (or canines), bicuspids (or premolars), and molars.

There are 32 teeth in the adult dentition which include four different types.

(32, four)
The deciduous dentition (baby teeth) are smaller in size and fewer in number. There are 20 teeth in total, 10 in each arch. Children have 8 incisors, 4 cuspids, and 8 molars.

The deciduous teeth are ________ than the permanent teeth, and there are only ___ in number.

(smaller, 20)

You are now ready for the first self-test.
SELF-TEST #1

Directions: Select the best answer and write the letter in the space provided at the top of page 11. When you have finished, find the row of letters that correspond to the combination of letters you have chosen and turn to the page indicated.

1. The hard structure that forms the outermost covering of the crown of the tooth is the:
   A) dentin
   B) enamel

2. The hard structure constituting the major support of the tooth in the mouth is the:
   C) periodontal ligament
   D) alveolar bone

3. The soft structure which attaches the tooth to the bone is the:
   E) periodontal ligament
   F) gingiva

4. The gingival sulcus may best be described as
   G) A trough of tissue surrounding the bone
   H) A trough of tissue surrounding the tooth

5. The part of the tooth that is "alive" is called the:
   I) Root
   J) Pulp

next page ...
### SELF-TEST #1

**ANSWER CODE SHEET**

Write your answers here

<table>
<thead>
<tr>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q5</th>
<th>Turn to page</th>
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<tbody>
<tr>
<td>A</td>
<td>C</td>
<td>E</td>
<td>G</td>
<td>I</td>
<td>12</td>
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<td>B</td>
<td>D</td>
<td>F</td>
<td>H</td>
<td>J</td>
<td>16</td>
</tr>
</tbody>
</table>

You have missed 3 or more questions on the self-test. Please re-read the section starting on page 3.
Enamel forms the hard outer covering of the crown of the tooth. The dentin, which is softer, lies underneath.

You may now continue with the program, beginning on page 21.
You have missed 2 questions on the self-test. Review the material starting on page 5 until you find your errors, then re-take the test.
You have missed 2 questions on the self-test. Review the material starting on page 7 until you find your errors, then re-take the test.
You have missed question #2 or #3. Examine the diagram below:

Bone constitutes the hard supporting structure of the teeth. The periodontal ligament is a soft supporting structure, i.e., it is made up of tissue fibers and attaches the tooth to the bone of the jaw (alveolar bone).

In a skeleton in which all of the soft tissue is gone, teeth may still remain in the jaw (if they were not lost during life) when there is a normal level of bone left. Hence, bone is the principal supporting structure.

Continue reading on page 21.
You have missed 2 questions on the self-test. Review the material beginning on page 8 until you find your errors, then re-take the test.
You have missed question #4. Examine the material below:

The gingival sulcus is a trough of tissue that surrounds the tooth. It is normally not visible in the average mouth as a large space as healthy gingiva fits snugly against the tooth.

The gingival sulcus extends under the gingiva but is usually only 1 to 3 millimeters deep and is hard to see. Its importance will become apparent as you continue with this program.

Continue reading on page 21.
You have missed Question #5. Find your error on page 6, then continue reading on page 21.
CONGRATULATIONS!! You have answered all 5 questions correctly. Continue reading on page 21—or take a break until you are ready. Have a snack—no sugar please!—then continue reading on page 21.
SECTION II

DENTAL PLAQUE AND DENTAL DISEASES
How may dental disease be recognized?

Below are symptoms that might indicate the presence of certain dental diseases. Turn to the page number at the right for more information.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Gingivitis</th>
<th>Periodontitis</th>
<th>Dental Caries</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bleeding gums</td>
<td>X</td>
<td>X</td>
<td></td>
<td>24,28</td>
</tr>
<tr>
<td>Pus from the gumline</td>
<td></td>
<td>X</td>
<td></td>
<td>28</td>
</tr>
<tr>
<td>&quot;Recession&quot; or lowering of the gums</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Loosening of the teeth</td>
<td></td>
<td>X</td>
<td></td>
<td>28</td>
</tr>
<tr>
<td>Sensitivity to hot, cold, sweets, etc.</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>24,28,31</td>
</tr>
</tbody>
</table>
DENTAL PLAQUE

Plaque is a sticky, nearly invisible film that adheres to the teeth. It consists of saliva, food debris, bacteria, and bacterial products.

