Effect of the Rubber-Cup Prophylaxis and the Self-Administered Prophylaxis on the Oral Hygiene Performance of the Pedodontic Patient

Kay Diane Edwards

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EFFECT OF THE RUBBER-CUP
PROPHYLAXIS AND THE SELF-ADMINISTERED
PROPHYLAXIS ON THE ORAL HYGIENE
PERFORMANCE OF THE PEDODONTIC PATIENT

by

Kay Diane Edwards
B.S. August 1976, Old Dominion University

A Thesis Submitted to the Faculty of
Old Dominion University in Partial Fulfillment of the
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DENTAL HYGIENE

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December, 1979

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ABSTRACT

EFFECT OF THE RUBBER-CUP PROPHYLAXIS AND THE SELF-ADMINISTERED PROPHYLAXIS ON THE ORAL HYGIENE PERFORMANCE OF THE PEDIODONTIC PATIENT

Kay Diane Edwards
Old Dominion University, 1979
Director: Michele L. Darby

The effects of two oral prophylaxis methods on the oral hygiene performance of children (N=100) between the ages of 8 and 13 years were studied over a three month period. Subjects were randomly selected from a dental hygiene clinic patient population and assigned to one of two prophylaxis groups. Each child's oral hygiene was evaluated using the Patient Hygiene Performance Index prior to and at one month intervals following treatment. Multifactor analysis of variance revealed no significant difference between children's age and the type of prophylaxis received. A significant difference was observed between children ages 8 to 10.5 and 10.6 to 13 years for the first three appointments; no significant difference was observed between the two age groups at appointment four. The self-administered prophylaxis is as effective as the rubber-cup prophylaxis in improving children's oral hygiene performance. Given adequate time, children ages 8 to 10.5 are capable of manipulating preventive materials as skillfully as children ages 10.6 to 13 years.
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Chapter 1

INTRODUCTION

One primary preventive oral health service used extensively in private practice and in public health and armed forces dental clinics is the rubber-cup prophylaxis. Empirical data is lacking which conclusively demonstrates that the rubber-cup prophylaxis is a useful preventive service for improving oral hygiene performance, gingival health and reducing the incidence of dental caries in children. An alternative to the traditional rubber-cup prophylaxis is the self-administered prophylaxis; however, only one study investigating the effects of the rubber-cup prophylaxis and the self-administered prophylaxis on the oral hygiene performance of children could be found in the literature.\textsuperscript{12} Therefore, the purpose of this study was to compare the effectiveness of the rubber-cup prophylaxis and the self-administered prophylaxis on the oral hygiene performance of children between 8 to 10.5 and 10.6 to 13 years.

Statement of the Problem

The investigation addressed the following questions:

1. Over a three month period was the self-administered prophylaxis as effective as the rubber-cup prophylaxis
in influencing children's oral hygiene performance?

2. Over a three month period, was there a statistically significant difference between the oral hygiene performance of children ages 8 to 10.5 years and 10.6 to 13 years as measured by the Patient Hygiene Performance Index?

3. Over a three month period, was there a statistically significant interaction between children's ages and the type of prophylaxis received as measured by the Patient Hygiene Performance Index?

Significance of the Problem

Research has been conducted on the long term effects of the rubber-cup prophylaxis on the oral hygiene habits of children; however, few studies have investigated the effect of the self-administered prophylaxis on children's oral hygiene habits. Active participation in the self-administered prophylaxis procedures might increase dental health knowledge and motivation, boost effective oral hygiene performance and, thereby, result in optimum oral health in children. This assumption has not been validated.

Dental professionals currently using self-administered prophylaxis procedures with children indicate that the cost to the practitioner and patient can be less than the cost of the traditional prophylaxis and that more efficient utilization of dental manpower can result by implementing a
self-administered prophylaxis program. A dental assistant may be trained to supervise self-administered prophylaxis procedures reducing the chairside time of the dentist and dental hygienist. The dentist and dental hygienist may devote more time with patients requiring extensive services. An additional number of patients can receive preventive care utilizing the same floor space and personnel that one patient would require, and more children can be seen in less time than with the traditional prophylaxis.

In addition to economic advantages and more efficient utilization of dental manpower, the self-administered prophylaxis program might have positive psychological effects on pedodontic patients. A more informal and relaxed atmosphere usually resulting from such a program might reduce the patient's apprehension and fear often associated with dental care. Active involvement of the child with the self-administered prophylaxis might be a better way to transfer preventive oral health behaviors from the professional setting to the home environment where they must be practiced for optimum oral health. Children who actively participate at an early age in the self-maintenance of oral health might develop into adults who continue to assume responsibility for and to value the benefits derived from effective personal hygiene habits. As the child's dental health knowledge and oral hygiene performance improves, dental health professionals might also achieve greater satisfaction resulting from their educational efforts and the self-administered prophylaxis
If beneficial, the self-administered prophylaxis program may be extended to community dental health programs such as public health dental clinics and school systems. A dental assistant may be trained to supervise self-administered prophylaxis procedures conducted in a public health dental clinic. A self-maintenance program may also be implemented in the school systems employing the professional skills of dental hygienists, dental assistants, or classroom teachers. By using trained dental assistants or teachers supervised by a dental hygienist within the school setting, more children could receive preventive services in less time. Economic benefits, more efficient utilization of dental manpower, and psychological advantages to children and dental professionals, perceived to be present in private practice self-administered prophylaxis programs, may also be expected in community dental health programs.

Definition of Terms

The terms of this study were defined as follows:

a. **Rubber-Cup Prophylaxis** — A primary care procedure performed by a dental hygiene student for the purpose of preventing dental diseases of the soft and hard tissues of the oral cavity. The rubber-cup prophylaxis was preceded by an intra and extra-oral examination and hard deposit removal; a topical fluoride treatment followed.
The procedure is one of the independent variables of the study.

b. **Self-Administered Prophylaxis** -- A primary care procedure, part of which is performed by a pedodontic patient under the supervision of a dental hygiene student, for the purpose of preventing dental diseases in the soft and hard tissues of the oral cavity. The prophylaxis procedure was preceded by an intra and extra-oral examination and hard deposit removal, and followed by a topical fluoride treatment. The dental hygiene student performs the oral examination, scaling procedures, and the fluoride treatment; however, the patient performs the cleansing procedure himself. The procedure is one of the independent variables of the study.

c. **Pedodontic Patient** -- Preadolescent children between the ages 8 and 13 years who have previously attended Old Dominion University Dental Hygiene Clinic for therapeutic and preventive services and who are devoid of any mental and physical handicaps, complex medical histories or orthodontic appliances.

d. **Dental Hygiene Student** -- Any person currently enrolled as a second year student in the Old Dominion Dental Hygiene Program.

e. **Improved Oral Hygiene Performance** -- A reduction of oral debris in the oral cavity as measured by the Patient Hygiene Performance Index. Improved oral hygiene performance was the dependent variable under study.

f. **Home Care Procedures** -- Techniques used daily
by the pedodontic patient for removal of dental plaque and included toothbrushing, flossing, and the use of disclosing tablets.

9. **Patient Education Instruction** — Standardized group instruction on plaque control concepts and home care procedures delivered to children during the first appointment of the study. A rehearsed dialogue and commercially produced filmstrip were the format used for delivering this instruction.

i. **Patient Hygiene Performance Index (PHP)** — A system for assessing the location and amount of oral debris on teeth. Six preselected teeth are divided into five subdivisions, all of which are scored after the application of a disclosing agent (see Appendix A). In this system, debris is defined as the soft foreign material, consisting of mucin, bacteria, and food, that is loosely attached to tooth surfaces.35

**Assumptions**

For the purpose of this investigation, the following assumptions were made:

a. Bacterial plaque is an etiologic factor in dental disease.46

b. The Patient Hygiene Performance (PHP) Index is a valid and reliable instrument for measuring oral hygiene performance.35
c. The PHP score is an adequate indication of the pedodontal patient's ability to effectively remove oral debris with a toothbrush and dental floss.

d. The modified scrub toothbrushing technique and flossing procedures taught to the patient can effectively improve oral hygiene by reducing the bacterial plaque present on the children's teeth.40

e. The effects of history and maturation were controlled by the use of one experimental and one control group.