Plaque begins forming soon after a meal and within 24 hours may begin to cause damage to the teeth or surrounding structures.

Plaque is a _____ film that may begin to cause damage within _____ hours after eating

(sticky, 24 hours)

Bacteria within plaque are the most damaging component. These bacteria act upon food debris, especially sugars and starches, to produce acids or toxins and more layers of sticky plaque.

Within plaque are numerous _____ which not only produce more sticky plaque, but _____ or _____ as well.

(bacteria, acids or toxins)
If left undisturbed (24 hours or longer), sufficient amounts of bacterial acids and toxins are produced to begin causing:

1. Decalcification of the enamel (removal of the hard calcium and other minerals) leading to dental decay.

2. Inflammation of the soft tissue (gingiva).

Bacteria may be responsible for beginning the processes of dental ___ and ___ of the gingiva.

(decay, inflammation)

Unremoved accumulations of plaque may eventually harden into deposits of calculus (tartar). Calculus consists of various materials, originating in the saliva, that are deposited onto the tooth surface in varying amounts. It harbors huge quantities of bacteria and is irritating to the gingival tissue.

Removal is essential. Once formed, calculus can only be completely removed by a dentist or dental hygienist.

Calculus is a hard/soft deposit that forms on the tooth surface. It acts as an _______ to the gingival tissue and harbors _______.

Calculus must be _____ by a dentist or dental hygienist.

(hard, bacteria, removed)
GINGIVITIS

Gingivitis is the first, but mild and reversible stage of periodontal disease. It is an inflammation confined to the gingiva.

Gingivitis is characterized by redness, swelling, and bleeding upon gentle probing (or brushing). It may or may not be painful.

Gingivitis may be defined as a mild ______ of the gingiva.

(inflammation)

The most significant cause of gingivitis is a substance called dental plaque.* What is the component of plaque most directly responsible for damaging the gingiva?

Choose an answer below and turn to the page indicated:

<table>
<thead>
<tr>
<th>Choice</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) saliva</td>
<td>25</td>
</tr>
<tr>
<td>b) food debris</td>
<td>26</td>
</tr>
<tr>
<td>c) bacteria</td>
<td>27</td>
</tr>
<tr>
<td>d) don't know</td>
<td>25</td>
</tr>
</tbody>
</table>

+Peri -- "around" odontal "tooth" Periodontal disease affects the structures that surround and support the teeth.

*New term? See page 22.
You will find a brief section on dental plaque beginning on page 22. Read this section then return to page 24 and select the correct answer.
Your answer is partially correct. Food debris, especially from starches and sugary foods, are involved in plaque formation. However, bacteria which normally inhabit the mouth begin multiplying in great numbers within plaque. They produce acids and toxins which cause inflammation of the gingiva. Consequently, bacteria are the most damaging component of plaque.

Continue reading on page 28 or choose another symptom from the chart on page 21.
Correct. Bacteria produce acids and toxins which can irritate and cause damage to the gingival tissue.

Continue reading on page 28 or choose another symptom from the chart on page 21.
PERIODONTITIS

Periodontitis is the more serious form of periodontal disease.* It may be characterized by bleeding of the gingiva, receding or lowering of the gingiva, sensitivity to hot and/or cold, loosening of the teeth, pus from the gumline, or pain.

Gingivitis, if left untreated, may develop into periodontitis, the effects of which are often not reversible.

The lower the level of the bone and gingiva the more severe is the destruction of the supporting structures. Observe the teeth below:

![Diagram of teeth with gumline and bone levels]

Circle the correct words in the sentence:

One may conclude that tooth #1 shows the least/most amount of periodontal damage and tooth #4 shows the least/most destruction.

Correct response next page...

*Definition may be found at the bottom of page 24.
The correct responses are: Tooth #1 - least
Tooth #4 - most

A tooth affected by severe periodontitis as shown by tooth #4, would probably be lost.

Accumulations of calculus (tartar),* some of which may lie deep under the gingiva in a deepened gingival sulcus, are usually associated with the periodontal disease process.

Removal of the irritating, bacteria-laden calculus is an essential part of the treatment of periodontal disease.

*Definition page 23.
A patient may be treated by a dentist or dental specialist called a **periodontist** to halt the progression of periodontal disease. Any treatment provided requires the maintenance of meticulous oral hygiene by daily plaque* removal.

The dental specialist who treats diseases of the supporting structures of the teeth is called a **periodontist**. Inhibiting the progress of periodontal disease requires the maintenance of good **oral hygiene** practices.

In addition to complete removal of all calculus deposits, treatment may involve a special type of surgery performed in the mouth.

( periododontist, oral hygiene )

Continue on page 31, or choose another symptom from the chart on page 21.

*New term? See page 22.
DENTAL CARIES (DECAY)

Which tooth is most damaged by decay? Select a tooth and turn to the indicated page.

<table>
<thead>
<tr>
<th>Tooth</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tooth #1</td>
<td>32</td>
</tr>
<tr>
<td>Tooth #2</td>
<td>33</td>
</tr>
<tr>
<td>Tooth #3</td>
<td>34</td>
</tr>
<tr>
<td>Tooth #4</td>
<td>35</td>
</tr>
</tbody>
</table>
Tooth #1

Only the enamel has been affected at this stage. The dentin and pulp are still intact.

This is the least damaged tooth. Turn to page 31 and select another.
Tooth #2

This tooth shows decay which has affected the dentin (side arrow). It is the second most damaged tooth. Choose another on page 31.
Decay has spread through both the enamel and dentin and into the pulp. When this occurs, an abscess, or infected area, will usually form at the end of the root showing that decay has "infected" the entire pulp. An abscess may or may not be accompanied by pain.

At this point, only a root canal procedure, in which the pulp is removed and the canals sterilized and sealed, will "save" the tooth from requiring extraction. Most teeth—with healthy surrounding tissues—can be treated and restored in this manner.

The bacteria in dental plaque* are strongly related to this decay process.

Turn to page 36

*New term? See page 22.
Tooth #4

This tooth is nearly the most damaged as the dentin has been penetrated by decay in two places. However, the pulp is still unaffected.

Now select the correct tooth on page 31.
When you have arrived at this page, you have observed the entire decay process.

Prior to the abscessed stage (Tooth #3), various dental restorations such as fillings can repair the damage and prevent the spread of new decay into the pulp. The body does not "grow" new tooth structure.

Dental restorations (also onlays, inlays, crowns, bridges, etc.) are designed to return a damaged tooth to normal structural form and function. In the process of restoring teeth, all decay is removed, and with proper care, will not return.

What can you conclude about dental decay?

Choose one:

1. It is a good idea to have decayed teeth filled before much tooth structure is lost or the pulp is affected.

2. Daily removal of dental plaque from all tooth surfaces will help prevent decay.

3. Both 1 and 2
I only gave you one choice because I knew you would get the right answer!

You are now ready for the second Self-Test
SELF-TEST #2

Directions:

Choose the best answer and write the letter in the space provided at the top of page 39.

1. Within dental plaque the most damaging component is:
   A) Bacteria
   B) Food debris
   C) Saliva

2. Plaque may best be described as:
   D) Food debris
   E) Sticky film

3. Loss of teeth in severe periodontitis is most directly related to
   F) Inflammation of the gingiva
   G) Loss of the supporting bone

4. One means of aiding in the prevention of dental decay involves:
   H) Fillings
   I) Effective plaque removal
### SELF-TEST #2

**ANSWER CODE SHEET**

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Page 39
You have missed two or more questions on the Self-Test. Review the material beginning on page 22.
You have answered all four questions correctly.
Proceed to section 3.
You have missed question #1 or #2. The answers can be found in the section on Dental Plaque beginning on page 22.