Limitations

The investigation was limited by the following factors:

a. Since the children have been patients at Old Dominion University Dental Hygiene Clinic, previous patient education might have influenced the child's oral hygiene performance. This limitation was controlled by random assignment of subjects to groups.

b. Personal contact between subjects and the number of different clinicians performing prophylaxis procedures might have introduced an extraneous variable. Although this limitation was minimized by standardizing the clinical procedures and by the use of a rehearsed dialogue, subtle differences in the clinicians' delivery of the prophylaxis might have occurred affecting subjects' oral
hygiene performance.

c. Subjects did not receive home care instruction at the same time. Subtle and unavoidable differences in each presentation might have introduced an extraneous variable which could have affected subjects' oral home care performance. This limitation was minimized by the use of one instructor who conducted the patient education instruction sessions using a rehearsed dialogue and commercially produced filmstrip cassette.

d. Parents' and subjects' knowledge of participation in a project might have influenced the subjects' oral hygiene performance and ultimately the external validity of the study.

e. The sample population was from the patient pool of the Old Dominion University Dental Hygiene Clinic; therefore, findings cannot be generalized to the general population of children. In addition, because the sample was comprised of volunteer subjects, the children might have been more motivated and more interested in oral health than a non-volunteer population, which might also affect generalization of the results.

f. Because more than one child per family was involved in the study, a transfer or comparison of information might have occurred and affected hygiene performance.

g. Subjects might have received patient education
from sources outside of the study. To minimize this limitation, the parents were requested not to assist their child with home care procedures throughout the duration of the study. If the child visited the dentist, the parent was instructed to inform the dentist of the project and request that no patient education instruction be given to the child.

h. If the child asked questions regarding home care during the three follow-up appointments, no additional patient education was given since exposure to additional patient education might influence oral hygiene performance. Children were told that all questions would be answered at the fourth appointment.

Hypotheses

$H_0$: There is no statistically significant difference at the 0.05 level between the oral hygiene performance of children who received a rubber-cup prophylaxis and children who received a self-administered prophylaxis as measured by the Patient Hygiene Performance scores over a three month period.

$H_0$: There is no statistically significant difference at the 0.05 level between oral hygiene performance of children ages 8 to 10.5 and 10.5 to 13 years as measured by the Patient
Hygiene Performance scores over a three month period.

H₀: There is no statistically significant interaction at the 0.05 level between children's ages and the type of prophylaxis received as measured by the Patient Hygiene Performance scores over a three month period.

Methodology

A two by two factorial design was used to determine if a statistically significant difference existed between two oral prophylaxis procedures and between two age groups in affecting children's performance of oral hygiene techniques. One hundred children were randomly assigned to either a self-administered prophylaxis group or a rubber-cup prophylaxis group. Each child was required to attend four appointments scheduled over a three month period. The first appointment included an oral debris assessment using the Patient Hygiene Performance Index, patient education conducted through the use of a rehearsed dialogue and commercially produced filmstrip cassette, and one of the two oral prophylaxis procedures. Prior to the scoring, each child was given a soft multitufted toothbrush, 24 yards of unwaxed dental floss, and 14 disclosing tablets. These supplies were used by the children during patient education instruction delivered by one instructor. Second year dental
hygiene students performed the oral prophylaxis procedures. At three follow-up appointments, each child was scored by the principal investigator using the PHP Index. Prior to these scorings, each child was asked to clean his teeth the way he does at home. At the one month follow-up appointment, each child was issued a second toothbrush to be used during the subsequent appointments for oral cleansing. Unwaxed dental floss and disclosing tablets were made available in a plaque control room for the children's use. The first appointment required approximately two hours and fifteen minutes; each follow-up appointment required approximately 15 minutes.

Data were analyzed using a two-way analysis of variance and the BMD P2V computer program. All analyses were conducted at the 0.05 level of significance.
Chapter 2

REVIEW OF THE LITERATURE

The literature relevant to this investigation was discussed in four sections: (1) oral health needs of children, (2) etiology and prevention of dental diseases, (3) the professionally-administered prophylaxis and the self-administered prophylaxis, and (4) motor skill development in children.

Oral Health Needs of Children

Dental disease begins early in life. Dental caries attack may follow the eruption of the first primary tooth, and has been observed to be present in two and three year old children.\textsuperscript{21,47} Ripa\textsuperscript{38} indicated that by the time half of the permanent teeth have erupted, the average child in the United States has 6.2 decayed, missing, or filled teeth. Although periodontal disease is commonly associated with the adult population, children are susceptible and often experience some form of periodontal disease which may range from mild gingivitis to severe disturbances that destroy periodontal tissues.\textsuperscript{19}

In the United States children are the primary recipients of orthodontic care.\textsuperscript{9} An etiologic factor that
may result in malocclusion is the premature loss of teeth due to dental caries. A consistent measure which may be used to determine orthodontic need is lacking; therefore the figures for malocclusion among school age children range from 20 to 80 percent. The effects of dental disease are painful, crippling, and costly health problems which require the concern and efforts of individuals interested in the total health of children.

Etiology and Prevention of Dental Disease

Dental plaque is an organized bacterial system which adheres to the teeth, calculus, and other surfaces in the oral cavity and is an etiologic factor in dental disease. Research demonstrates a relationship between dental plaque, the initiation and progression of periodontal disease, and dental caries. Dental plaque is also indirectly associated with the incidence of malocclusion in that loss of primary and permanent teeth due to dental caries is a local causative factor of malocclusion. Considerable evidence indicates the importance of good oral hygiene in the prevention of dental caries and periodontal disease. Green and Vermillion stated that a strong relationship exists between oral cleanliness and periodontal states and that the progress of periodontal disease can be retarded or altered by professional therapeutic and preventive care and daily personal oral hygiene. Lindhe and Koch studied the
effect of supervised oral hygiene procedures on the gingiva of school children 12 to 13 years of age. The results of the study revealed that daily supervised brushing reduces the prevalence and severity of gingivitis.

An indirect relationship exists between good oral hygiene and the incidence of malocclusion. Seven etiologic factors are classified as being responsible for malocclusion, and among these causes are local diseases which includes dental caries. The premature removal of a primary or permanent tooth resulting from dental caries may result in malocclusion. Pedersen, Stensgaard, and Melson conducted an investigation with 723 third grade Danish school children to determine the influence of premature extraction of primary teeth on the frequency of malocclusion. Results of the study showed the overall influence of early extraction of primary teeth significantly increased the need for orthodontic treatment. A limitation of this study was that no differentiation was made between premature loss of teeth due to dental caries or serial extraction due to crowding.

A large component of the oral health problems observed in the United States today stems from the failure of individuals to practice accepted methods of dental disease prevention. Although the importance of good personal oral hygiene habits necessary in preventing dental disease is well documented, research suggests that few children appear
Horowitz and colleagues conducted a study with school children to determine the effect of supervised daily toothbrushing and flossing on dental decay, gingivitis, and oral hygiene status. At the end of 35 months of a supervised daily plaque removal program, the children in the treatment group showed a significant reduction in plaque and gingival inflammation as compared to children who were included in the control group and who received no education or supervision. Moreover, differences between each group's plaque and gingival inflammation scores virtually disappeared during the summer vacation. The children received no supervision or follow-up evaluation of oral hygiene performance during the summer vacation and apparently did not practice those preventive measures learned at school. The results show that although the children might have practiced the preventive measures at school, they did not transfer this learning to their home environment.

Podshadley and Shannon conducted a study to determine the effectiveness of an oral home care educational program on the oral hygiene habits of elementary school children. The program consisted of one lecture presentation followed by a question and answer period, a toothbrush demonstration and a practice session where the children actually used the toothbrush under supervision. The children were evaluated for oral hygiene performance at
intervals of two weeks, three months, and six months using the Patient Hygiene Performance Index. The results of the study showed that the program produced only minor improvements and that these improvements subsided after three months. Failure of the children to maintain effective oral hygiene performance might be attributed to the educational program, in that the program was not comprehensive enough to produce a significant change in oral hygiene habits.\textsuperscript{36} Also, the children received no instruction or evaluation between the three month and six month follow-up intervals. When comparing results of the studies conducted by Horowitz\textsuperscript{25} and Podshadley\textsuperscript{36}, the element of time intervals between supervision and evaluation of oral hygiene habits might be a factor affecting the degree to which the children maintain acceptable oral hygiene performance. The longer the time interval between supervision or evaluation the less the children appeared to practice effective preventive oral hygiene techniques. Supervision and evaluation of children's oral hygiene performance might be a key motivating factor influencing the practice of disease control methods.

The Professionally-Administered Prophylaxis and the Self-Administered Prophylaxis

The traditional prophylaxis is considered to be a preventive dental service which usually includes the removal of hard and soft deposits, indicated radiographs, oral
hygiene instruction, and a fluoride treatment. The objectives for polishing the teeth include soft deposit and stain removal rendering a smooth tooth surface which resists deposit accumulation and preparing the teeth for topical application of fluoride. 46 Although the rubber-cup prophylaxis is considered to be a primary preventive service, research does not substantiate this assumption. 37, 39 As already mentioned, one objective for polishing tooth surfaces is to prepare the teeth for the application of topical fluoride solutions. Tinanoff 38 conducted a study to investigate the effectiveness of topical fluoride preparations on teeth polished with a rubber-cup compared to teeth not polished with a rubber-cup. Results of the study indicated that topical fluoride preparations had the same effect on teeth polished with a rubber-cup as the fluoride had on teeth that had not been polished. Such results lead one to question the validity of the rubber-cup prophylaxis procedure.