When you find your errors, continue reading on page 45.
You have missed question #3. Re-read the section beginning on page 27 until you find your error, then proceed to Section 3, page 45.
You have missed question #4. The answer can be found on page 36. When you find it, proceed to Section 3, page 45.
SECTION III

THE "PLAQUE CONTROL" METHOD
As mentioned earlier, plaque is a sticky, nearly invisible film that adheres to the teeth. In order to remove plaque, it is important to understand where it accumulates most.

Areas of high plaque accumulation include:

1. The area adjacent to the margin of the gingiva (gumline) and the gingival sulcus

![Gingival Sulcus and Gingiva Margin Diagram]

2. Between the teeth

3. Biting surface of molars and bicuspids

Look at the pictures below. Which picture correctly shows where plaque would most likely be?

![Plaque Accumulation Diagrams A, B, C]

Correct answer next page...
The correct answer is "C."

In most people, plaque accumulates most heavily at the gingival margin or gumline.

Two other areas where plaque is likely to accumulate include:

1. Between __________.
2. ______ surface.

(Between the teeth, Biting (or chewing) surface)

You are now ready to begin the process of plaque removal. The following materials will be needed.

Your instructor will provide:

1. Toothbrush (soft, nylon type is recommended).
2. Dental floss
3. Disclosing tablets

At home you will need:

1. Mirror
2. Good light source (a small flashlight is helpful but a well-lighted bathroom is sufficient)
3. Glass of water (for rinsing)
From what you know about where plaque is usually found, what two areas (from the list below) do you think might be reached most adequately by the toothbrush?

1. gingival margin
2. biting surface
3. between the teeth

If you picked 1 and 2, you were correct.

The bristles of the toothbrush do not reach the entire area that lies between the teeth. Dental floss is used to clean this area.

In order to identify plaque, you will use a "disclosing tablet" which stains the plaque on your teeth a red-pink color.

Take one of the tablets and chew it up, spreading parts of the dissolved tablet on the various tooth surfaces with your tongue. Rinse once with a sip of water. You may rinse the remaining tablet particles out, you do not have to swallow them.

Examine your teeth in the mirror. Areas of plaque accumulation will appear _______. Clean tooth surface will appear light pink or white.

(red-pink)
Do you see the plaque on your teeth?

Yes: page 49

No: see below

Possible explanations for not observing the plaque:

1. Did you chew the tablet completely, spreading the dye over the teeth with your tongue?

2. Did you rinse all of the excess tablet particles out well? Too many remaining tablet particles will obscure the color difference that is necessary for observing the plaque.

3. Did you brush your teeth recently and use dental floss? You may have been successful in removing some or all of the plaque. Check carefully, especially the back teeth.

If you need to chew another tablet, do so and then proceed to page 49.
To remove plaque at the gingival margin and gingival sulcus, place the bristles of your toothbrush at a 45 degree angle to the long axis of the tooth (as shown below) where the gingiva and tooth meet (gingival margin).

45°

Toothbrush
Gingival margin

Gingival margin
Toothbrush

Lower Tooth
Upper Tooth

On the upper teeth, the bristles will face upwards/downwards, and on the bottom teeth, the bristles will face upwards/downwards.

(upwards, downwards)

Now, jiggle the toothbrush horizontally back and forth. Use firm but not excessively hard pressure. The bristles should move in a vibratory motion. It is not necessary to use broad, hard strokes.

Using this method, you can clean approximately two teeth at a time.

The above method is called the Bass Technique.
You may wish to begin brushing on the upper teeth, at the back molars facing the cheek. Proceed around to the opposite side (2 teeth at a time). Then, brush the surfaces facing the tongue on the upper teeth. You will have brushed half your mouth.

The same procedure is followed for the lower teeth. Make sure the bristles face in a downward direction.

To adjust brushing in the curved front portion of your mouth, the tip of the toothbrush may be used (1-2 teeth at a time) with the same vibratory motion.

If you find plaque near the biting edges, several rolls of the brush as shown will remove it.

When you have completed the above steps, you will have brushed four surfaces: upper and lower teeth facing the cheeks and upper and lower teeth facing the tongue.
To remove plaque from the biting surfaces of molars and bicuspids, the toothbrush may be used in a circular vibratory motion. Make sure the bristles are worked into the grooves and crevices.

As a rule of thumb, brushing is not complete until you have covered a total of _____ surfaces. Can you name them?


Our plaque removal procedure is still not complete. We have still not removed plaque from _____ _____ _____ with dental floss.

(between the teeth)

next page ...
The procedure for the use of dental floss is best learned by following the steps below:

1. Tear off 1 approximately 18" piece of floss.

2. Wrap the free ends of the floss securely around each ring finger so that floss will not slip when hands are held apart (as shown).

![Hand diagram]

3. With floss still held on ring fingers, turn hands so that floss is held between thumb and index finger of each hand, allowing about 1 inch of slack (as shown).

![Hand diagram]

4. Place thumb and index finger of one hand slightly behind the front teeth and the other thumb and index finger slightly in front of the front lower teeth. The floss will then extend over the top of these teeth.

5. Carefully insert the floss with a short sawing motion between any two of the lower front teeth until the floss meets the firm resistance of the gum tissue (floss should appear to penetrate 1-2 millimeters below the gumline).

6. Raise and lower floss with a slight sawing motion to clean both sides of the contact area between the two teeth (as shown on next page ...).
7. Carefully lift floss out with a sawing motion.

8. All areas between the teeth can be flossed in a similar manner. The back teeth may require some modifications of the finger position (as shown below), but with practice, all areas will become routine.

Don't forget to pass the floss behind the back surface of the last back molars.
To determine whether you have successfully removed all plaque, chew another disclosing tablet as described on page 47.

Did you find any plaque?

Yes: page 55
No: page 56
Some helpful hints regarding plaque removal that might explain why you were not successful:

1. Close your mouth slightly when brushing the back teeth. This relaxes the cheek muscles somewhat and makes it easier to reach these areas with the toothbrush.

2. Make sure you jiggle or vibrate the toothbrush back and forth at least ten times in each area (every two teeth). Remember plaque is sticky.

3. When you floss, make sure you gently saw the floss up and down leaning the floss across the sides of both teeth to clean each adjacent surface (as shown).

Brush and/or floss once more in needed areas, then restain with the disclosing tablet. You will probably have removed all plaque. If so, proceed to page 56. If plaque still remains, go back and review the section from page 49.
SELF-TEST #3

Directions:

Choose the best answer and write the letter in the space provided at the top of page 57.

1. The correct position for toothbrushing using the Bass Technique is:

   A B C

2. The type of movement of the toothbrush employed when performing the Bass Technique is:

   D A vibration or jiggle in a horizontal direction.
   E A vibration or jiggle in a vertical direction.

3. The above method will best remove plaque from:

   F The gingival margin/sulcus
   G Between the teeth

4. Proper use of dental floss will remove plaque from surfaces each time it is passed between the teeth.

   H Biting or chewing
   I Adjacent
SELF-TEST #3

ANSWER CODE SHEET

Write your answers here:

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You have missed two or more questions on the Self-Test. Please re-read the section starting on page 45.
You have missed Question 1, 2, or 3. Find your error on page 49, then proceed to page 62.
You have missed Question #4. Find your error on page 52, then proceed to page 62.
CONGRATULATIONS!! You have answered all four questions correctly. Take a break, then proceed to Section IV, page 62.
SECTION IV

SOME PREVENTIVE DENTISTRY CONCEPTS
Information in this section will probably be discussed in class. Choose from the list below:

<table>
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<td>2. Vitamins</td>
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<td>3. Dental Care for Children</td>
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<td>4. Fluoride</td>
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<td>5. Routine Care: Why?</td>
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DIET AND DENTAL HEALTH

Repeated or continuously ingested quantities of sugar are strongly related to:

1. growth of bacteria within the mouth
2. formation of dental plaque

Consequently, sugar should be eaten only once or twice a day, rather than all day long (as for example, when candy mints are repeatedly eaten).