Ripa 39 conducted a study to determine if a biannual oral prophylaxis improved the oral health status of 384 school children who received four prophylaxis treatments administered over a two year period. Results of the study indicated that the prophylaxis treatments did not alter oral hygiene, caries activity, or gingival health of children. Moreover, abrasives found in polishing agents remove tooth
structure when teeth are polished. This factor is especially significant for pedodontic patients because the surfaces of newly erupted teeth are less mineralized. The results of a study conducted by Zuniga also showed that areas of hypocalcification on surfaces of teeth are removed with polishing pastes. Clearly, the contribution of the rubber-cup prophylaxis to the oral health of the patient must be questioned.

The professionally-administered prophylaxis delivered to children might no longer be a justifiable method of primary preventive care. An alternative to the professional rubber-cup prophylaxis which has been used in private practices on a minimal basis is the self-administered prophylaxis. Barkley initiated a pedodontic self-prophylaxis program into his private practice in 1961. The self-administered program consisted of home care instruction, radiographs when indicated, removal of soft deposits by the patient using a toothbrush and dental floss, and topical application of fluoride by the patient. The children were placed on a three month recall to measure the level of health and skill of cleaning and to reinforce oral cleansing skills. A disease control therapist supervised the three month plaque check, and a routine exam by the dentist was conducted every six months. Barkley observed a higher level of health and reduced fear in those children who were on the self-prophylaxis program as compared to the children
still receiving the traditional prophylaxis. Barkley also indicated that the cost to the patient and to the practitioner was not increased as a result of the self-prophylaxis program.

An investigation was conducted by Clarke and Seabrook to compare the effectiveness of the rubber-cup prophylaxis and the self-administered prophylaxis in improving dental health knowledge and oral home care of 258 children. The Barkley self-administered prophylaxis was used and included a general discussion of the causes and prevention of dental disease, identification of bacterial plaque, toothbrushing and flossing demonstration, stain and calculus removal by the dental hygienist where required, and removal of plaque by the patient with a toothbrush and prophylaxis paste containing stannous fluoride. The selection of children who received the self-administered prophylaxis was determined by the convenience of scheduling appointments. Dental health knowledge was measured by a six question test administered to each child during an interview and oral hygiene status was determined by scoring each child using Green and Vermillion Oral Hygiene Index. For the purpose of data analyses the subjects were divided into the following three groups; children who received no prophylaxis (N=98), and children who received one or more self-administered prophylaxes (N=100). The subjects
were also subdivided by age and sex. The results of the investigation suggested that the self-administered prophylaxis is more effective than the rubber-cup prophylaxis for achieving improvement in oral hygiene habits and general dental health knowledge of individuals. The article which reported the information regarding the study was difficult to understand and pertinent facts which might have influenced the results were not discussed. The Barkley self-administered prophylaxis used in the study included a three month recall; whereas, the traditional rubber-cup prophylaxis is usually based on a six month recall. The article did not state the number of prophylaxes received by the subjects. Additional exposure to dental services or home care evaluation and instruction by one of the three groups of children would influence oral hygiene and dental health knowledge. Also, the time period of the study and the time intervals at which oral hygiene and dental health knowledge were evaluated was difficult to ascertain. The validity of the results obtained by the study are questionable and should be investigated further.

During the traditional rubber-cup prophylaxis the patient is often a passive participant. In contrast, the self-administered prophylaxis program involves active participation on the part of the patient. Active participation during the self-administered prophylaxis increases learning and places the responsibility for plaque control
on the patient. This finding is particularly significant when one considers that dental caries and periodontal disease can be controlled by the behavior of the individual himself.

**Motor Skill Development in Children**

Motor performance has been defined as a short-term aspect of behavior marked by movement oriented toward the execution of an identifiable task, whereas motor skill denotes learning and mastering or that an integration of behavior has taken place resulting in learning or mastery. The acquisition of preventive oral hygiene behaviors by children involves motor performance which in turn is necessary for the child to effectively remove bacterial plaque. Factors which affect motor performance and motor skill development of preventive oral hygiene techniques include the physical and mental maturity of the child, the method of oral health instruction, the environment in which instruction was conducted, and the individual's motivation to learn preventive behaviors.

Brunk indicated that children between the ages of 7 and 11 become more capable of logical thought processes, including the coordination and understanding of the relationships among successive steps in a logical sequence. By age 15, the adolescent has achieved the final stages of his cognitive structures and is capable of mature
thought processes which gives him the potential to manage all classes of problems. Physiologically, the child between the ages of 6 and 12 acquires control of arm, shoulder, and wrist muscles, approximating the adult level at age 12. Control of the fingers progresses more slowly, and the fine muscle control necessary for speedy, delicate and rapid finger manipulation is not accomplished by most children before age 12. Rapid development in the manipulation of tools, however, occurs from 8 to 9 years of age.

Terhune conducted a study on 117 children between 8 and 11 years of age to investigate the relationship among age, sex, and eye-hand coordination to the time it takes to learn how to effectively manipulate dental floss between all of the teeth. Results of the study showed a significant relationship between age and eye-hand coordination, age and flossing manipulation skill, and age and flossing effectiveness. Eye-hand coordination and age were found to be the best combination of variables for predicting the time it will take for children to learn how to use dental floss effectively. All children were able to learn how to effectively clean their teeth with dental floss; however, the younger the child the longer it took for him to master the skill. Young children may be physiologically capable of skillfully manipulating preventive dental aids for effective removal of bacterial plaque. More supervised
practice time may be necessary for the child to attain an accepted level of oral hygiene performance. Breckenridge and Vincent\(^8\) stated that to push a child to a level of perfection when he does not yet have the maturity or background of practice is a detriment to the child's learning. The frustration experienced from being unable to meet the standards of perfection may cause the child to hate and avoid use of the materials he is unable to manipulate.

Learning has been defined by Cratty\(^3\) as a long range permanent change in behavior brought about through practice and demonstrated in retention measures collected over a period of time. Children need practice with oral hygiene techniques to develop proficiency for removal of bacterial plaque; the amount of time needed for practice depends upon the child's potential motor skill level. Cratty\(^13\) further indicated that the learning of a motor skill is different from problem solving because the nature of the input to induce retention is different and that the resultant learning is accompanied by a movement or series of movements. These series of movements if practiced often enough appear to rely less and less upon conscious thought as they are learned and seem to be remarkably resistant to extinction. Practice appears to be an important factor in motor skill development. Chairside instruction during a professionally-administered prophylaxis appointment may not offer the child enough time to practice motor performance
required for the acquisition of oral health behaviors.

Another factor considered to be important in the acquisition of motor skill is the anxiety and stress level of the child performing the task. Anxiety is defined as a general fear marked by a lower threshold to stressful events, whereas stress is an internal reaction, an intervening variable between situation and performance.\textsuperscript{13} Malmo and Davis\textsuperscript{31} further defined stress as "... a temporarily induced physiological or psychological imbalance, caused by an event considered threatening by the organism." Cratty\textsuperscript{13} and Malmo and Davis\textsuperscript{31} agree that the anxiety level of an individual has an effect upon motor performance and that anxiety and stress are manifested in increased muscular tension. If the child perceives the professionally-administered prophylaxis as threatening and experiences increased muscular tension, his motor performance could be affected during the chairside instruction of oral hygiene techniques. The informal and relaxed atmosphere associated with the self-administered prophylaxis program might reduce the anxiety level of the child enabling him to perform more effective preventive techniques under professional supervision. Factors which include sufficient practice time and a low anxiety producing environment may facilitate learning and mastery of motor skills. Motor skill development using oral physio-
therapy aids is necessary if children are to assume responsibility for their oral health.
Chapter 3

METHODS AND MATERIALS

This study was designed to determine if a statistically significant difference exists between oral hygiene performance of children in two age groups who received either a rubber-cup prophylaxis or a self-administered prophylaxis.

Sample Description

A convenience sample was randomly selected from a list of children who previously received preventive and therapeutic services at the Old Dominion University Dental Hygiene Clinic. Parents of these children were sent a cover letter requesting permission for their child to participate in a project comparing two methods of cleaning children's teeth (see Appendix B). Also included in the mailing was a medical history form and a participation consent form to minimize subject mortality and protect subjects' rights (see Appendix C and D). Parents were requested to return the forms within two weeks if agreement was made for the child to participate in the project. One hundred twenty parents responded and from these returns 100 children were selected for the study. To participate, subjects had
to be between the ages of 8 to 13, and free of mental or physical handicaps, complex medical histories, and orthodontic appliances.

Following completion of data collection, the investigation experienced a subject attrition rate of seven percent (see Appendix E). Characteristics of the final sample are shown in Table 1. These subjects were being studied concurrently by Damon.¹⁴

**Research Design**

A two by two factorial design was used to test the effectiveness of two oral prophylaxis procedures on improving the oral hygiene performance of children (see Table 2, page 29). The independent variables were the professionally-administered prophylaxis and the self-administered prophylaxis and two groups of children ages 8 to 10.5 and 10.6 to 13 years; the dependent variable was oral hygiene performance as measured by the Patient Hygiene Performance Index. The Patient Hygiene Performance Index was used to obtain baseline data on the children's oral hygiene performance and to monitor oral hygiene performance over a three month period. The investigation was double blind. Extraneous variables were controlled through randomization and the use of an experimental and control group. Situational variables were controlled by standardizing patient education using a rehearsed dialogue and commercially produced filmstrip.
cassette; standardizing prophylaxis procedures through the inservice training of clinicians; and using identical dental materials, equipment and treatment settings.
Table 1
Characteristics of Final Sample

<table>
<thead>
<tr>
<th>Group</th>
<th>Males</th>
<th>Females</th>
<th>Mean Age</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rubber-Cup Prophylaxis</td>
<td>26</td>
<td>20</td>
<td>10.10</td>
<td>1.00</td>
</tr>
<tr>
<td>Self-Administered Prophylaxis</td>
<td>23</td>
<td>24</td>
<td>10.20</td>
<td>1.76</td>
</tr>
<tr>
<td>Total</td>
<td>49</td>
<td>44</td>
<td>10.10</td>
<td>1.60</td>
</tr>
</tbody>
</table>
Table 2

Two x Two Factorial Research Design

<table>
<thead>
<tr>
<th>TYPE OF PROPHYLAXIS (IV1)</th>
<th>RCP</th>
<th>SAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-10.5 Years</td>
<td>PHP SCORES</td>
<td>PHP SCORES</td>
</tr>
<tr>
<td>10.6-13 Years</td>
<td>PHP SCORES</td>
<td>PHP SCORES</td>
</tr>
</tbody>
</table>

PHP = Patient Hygiene Performance Index
Methodology

All research was conducted at the Old Dominion University Dental Hygiene Clinic. Scoring procedures were performed by the principal investigator; patient education instruction was delivered by one instructor using a rehearsed dialogue and a commercially produced filmstrip cassette; and prophylaxis procedures were administered by second year dental hygiene students who had been standardized through inservice training. The patient education instructor randomly assigned each child to either a professionally-administered prophylaxis group or a self-administered prophylaxis group. Each of the 100 subjects were required to attend four appointments over a three month period. Procedures at each appointment included:

Appointment One:

1. Distribution of an envelope to parents which contained a letter discussing appointment procedures, a consent form, a station card and name tag for each child. Parents were asked to read the letter, sign the consent form and return it to the clinical secretary (see Appendices F and G). The station card directed the children to the appropriate treatment stations (see Appendix H).

2. Distribution of one multi-tufted soft toothbrush, 24 yards of unwaxed dental floss, and 14 disclosing tablets to each child.

3. Removal of dental plaque by children using only
those materials and techniques they use at home.

4. Oral debris scoring of each child by the principal investigator using the PHP Index.

5. Viewing of a commercially produced filmstrip cassette by subjects in groups of six.

6. Standardized patient education instruction delivered to six children on the modified scrub toothbrushing technique, flossing technique, and the use of disclosing tablets presented by one instructor (see Appendix I).

7. Standardized prophylaxis procedures administered to each child by dental hygiene students. Clinicians' procedures were standardized by inservice training prior to the first appointment (see Appendix J).

The initial appointments were conducted over a five day period and each appointment was approximately two and one-half hours in length.

Appointment Two: (One Month Follow-up)

1. Distribution of one toothbrush to each child. This toothbrush remained at the clinic for use during appointments three and four.

2. Removal of dental plaque by children in a disease control room using only those materials and techniques that they use at home. Dental floss and disclosing tablets were made available in the disease control room for children's use if they so desired.

3. Oral debris scoring of each child by the
principal investigator using the PHP Index.

**Appointment Three: (Two Month Follow-up)**
Followed same sequence as appointment two.

**Appointment Four: (Three Month Follow-up)**
Appointment four followed the same sequence as appointment two and three except that each child received patient education instruction related to their specific needs and questions and a pack of sugarless bubble gum as a token of appreciation. Parents were debriefed concerning specifics of the study and any questions that they may have had were also answered. In addition, parents received a letter of appreciation thanking them for their time and cooperation and reiterating when and where results of the project would be available (see Appendix K). These same procedures were being used concurrently by Damon.

**Instrumentation**

The instrument used for assessing oral debris was the Patient Hygiene Performance (PHP) Index. An investigation by Podshadly and Haley \(^{35}\) compared the PHP Index to the Debris Index-Simplified (DI-S) aspect of the Oral Hygiene Index-Simplified (OHI-S) and found that a greater consistency between examiners could be achieved using the PHP Index rather than the DI-S. The intraexaminer correlation for the PHP Index method (test-retest \(r = 0.91\)) was higher than the intraexaminer correlation of the DI-S method (Test-retest)
r = 0.72). The intraexaminer correlation coefficient for the PHP Index method was r = 0.85 for the first examiner and r = 0.80 for the second examiner. These correlations demonstrate that an examiner can repeatedly use the PHP Index with a satisfactory degree of accuracy. These higher correlations also indicate that the PHP method is a more sensitive instrument for assessing oral debris than the DI-S method and serves a useful purpose in dental health education and research.35

The PHP Index was used in studies by Horowitz23,25 and Podshadly and Shannon36 to determine oral hygiene behavior in children as demonstrated by the amount of oral debris present on the children's teeth. These investigations utilized the PHP Index to determine oral hygiene performance as demonstrated by the PHP Index score received by the children participating in the study.

Prior to the conduct of this study, calibration of scorer error was established. The principal investigator scored 17 elementary school children, ages 8 to 12 on two different occasions using the PHP Index. The Pearson-product moment correlation was used to determine intra-rater reliability which resulted in a coefficient of r = 0.95 (see Appendix L).

Materials

Materials and equipment that were utilized for
scoring, patient education, and prophylaxis procedures are as follows:

PHP Scoring Procedures:
1. PHP Index scoring charts (see Appendix M).
2. Front surface mirrors.
3. Disclosing solution.
5. The same dental unit with attached light was used for the four appointments and each child was placed in a supine position.

Patient Education Procedures:
1. Instructional aids included a large mouth model, large toothbrush, unwaxed floss, disclosing tablets, and paper towels and cups.
2. Equipment included a blackboard, wall mirrors, and an audio-visual cassette projector.

Prophylaxis Procedures:
1. Instruments: mouth mirror, shepherd's hook explorer, Columbia 13/14 curet, Gracey 1/2 curet, O.D.U. 533 sickle, prophylaxis angle (snap-on type), dappen dish, finger cup, and hand mirror.
2. Clinical supplies: patient bibs, headrest and tray covers, cotton tip applicators, 2 x 2 inch gauze, saliva ejectors, disclosing solution, prophylaxis paste, fluoride solution and trays, unwaxed dental floss, and
zephiran chloride disinfectant.

e. Dental unit with attached light.

Statistical Treatment

The data was analyzed using a two-way analysis of variance at the 0.05 level of significance and the BMD PlV computer program.\textsuperscript{15} The analysis of variance was employed to determine the main and interaction effects due to type of prophylaxis received and age of children. This parametric technique was used due to the randomization procedures, the number of variables under study, and the number of subjects who participated in the investigation.

Protection of Human Subjects*

Prior to the initiation of the study, the following subtopics were submitted to the Review Board for the Protection of Human Subjects at Old Dominion in order to receive approval to implement this investigation. Approval was granted in February, 1979.

*This section was taken directly from: Damon, P. J. "Effect of the Professionally Administered Prophylaxis and the Self-Administered Prophylaxis on the Oral Health Status of the Pedodontic Patient." Unpublished Thesis, Old Dominion University, 1979.
1. **Subject Population** - The proposed research required the utilization of 100 children between the ages of 8 - 13 years. The subjects were selected from the Old Dominion University Dental Clinic. Subjects did not have any mental or physical handicaps, orthodontic appliances, or complex medical histories.

2. **Potential Risks** - One potential risk could have been the sequela of a bacteremia created during the oral prophylaxis. This risk was minimized by excluding patients with known heart disease who would be most adversely affected. The prophylaxis procedures were not stressful and were conducted by dental hygiene students under the direct supervision of licensed dental hygiene faculty members at Old Dominion University.

3. **Consent Procedures** - A complete explanation of the study's purposes, procedures, and potential risks was made to the parents of the subjects at least one month before the study. Subjects were explicitly informed that they might withdraw from the experiment at any time.

4. **Protection of Subject's Rights** - Anonymity of each subject's performance was maintained throughout the study by using numbers rather than names to identify data. In addition, all data were regarded as confidential by the researcher and no data were released without written request of subjects. Upon completion of the study, all subjects were debriefed and results were made available.
5. **Potential Benefits** - Subjects might have benefited from dental health care procedures and education received at no charge.

6. **Risk-Benefit Ratio** - The potential benefits of this investigation far outweighed the minor potential risks involved.
Chapter 4

RESULTS AND DISCUSSION

Results

Data were analyzed to test the hypothesis that no statistically significant difference existed between the oral hygiene performance of children who received a rubber-cup prophylaxis and children who received a self-administered prophylaxis. Data analysis revealed no statistically significant difference between the two prophylaxis groups' PHP scores for each of the four appointments (Appointment 1 $F=1.352$, $df=1/89$, $p=0.248$; Appointment 2 $F=3.356$, $df=1/89$, $p=0.070$; Appointment 3 $F=0.556$, $df=1/89$, $p=0.458$; Appointment 4 $F=2.191$, $df=1/89$, $p=0.142$) (see Tables 3-6, pages 51-54). Although not statistically significant, the mean scores of children in both prophylaxis groups decreased consistently at each of the four appointments, with scores of the rubber-cup prophylaxis group being slightly lower than the mean scores for the self-administered prophylaxis group. Mean PHP scores for the RCP and SAP groups at each of the four appointments are presented in Table 7, page 46, and Figure 1, page 49.