It is not so much the quantity of sugar consumed but the frequency it is eaten that is related to dental decay (and perhaps to periodontal disease).

Watch out for hidden sugars. Many non-sweet tasting items such as some crackers, for example, contain significant quantities of sugar. In addition, many starchy foods are sticky and enable sugar to remain on the tooth surface for longer periods of time than with less sticky foods.

Thus, reading package labels will often indicate the presence of sugar in many products.

Sugar may be listed as sucrose, dextrose, glucose, etc.
VITAMINS

Severe vitamin deficiencies are probably related to periodontal disease. The effect of borderline deficiencies, however, is still not yet clear.

Therefore, if a diet is ______, with amounts of foods and vitamins thought to be necessary, there should be little danger of periodontal disease due to vitamin deficiency.

(balanced)
DENTAL CARE FOR CHILDREN

Children who are given a baby bottle with soda pop, apple juice, or other sugar-containing product should not be allowed to "carry around" the bottle for any length of time. They should never take the bottle to bed (unless it contains water).

As you might have guessed, the continuous bathing of the teeth in a sugary solution could produce severe [P: decay]. This condition is referred to as "the baby bottle syndrome."

Yes, the baby teeth are important. If they are lost prematurely, various orthodontic* problems may occur.

Children should usually see the dentist when they are approximately two and one-half to three years of age, as the [P: primary] teeth are usually present by this age. In regard to children:

1. An adult should brush a child's teeth twice a day (after breakfast, before bed) until the child can do an adequate job alone. Toothbrushing with a child's soft nylon brush may begin as soon as the first baby teeth appear.

2. Proper care at home will help insure that a child's first visit to the dentist will be a pleasant one (the child is less likely to be suffering the pain of an abscessed tooth, for example).

*Orthodontics—the dental specialty that deals with straightening of the teeth.
Fluoride is an element that when incorporated into the tooth enamel can make the enamel more decay resistant.

It is thought to be most beneficial when teeth are forming. Therefore, especially in areas where there is no natural or artificial fluoridation of the water, fluoride containing vitamins may be given to pregnant women (when the baby's primary teeth are developing), and to young children (when their permanent teeth are being formed).

A dentist or dental hygienist may apply ______ to the teeth in a dental office. This is also beneficial.

A physician or dentist should be consulted concerning these fluoride vitamins or office application of fluoride.

Fluoride is most beneficial when teeth are ________, but can be of benefit after teeth have erupted when applied in a dental office.

(flouride; forming)

Fluoride containing toothpastes are also thought to be of some benefit.
ROUTINE CARE: WHY?

Routine dental care enables early detection of dental problems:

1. Cavities, while they are still small are less costly to repair.

2. Calculus and stains should be removed periodically when needed.

3. Periodontal disease can be recognized early so that treatment to halt its progress may begin.

4. Orthodontic problems can be recognized.

5. Detection of oral cancer—(10 percent of all cancer occurs in the mouth and adjacent areas).
There is no self-test. The information in this last section is intended as background for classroom instruction. Your instructor may provide additional information where necessary.

I could end with "be true to your teeth or they'll be false to you," but I'll just say, "Take care of your teeth, they are really important."
APPENDIX B

DENTAL HEALTH PRETEST
Directions: Circle the best answer

1. Components of dental plaque include:
   a) material from saliva
   b) bacterial secretions
   c) sticky polysaccharide film
   d) all of the above
   e) b only

2. The most efficient way to remove plaque from between the teeth involves the use of:
   a) the "Water-Pik" or other oral irrigating devices
   b) dental floss
   c) tooth picks
   d) rubber tip

3. The toothbrushing method currently advocated as most effective for removing plaque is called:
   a) The Bass Technique
   b) The Rolling Stroke Method
   c) Stillman's Method

4. The above correct method involves the use of:
   a) a natural bristle toothbrush
   b) hard nylon toothbrush with rounded bristles
   c) medium nylon toothbrush
   d) soft nylon toothbrush with rounded bristles