Data were examined to test the hypothesis that no statistically significant difference existed between the oral
hygiene performance of children ages 8 to 10.5 and 10.6 to 13 years. Analysis revealed a statistically significant difference in oral hygiene performance between the two age groups for appointments one, two, and three; however, no statistically significant difference was found in oral hygiene performance between the two age groups at appointment four (Appointment 1 $F=13.054$, $df=1/89$, $p=0.001$; Appointment 2 $F=15.097$, $df=1/89$, $p=0.000$; Appointment 3 $F=8.301$, $df=1/89$, $p=0.005$; Appointment 4 $F=1.356$, $df=1/89$, $p=0.247$). Although not significant at the fourth appointment, children between the ages of 8 and 10.5 had higher PHP scores than children between the ages of 10.6 to 13 years. Mean PHP scores for the two age groups at each of the four appointments are presented in Table 8, page 47, and Figure 2, page 50.

Data were examined to determine if a statistically significant interaction existed between children's ages and the type of prophylaxis received as measured by the children's PHP scores. Data revealed that no statistically significant interaction existed between the four groups for each of the four appointments; therefore the null hypothesis was retained (Appointment 1 $F=1.057$, $df=1/89$, $p=0.307$; Appointment 2 $F=1.285$, $df=1/89$, $p=0.260$; Appointment 3 $F=0.871$, $df=1/89$, $p=0.353$; Appointment 4 $F=0.001$, $df=1/89$, $p=0.974$). The overall mean scores for the younger age group in both prophylaxis groups was higher than the overall mean scores for the older children in both prophy-
laxis groups. Children in the RCP group had lower overall mean scores than children in the SAP group. Mean scores for the four groups at each of the four appointments are presented in Table 9, page 48. The mean PHP scores for the RCP group and SAP group, when compared to the two age groups are illustrated in Figures 3 - 6, pages 51-54.

Children ages 8 to 10.6 in the RCP group had higher PHP scores than children ages 10.6 to 13 years who were in the RCP group at each of the four appointments (see Figure 3, page 51). This trend was also observed between the two age groups of children who were in the SAP group (see Figure 4, page 52). When comparing the mean PHP scores for children ages 8 to 10.5 who were in the RCP and SAP groups, the children in the SAP group had higher scores than children in the RCP group for appointments one and two. However, at appointments three and four the younger children in the RCP group had higher scores than the younger children in the SAP group (see Figure 5, page 53). Children ages 10.6 to 13 years in the SAP group had higher PHP scores than the older children in the RCP group for appointments one, two, and three; whereas, older children in the RCP group had higher scores than older children in the SAP group at appointment four (see Figure 6, page 54).
### Table 3
Multifactor Analysis of Variance for PHP Scores at Appointment One

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Columns (RCP and SAP)</td>
<td>0.295</td>
<td>1</td>
<td>0.295</td>
<td>1.352</td>
<td>NS</td>
</tr>
<tr>
<td>Between Rows (Children's Ages 8-10.5 and 10.6-13)</td>
<td>2.848</td>
<td>1</td>
<td>2.848</td>
<td>13.054</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Columns by Rows (Interaction)</td>
<td>0.231</td>
<td>1</td>
<td>0.231</td>
<td>1.057</td>
<td>NS</td>
</tr>
<tr>
<td>Between Groups</td>
<td>3.370</td>
<td>3</td>
<td>0.47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td>19.414</td>
<td>89</td>
<td>0.218</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>22.514</td>
<td>92</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Source of Variance</td>
<td>SS</td>
<td>df</td>
<td>MS</td>
<td>F</td>
<td>Level of Significance</td>
</tr>
<tr>
<td>------------------------------------</td>
<td>-------</td>
<td>----</td>
<td>-------</td>
<td>-------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Between Columns (RCP and SAP)</td>
<td>0.874</td>
<td>1</td>
<td>0.874</td>
<td>3.556</td>
<td>NS</td>
</tr>
<tr>
<td>Between Rows (Children's Ages 8-10.5 and 10.6-13)</td>
<td>3.932</td>
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<td>3.932</td>
<td>15.097</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Columns by Rows (Interaction)</td>
<td>0.335</td>
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<td>0.335</td>
<td>1.285</td>
<td>NS</td>
</tr>
<tr>
<td>Between Groups</td>
<td>5.140</td>
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<td>1.113</td>
<td></td>
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</tr>
<tr>
<td>Within Groups</td>
<td>23.180</td>
<td>89</td>
<td>0.260</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>28.320</td>
<td>92</td>
<td>--</td>
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Table 5
Multifactor Analysis of Variance for PHP Scores at Appointment Three

<table>
<thead>
<tr>
<th>Source of Variation</th>
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<th>df</th>
<th>MS</th>
<th>F</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Columns (RCP and SAP)</td>
<td>0.142</td>
<td>1</td>
<td>0.142</td>
<td>0.556</td>
<td>NS</td>
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<td>Between Rows (Children's Ages 8-10.5 and 10.6-13)</td>
<td>2.122</td>
<td>1</td>
<td>2.122</td>
<td>8.301</td>
<td>&lt;0.05</td>
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<tr>
<td>Columns by Rows (Interaction)</td>
<td>0.223</td>
<td>1</td>
<td>0.223</td>
<td>0.871</td>
<td>NS</td>
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<td>Between Groups</td>
<td>2.487</td>
<td>3</td>
<td>0.829</td>
<td></td>
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</tr>
<tr>
<td>Within Groups</td>
<td>22.745</td>
<td>89</td>
<td>0.256</td>
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<td></td>
</tr>
<tr>
<td>Total</td>
<td>25.232</td>
<td>92</td>
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<td></td>
</tr>
</tbody>
</table>
Table 6
Multifactor Analysis of Variance for PHP Scores at Appointment Four

<table>
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<tr>
<th>Source of Variation</th>
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<th>df</th>
<th>MS</th>
<th>F</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Columns (RCP and SAP)</td>
<td>1.376</td>
<td>1</td>
<td>1.376</td>
<td>2.191</td>
<td>NS</td>
</tr>
<tr>
<td>Between Rows (Children's Ages 8-10.5 and 10.6-13)</td>
<td>0.852</td>
<td>1</td>
<td>0.852</td>
<td>1.356</td>
<td>NS</td>
</tr>
<tr>
<td>Columns by Rows (Interaction)</td>
<td>0.001</td>
<td>1</td>
<td>0.001</td>
<td>0.067</td>
<td>NS</td>
</tr>
<tr>
<td>Between Groups</td>
<td>2.229</td>
<td>3</td>
<td>0.743</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td>55.894</td>
<td>89</td>
<td>0.628</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>58.120</td>
<td>92</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RCP/ 8-13 Years of Age</td>
<td>SAP/ 8-13 Years of Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td>------------------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appointment No.</td>
<td>$\bar{x}$</td>
<td>sd</td>
<td>Appointment No.</td>
<td>$\bar{x}$</td>
<td>sd</td>
</tr>
<tr>
<td>------------------</td>
<td>--------</td>
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<td>------------------</td>
<td>--------</td>
<td>---</td>
</tr>
<tr>
<td>1</td>
<td>2.88</td>
<td>0.49</td>
<td>1</td>
<td>2.99</td>
<td>0.43</td>
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<td>10.6-13</td>
<td></td>
<td></td>
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<tr>
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<td>( \bar{X} )</td>
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<td>( \bar{X} )</td>
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<td>0.79</td>
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<td>2.56</td>
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Table 9
Mean and Standard Deviations for PHP Scores for Interaction Effects

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<th>RCP</th>
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</table>
Figure 1. Comparison of mean PHP scores for the two prophylaxis groups at each appointment.
Figure 2. Comparison of mean PHP scores for children's age group at each appointment.
Figure 3. Comparison of mean PHP scores for children's age groups in the RCP group at each appointment.
Figure 4. Comparison of mean PHP scores for children's age groups in the SAP group at each appointment.
Figure 5. Comparison of mean PHP scores for children ages 8 to 10.5 in the RCP and SAP group at each appointment.
Figure 6. Comparison of mean PHP scores for children ages 10.6 to 13 in the RCP and SAP group at each appointment.
Discussion

At the end of three months, results failed to show a significant difference in oral hygiene performance of children who received a rubber-cup prophylaxis and children who received a self-administered prophylaxis suggesting that the self-administered prophylaxis is as effective as the rubber-cup prophylaxis for improving oral hygiene performance over a three month period. These findings do not support the results of the study by Clark and Seabrook\textsuperscript{65} which showed the self-administered prophylaxis to be more effective than the rubber-cup prophylaxis for improving gingival health and dental health knowledge. Results from this investigation might be attributed to the sample population in that the children had previously received preventive and therapeutic services at Old Dominion University Dental Hygiene Clinic and might have been more skilled in preventive techniques than the general population. Also, since the sample was a volunteer population with parental consent, the children and/or their parents might have had high regard for oral health initially.

From appointment one to appointment four, the mean scores for the children in both groups showed a consistent decrease. This decrease in mean scores indicates an improvement in the oral hygiene performance of both groups. This finding supports the results of the study conducted by Podshadley and Shannon\textsuperscript{66} which showed a decrease in children's
PHP scores at two weeks and three month intervals. The improvement in oral hygiene performance is attributed to the preventive education instruction, prophylaxis, and the PHP scoring received at each appointment. The children's knowledge that a dental professional would be examining their mouth might have motivated them to spend additional time and effort with oral hygiene techniques. Although the children in both prophylaxis groups showed an overall improvement in oral hygiene performance over the three appointments, no method for measuring gingival health was used. The children's gingival health status would have been a more definitive indication of the children's preventive oral health behavior outside of the clinical setting.

Data analysis revealed a significant difference in oral hygiene performance between children 8 to 10.5 and 10.5 to 13 years for appointment one, two and three. Children in the younger age group had higher PHP scores than children in the older age group. The lower PHP scores of the older age group indicate that older children were performing preventive techniques more skillfully than the younger children. Because of their age alone, older children have had a greater time span for exposure to dental care and to practice preventive skills. This interpretation agrees with Cratty's research which indicated that the amount of practice time is an important variable for children
to develop motor skill with a particular object or tool. Although no significant difference was observed in the mean PHP scores between the two age groups at appointment four, the mean scores for the children in both groups declined at each of the four appointments; therefore, younger children were performing preventive techniques as skillfully as the older children by appointment four. These results are attributed to the preventive education instruction, prophylaxis, and the three, one month follow-up evaluations of oral hygiene performance. The preventive education instruction might have provided children with the opportunity to learn and practice preventive skills under professional supervision. The prophylaxis and follow-up evaluations provided a motivating factor for the children to spend additional time and effort when cleaning their teeth. Over the three month period both age groups improved in oral hygiene performance with the younger children catching up to the skill level of the older children. The three months might have provided the practice time necessary for the younger children to develop skill with preventive techniques and for the older children to further develop their preventive skills.

Data analysis revealed no significant interaction between children's age and the type of prophylaxis received. The means scores for the two age groups of children within each prophylaxis group showed a consistent decline at each
the mean scores of the four treatment groups might be attributed to a combination of exposure to a prophylaxis, regardless of method, patient education instruction, and evaluation of oral hygiene performance. These results, as stated previously, might also be attributed to the characteristics of the sample population. The children and their parents might have been a highly motivated population who placed importance on oral care. Replication of this study with a population who had no previous oral health education experience may yield a different result. Additionally, exposure to more than one self-administered prophylaxis and a longer observation time after the exposure might be needed before any significant effects or trends become observable. This interpretation should be investigated further.
Chapter 5

SUMMARY AND CONCLUSIONS

The self-administered prophylaxis has been used on a minimal basis as a substitute for the traditional rubber-cup prophylaxis. Dental professionals currently using the self-administered prophylaxis indicate that such a program offers improved dental health, a reduction in fear and anxiety, economic savings, and high patient acceptance; however, only one study was found in the literature which investigated the effect of the two prophylaxis methods on the oral hygiene performance and gingival health of children. This study was conducted to compare the effectiveness of the self-administered prophylaxis and the rubber-cup on the oral hygiene performance of two age groups of children and to identify any interaction effects between age and type of prophylaxis used.

Ninety-three children between 8 and 13 years of age received preventive education instruction and either a self-administered prophylaxis or a rubber-cup prophylaxis. The Patient Hygiene Performance Index was used to measure the children's oral hygiene performance prior to the prophylaxis and at one, two and three month intervals. Multifactor analysis of variance was computed to determine if a statis-
tically significant difference existed in the oral hygiene performance of children between the ages of 8 to 10.5 and 10.6 to 13 years who received a rubber-cup or self-administered prophylaxis. The interaction effects of children's ages and the type of prophylaxis received was also determined.

The results of this study failed to reject the null hypothesis that there is no statistically significant difference between oral hygiene performance of children who received a self-administered prophylaxis and children who received a rubber-cup prophylaxis. The null hypothesis that there is no statistically significant difference in oral hygiene performance between children ages 8 to 10.5 and 10.6 to 13 years was rejected for appointment one, two and three; however, this null hypothesis was retained for appointment four. The results of this investigation failed to reject the null hypothesis that there is no statistically significant interaction effects between children's age and the type of prophylaxis received. Although no significant difference was found in oral hygiene performance between the two prophylaxis groups, a consistent decline in the mean PHP scores was observed for both groups of children at each of the four appointments. From these findings the following conclusions were made: (1) the toothbrush prophylaxis is as effective as the rubber-cup prophylaxis for improving the oral hygiene performance of children ages 8 to 13 years over a three month period; (2) with professional guidance and adequate time
children between the ages of 8 to 10.5 years are capable of manipulating preventive dental materials as effectively as children between the ages of 10.6 to 13 years; (3) follow-up evaluation of oral hygiene performance appears to be a motivating factor influencing children to spend additional time and effort when cleaning their teeth. These findings should be considered by those oral health professionals who currently treat children or other populations of individuals where hard deposits and stain are not present. Considering the results and limitations of this investigation the following recommendations for future study are made:

1. Replication of this study to verify the findings and to determine the long-term effects of the two prophylaxis methods on the oral hygiene performance of children.

2. Conduction of studies investigating the two prophylaxis methods which includes a control group in the sample population that receives only those oral hygiene performance evaluations that determine baseline and final data.

3. Conduction of studies designed to determine the effects of the two prophylaxis methods on children in various clinical settings and with a wider age span.

4. Conduction of studies which investigate the caries and fear and anxiety reducing potential of the two prophylaxis methods with children.
APPENDIX A

PATIENT HYGIENE PERFORMANCE INDEX
SCORING CRITERIA*

Six preselected teeth:

a. maxillary right first molar
b. maxillary right central incisor
c. maxillary left first molar
d. mandibular left first molar
e. mandibular left central incisor
f. mandibular first right molar

Tooth surfaces which are assessed:

a. buccal of maxillary molars
b. lingual of mandibular molars
c. labial of maxillary and mandibular incisors

Teeth substitutions for missing preselected teeth:

a. missing first molars: substitute second molar and if second molar missing substitute third molar
b. missing central incisor: substitute adjacent central incisor
c. missing substitute teeth: an M is placed on the chart

Division of tooth surface:

a. the clinical crown is subdivided longitudinally into mesial, middle, and distal thirds
b. the mesial and distal thirds make up the first two subdivisions; each area extends to the middle third of its adjacent proximal surface
c. the remaining middle third is subdivided into gingival, middle, and occlusal thirds

Determining debris score:

a. a score of zero is assigned to a subdivision if no debris is present
b. a score of one is assigned to a subdivision if debris is present
c. a score of zero is assigned to any questionable subdivisions
d. debris score for each tooth is determined by adding the values of each of the five subdivisions
e. the patient hygiene performance score is calculated by dividing the sum of the scores by the number of surfaces charted
f. a tooth charted as M is not included in the calculations
APPENDIX B

COVER LETTER FOR PARENTS

January 22, 1979

Dear Parent:

A project to test the effectiveness of two methods of cleaning children's teeth will be conducted at the Old Dominion University Dental Hygiene Clinic. A registered dental hygienist, under the supervision of the dental hygiene faculty, will implement the project. Because your child has been a member of our patient population, a unique opportunity exists for him/her to become a candidate for inclusion in the project. The results of this project may mean better dental health for your child in the future.

Participation in the project necessitates that your child attend four appointments at the O.D.U. Dental Hygiene Clinic:

Appointment #1: Teeth cleaning, fluoride treatment and oral hygiene education (2 hours).

Appointment #2: (Two-week follow-up) Oral hygiene evaluation and education (30 minutes).

Appointment #3: (One-month follow-up) Oral hygiene evaluation and education (30 minutes).

Appointment #4: (Three-month follow-up) Oral hygiene evaluation and education (30 minutes).

During this project, all the dental hygiene services rendered will be free of charge. Additionally, a toothbrush, unwaxed dental floss and disclosing tablets will be provided.

If you would like to have your child considered for inclusion in this project, please complete the attached medical history and preliminary consent form. These forms should be returned in the preaddressed, stamped envelope by February 1, 1979. Your child's eligibility to participate will be determined
from the information that you provide.
I look forward to working with you and your child!

Sincerely,

Patricia J. Damon
Registered Dental Hygienist
Old Dominion University
APPENDIX C

MEDICAL HISTORY
Old Dominion University
Dental Hygiene Department

Patient ___________________________ Date of Birth __________ Sex M F
(Last Name) (First) (Middle)

Guardian/Parent ____________________________________________________________

Address of Patient __________________________________________________________

Home Phone No. __________________________

Please circle "Yes" or "No" for each question and provide an explanation for all "Yes" answers.