5. The above method emphasizes brushing to remove plaque
   a) at the gum-line
   b) near the biting surface
   c) on the molar teeth

6. The most common cause of tooth loss after age 50 is:
   a) dental decay leading to abscesses
   b) periodontal disease
   c) injury due to improper brushing

7. The greatest damage to teeth from sugar occurs when:
   a) sweets are nibbled slowly and continuously
   b) quantities of sweets are eaten occasionally
   c) sweets are eaten only with meals
8. Fluoride tablets are most helpful:
   a) before teeth erupt
   b) for teen-agers
   c) after teeth erupt
   d) for adults

9. Minerals which give strength and hardness to teeth and bones are:
   a) iron and thiamine
   b) niacin and riboflavin
   c) riboflavin and fluoride
   d) calcium and phosphorous

10. The amount of fluoride in the community water supply which will effectively reduce tooth decay is approximately:
    a) 50 parts per million (ppm)
    b) 1 ppm
    c) 8 ppm
    d) 15 ppm

11. Fluoride most effectively helps protect the tooth from decay by becoming incorporated into the:
    a) roots
    b) pulp
    c) dentin
    d) enamel

12. Tooth loss as a result of periodontal disease is most directly due to:
    a) bacterial infection of the gingiva (gums)
    b) loss of alveolar bones
    c) destruction of the tooth root

13. The dental specialist who primarily treats diseases of the supporting tissues of the teeth is called an
    a) orthodontist
    b) endodontist
    c) periodontist
    d) prosthodontist
14. The dental specialist who helps save teeth that might otherwise be lost due to abscess or infection of the pulp is called: (HINT: This Dr. does "root canals")

a) orthodontist  
b) endodontist  
c) periodontist  
d) prosthodontist

15. The component of dental plaque most directly responsible for damage to the teeth is:

a) bacteria  
b) sugar  
c) food debris

16. "Caries" refers to:

a) the permanent teeth  
b) dental decay  
c) decayed food debris  
d) diseased gingiva

17. Possible causes of halitosis (bad breath) include:

a) periodontal disease  
b) dental decay  
c) poor oral hygiene  
d) smoking  
e) all of the above  
f) b, c, d only

18. Eruption of the primary teeth (baby or deciduous teeth) is usually completed by age

a) 1  
b) 2 1/2  
c) 4  
d) 4 1/2

19. What is the most significant consequence of premature loss of the primary teeth?

a) there is no significant consequence, the baby teeth are not important  
b) loss of chewing function  
c) disruption of eruptive pattern of the permanent teeth, possibly leading to later orthodontic problems  
d) development of an abnormal swallowing pattern
20. The most significant cause of tooth loss during pregnancy is:
   a) the baby causing depletion of calcium in the mother's teeth
   b) periodontal disease
   c) changes in the mother's body chemistry
   d) poor oral hygiene coupled with inadequate dental care

21. What two areas of the teeth are most susceptible to attack by decay?
   1. Pits and fissures (grooves and pits on the chewing surface)
   2. Contacting surfaces of adjacent teeth (between the teeth)
   3. The area near the gum-line
   a) 1 & 3
   b) 2 & 3
   c) 1 & 2

22. The first permanent teeth to erupt are the:
   a) central incisors
   b) upper cuspids
   c) first molars

23. Permanent teeth usually begin erupting by age:
   a) 4
   b) 6
   c) 7
   d) 8

24. Inadequate nutrition is related to:
   a) dental decay
   b) periodontal disease
   c) both a and b
   d) a only

25. The areas of greatest plaque accumulation are:
   a) outer surfaces (facing away from the tongue)
   b) inner surfaces (facing toward the tongue)
   c) at the gum-line
   d) none of the above
Answers to Dental Health Pretest

1. d
2. b
3. a
4. d
5. a
6. b
7. a
8. d
9. b
10. d
11. b
12. d
13. c
14. b
15. a
16. b
17. e
18. b
19. c
20. d
21. c
22. c
23. b
24. c
25. c