Has your child recently been under a physician's care? . . . . . . . YES NO
Reason: ____________________________________________________________________
Physician's Name and Address: ______________________________________________

Is your child taking any medicine at present? . . . . . . . YES NO
For What: __________________________________ Name of Medication ___________
Date Prescribed: __________ Dosage: __________________________

Has your child ever had heart disease or rheumatic fever? . . . . . . . YES NO
Date: __________ Type: ______________________________
Treatment Received: ________________________________________________________

Has a physician ever told you that your child has a heart murmur? . . . . . . YES NO
If yes, explain: __________________________________________________________________

Does your child bleed for a long time following a cut? . . . . . . . YES NO
If yes, explain: __________________________________________________________________
APPENDIX C CONTINUED

Is your child allergic to anything? .......................... YES  NO
If yes, explain:__________________________________________

Does your child have diabetes? .............................. YES  NO
If yes, explain:__________________________________________

Has your child ever had hepatitis? .......................... YES  NO
Type:__________ Date:__________ Treatment Received:________

Has your child ever experienced dizziness or fainting? .... YES  NO
If yes, explain:__________________________________________

Has your child ever been treated for cerebral palsy or epilepsy? .... YES  NO
If yes, explain:__________________________________________

Has your child ever had one or more convulsive seizures? .... YES  NO
If yes, explain:__________________________________________

Does your child have any mental or physical handicaps? .... YES  NO
If yes, explain:__________________________________________

Has your child ever had radiation therapy for treatment of any oral or
physical conditions? .............................................. YES  NO
If yes, explain:__________________________________________

Does your child wear any orthodontic appliances? ........ YES  NO
Name of Orthodontist:____________________________________

Is there any additional information about your child's general health
which should be known? ....................................... YES  NO
If yes, explain:__________________________________________
APPENDIX D

PARENTS CONSENT FORM

Consent To Participate Form
O.D.U. Dental Hygiene Clinic

I understand that my son/daughter, __________________________ (name of child), age ________, may be selected as a member of a group participating in a project, the purpose of which is to investigate two methods of cleaning children's teeth.

I understand that the procedures will involve four appointments at the Old Dominion University Dental Hygiene Clinic over a three-month period. The first appointment will be two hours; each of the subsequent appointments will be 30 minutes.

I have completed a medical history on my child and verify that all questions have been answered truthfully and to the best of my knowledge.

I understand that I may withdraw my child from the project at any time without compromise to his/her eligibility for future dental hygiene services at the O.D.U. Clinic.

I understand that my child's participation may be terminated by the project director at any time.

I understand that the results of this study may be published or presented orally, but that my child will in no way be identified individually.

I understand that participation in this study is strictly voluntary and no monetary compensation will be given.

I understand that all services rendered during participation in the project will be free of charge including the cleaning and fluoride procedures.

I understand that the information sought may mean better dental care for children in the future.
APPENDIX D CONTINUED

I, ____________________________, consent to having my (parent's signature) participate in the project being conducted at the O.D.U. Dental Hygiene Clinic. I understand that if my child is eligible, I will be contacted by the Dental Hygiene Clinic to schedule the necessary appointments.
# APPENDIX E

## SUBJECT MORTALITY

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<td>Employment difficulty with parents</td>
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<tr>
<td>95</td>
<td>A</td>
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<td>96</td>
<td>A</td>
<td>Placement of orthodontic appliances</td>
</tr>
<tr>
<td>97</td>
<td>A</td>
<td>Parents divorced</td>
</tr>
<tr>
<td>98</td>
<td>B</td>
<td>Brother of #97</td>
</tr>
<tr>
<td>99</td>
<td>A</td>
<td>Relocated in California</td>
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<tr>
<td>100</td>
<td>B</td>
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APPENDIX F

WELCOMING LETTER TO PARENTS

February 1979

Dear Parents:

Welcome to the Old Dominion University Dental Hygiene Clinic! Today's visit to the O.D.U. Clinic is the first of the four appointments scheduled for your child during participation in the project. This appointment includes: an oral examination, cleaning procedures, fluoride treatment and oral health education. During this project, all dental hygiene services rendered will be free of charge. Today's appointment will take approximately 2½ hours. Below are the approximate times of your child's dismissal:

<table>
<thead>
<tr>
<th>Begin</th>
<th>Dismiss</th>
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</thead>
<tbody>
<tr>
<td>8:45 a.m. appointment</td>
<td>11:00 a.m.</td>
</tr>
<tr>
<td>9:30 a.m. appointment</td>
<td>12:00 p.m.</td>
</tr>
<tr>
<td>12:45 p.m. appointment</td>
<td>3:00 p.m.</td>
</tr>
<tr>
<td>1:30 p.m. appointment</td>
<td>4:00 p.m.</td>
</tr>
</tbody>
</table>

Enclosed in the envelope is a consent form, station card and name tag for your child. Please sign the consent form and return it to the secretary before departing the clinic. Place the name tag on your child's left side and ask your child to carry the station card throughout today's session.

Thank you for your time and cooperation today. I will be in contact with you in the near future to schedule the subsequent appointments!

Ms. Patricia J. Damon, R.D.H.
O.D.U. Dental Hygiene Clinic

Important Notice: Due to the design of this project, please do not help your children clean their teeth at home. If the child must visit the dentist, please inform him of your child's participation in this project and ask that patient education and prophylaxis procedures not be scheduled.
APPENDIX G

CONSENT FORM FOR THERAPEUTIC AND PREVENTIVE SERVICES
Old Dominion University Dental Hygiene Clinic

I, ________________________, consent to having
(Parent's Signature)
my son/daughter, ______________________ participate
(Name of Child)
in the project being conducted at the O.D.U. Dental Hygiene
Clinic. To my knowledge, the requested information is
correct and I consent to having Preventive and Therapeutic
Services performed during the four appointments at Old
Dominion University Dental Hygiene Clinic.

Date ___________________________
APPENDIX H

PATIENT STATION CARD

Patient Name_________________________________________ No#________

☐ Station #1 - Reception Area

☐ Station #2 - Damon's Cubicle

☐ Station #3 - Plaque Room New Clinic

☐ Station #4 - Edwards' Cubicle

☐ Station #5 - Toothbrushing Room

☐ Station #6 - Prophylaxis Cubicle
APPENDIX I

PATIENT EDUCATION INSTRUCTION DIALOGUE

Patient Education Clinician:

"Good morning." (or "Good afternoon.")

"My name is Ms. Cunningham."

"Today we are going to see a film about how to keep your teeth and gums healthy. Then we are going to talk about the film, and learn how to brush and floss our teeth."

(Children watch the film.)

Patient Education Clinician:

"The film talked about plaque. Plaque is spelled P L A Q U E (write on board). Does anyone remember what plaque is?"

(Children respond and patient education instructor will listen to the children's answers.)

Patient Education Clinician:

"Plaque is a sticky, invisible film that forms on your teeth and gums every day. Plaque can make your teeth and gums sick because it contains many germs. These germs can cause you to have cavities, make your gums bleed and give you bad breath. Since these germs form every day, you must brush and floss your teeth also every day to remove the plaque in order to keep your mouth healthy."

"Remember the film said how plaque was sneady and hides? Well, to make sure you can see where the plaque is hiding you must color the plaque with a special tablet. This tablet is called a disclosing tablet."

"Now that we have learned about plaque we are going to learn how to remove it so the plaque does not make our teeth and gums sick."
Patient Education Clinician:

"We will now review the methods which will remove the plaque from your teeth. Everyone will be given a bag which has a toothbrush, dental floss, and disclosing tablets in it. You will use these today and also take them home to use every day."

(Pass out bag and cup to each child.)

"Open your bag and take out the pink tablets which are called disclosing tablets. Remember, the disclosing tablets will color the plaque on your teeth so you can see it."

"Please chew one tablet, swish it all around your mouth for thirty seconds and spit it into the cup."

(Children follow the directions.)

"Go to the mirror and look at your teeth in the mirror and let's see if you can find any of these germs which have been colored red on your teeth."

(P.E.C. will circulate among the children and assist them in locating their plaque. Tongue blades will be used to assist P.E.C. The following question will be asked of each child.)

Patient Education Clinician:

"Where do you see the plaque on your teeth?"

"Everyone take a seat!"

"Now you will brush the plaque off your teeth with the toothbrush in your bag."

"Everyone raise your right hand."

(Children raise hand.)

"Put your finger of your raised hand on the last tooth of your top teeth."

"Run your finger along the outside of your top teeth to the other side of your mouth."

(P.E.C. demonstrates with model.)

"Now bring your finger around inside of your top teeth back to where you started from."

(P.E.C. demonstrates with model.)

"Put your finger on the biting surface of your top teeth and run it along to the other side of your mouth."

(P.E.C. demonstrates with model.)
"This is the direction you will use your toothbrush."
"I will show you how to place your toothbrush on your teeth using this model and toothbrush, and you try using your toothbrush in your mouth."
"Gently place the toothbrush on your top last tooth so that you can feel the bristles slide into the space between the gums and tooth. Remember from the film that plaque is sneaky and hides in those spaces."
"Wiggle the toothbrush back and forth on that tooth for 5 seconds so you can remove the plaque."
"Let's see if you can feel the bristles moving in those spaces where the plaque hides. Does everyone feel the bristles moving in their gums?"

"Now move to the next tooth. Make sure you gently press the bristles of the toothbrush against your tooth so they will slide in those spaces. Wiggle the brush back and forth to remove the plaque."

(Children following directions.)

"Brush the biting surface of your teeth by placing the bristles on the top like this" (demonstrate on model) "and scrub back and forth."

"Everyone go to the mirror and practice brushing your top teeth, moving your toothbrush the way you moved your finger and I will come around to everyone to see how you are doing."

(P.E.C. circulates among the children and assists by using above dialogue.)

"The bottom teeth are brushed the same way."
"Remember to start on the outside of your right last tooth."
"Let's everyone place your toothbrush there."
"Make sure you can feel the bristles slide in those spaces."
"Wiggle back and forth just like you did on the top teeth."
"Now move around your bottom teeth while I help each one of you."

(P.E.C. circulates while children practice.)

Patient Education Clinician:

"The next step in removing the plaque is using dental floss. Remember that plaque also forms in between your teeth."
"Where are these spaces in your teeth?"

(Children point out spaces.)
"Take the dental floss out of your bag."

(Children follow instructions.)
APPENDIX I CONTINUED

"Tear off a strand of floss the length of your arm from your elbow to your finger tips."

(P.E.C. is demonstrating.)
"Keep the floss together and tie 2 knots."
(demonstrates)
"The idea is to get the floss between two teeth."
"Hold the floss loop with your three fingers grasping the floss gently with your pointing finger and thumb."
"Gently put the floss in between the teeth and move the floss up and down two or three times keeping it as close as you can to the tooth. Be careful not to hurt the gum between each tooth. Does everyone see where this gum is?"
(demonstrate and show interproximal papilla in mouth of P.E.C.)
"Now everyone go to the mirror and try using the floss, while I come around and help each of you."
(circulates among the children and assists with flossing)
"Now let's try flossing between two back teeth."
"Start in the same place where you learned to begin brushing."
"I will come around to everyone and help each of you."
(circulates among all the children)
"Remember that you floss all your teeth in the same direction that you brush."
"Start at the last top right tooth and come around to the other side, flossing between every tooth. Then floss all of your bottom teeth beginning with the last tooth on the right side of your mouth. Floss all the way around your bottom teeth ending up with the last tooth on the left side of your mouth."

"You have learned the things you can do at home to remove your plaque." "Look in the mirror." "Do you see any plaque?"
(Children look in mirror for plaque.)

"What can you do to remove it?"
(Child is guided to respond with, brush and floss everyday.)

Patient Education Clinician:

"This toothbrush, dental floss, and disclosing tablets are for you to use everyday at home."
"Remember to chew the disclosing tablet so you can see your plaque, brush and floss your teeth the way you learned today to remove your plaque."

"Now all of you will have your teeth checked and cleaned by a dental hygienist. Each of you will have a fluoride treatment to make your teeth stronger."
APPENDIX J

CLINICIAN'S PROCEDURES AND DIALOGUE

TO: Second Year Dental Hygiene Students
FROM: Ms. Damon
SUBJECT: Orientation for Clinicians in Research Project

VERY IMPORTANT MESSAGE:

Thank-you! Thank-you! Thank-you! Thank-you!

INTRODUCTION:

The purpose of this study is to determine the effect of two prophylaxis techniques on the oral health status of children between the ages of 8 and 13. The prophylaxis techniques will involve using either a rubber-cup or a supervised toothbrush method. All the procedures throughout the project will be the same except for the type of prophylaxes that the children are to receive--Group A will receive a rubber-cup prophylaxis by a dental hygienist and Group B will administer their own toothbrush prophylaxis under the supervision of a dental hygienist. During both prophylaxes procedures, no patient education is to be given to the patient!! Clinical procedures include: reviewing the medical history, performing a modified oral examination, scaling, polishing (toothbrush or rubber-cup) and a fluoride treatment. As you know, it is imperative that the rules and instructions be followed strictly! Any deviations from the outlined procedures could significantly affect the research project. It is important to remember that everyone must remain as "neutral" as possible during participation in the study. To compensate for any possible deviations, the rehearsed dialogue has been prepared which must be abided by in order to eliminate interpersonal differences.
APPENDIX J CONTINUED

Please Remember the Do's and Don'ts!!

Rubber-Cup Prophylaxis

1. Do wear proper clinical attire.
2. Do remain as neutral as possible. Maintain a monotone voice.
3. Do not use any stimulating verbal or non-verbal communication skills.
4. Do not give any patient education—follow the dialogue strictly!
5. Do perform the rubber-cup prophylaxis on the children.
6. Do floss the patient, use the loop method.
7. Do perform F12 treatment on patient.

Toothbrush Prophylaxis

1. Do wear proper clinical attire.
2. Do remain as neutral as possible. Maintain a monotone voice.
3. Do not use any stimulating verbal or non-verbal communication skills.
4. Do not give any patient education—follow the dialogue strictly.
5. Do not perform the T.B. prophylaxis on the children—Guide the child to the proper sequence.
6. Do not floss the patient. Let patient prepare loop and floss their own mouths.
7. Do not perform F12 treatment on patient. Guide the child to the proper sequence.

*In the event that the patient asks a question pertaining to patient education, answer with the response outlined on the rehearsed dialogue.

Clinician Procedures

I. Clinicians given cubicle assignments; type of prophylaxises and date of prophylaxis.

II. Clinicians given prepared folders by Cunningham. Each folder will include:

A. Medical History Form (Completed)
B. Oral Examination Form
C. Rehearsed Dialogue
APPENDIX J CONTINUED

III. Seat patients and begin clinical procedures:

A. Review Medical History

B. Perform Modified Oral Examination (Mount Mirror and Shepherd's Hook Explorer):

1st--Intraoral Examination (see "soft tissue" on form).

2nd--Chart--missing teeth (X), caries (red) and circle letter if deciduous tooth present.

3rd--Determine occlusion.

4th--Extraoral Examination--Palpate submandibular and submental glands; lymph node chain on left/right side of neck.

5th--Fill in services rendered (MH, OE, Type of prophylaxis) and date.

6th--Fill in referral information.

NOTE: Please record only significant findings on the soft tissue evaluation.
Please record pathological findings in the "alert" box in red.

C. Scaling Procedures--Remove all sub and supra marginal calculus using Columbia 13/14 curet, Gracy 1/2 and 533 Sickle.

D. Perform Prophylaxes.

1. Rubber-Cup
   A. Disclose Patient.
   B. With proper armamentarium begin the prophylaxes in the:
      --Maxillary right posterior buccal quadrant to
      --Maxillary left posterior buccal quadrant
      --Maxillary left posterior linguals to
      --Maxillary right posterior linguals
      --Maxillary right posterior occlusals to
      --Maxillary left posterior occlusals with rubber cup
      --Mandibular right posterior buccals to
      --Mandibular posterior left buccals
      --Mandibular left posterior linguals to
      --Mandibular right posterior linguals
      --Mandibular right posterior occlusals to
      --Mandibular left posterior occlusals with rubber cup
   C. Floss (tie floss in loop form).
APPENDIX J CONTINUED

--Unwaxed dental floss used in the same above sequence.

D. Fluoride Treatment
E. Exit child--waiting room with bag!

2. Toothbrush Prophylaxis.

A. Disclose Patient.
B. Patient is seated in upright position (use patient education hand mirror and cuspidor to expectorate).
C. Clinician explains to patient that they will be "removing their own plaque," not the hygienist.
D. Patient prepares the brush that was given to him/her in toothbrush room with prophylaxis paste.
E. Clinician guides patient to begin brushing in the same area that they started in the toothbrush room. Clinician guides patient through sequence until entire dentition is completed. Sequence in same as above.
F. Floss.
   --Patient prepares loop (same was Ms. Cunningham showed you in the toothbrush room).
   --Clinician guides patient around mouth removing plaque with floss (repeating sequence dialogue).
   --Upon completion, clinician asks patient if they see any remaining plaque that they want to remove before the fluoride treatment is administered.
G. Fluoride Treatment by patient, not clinician.
   --Ask each to fill trays with small amount fluoride, place one of the trays on the lower teeth first; then place other tray on upper teeth. Place saliva ejector in patient's mouth and ask them to close.
H. Exit child to waiting room with bag.

NOTE: There is no need to re-disclose the patient after polishing procedures in either prophylaxis group. Do remember to disclose before the polishing procedures.
APPENDIX J CONTINUED

I. CLINICIAN'S DIALOGUE: PROFESSIONAL PROPHYLAXIS

1. "Good morning or good afternoon, _________."
   (child's name)

2. "My name is ________________." (clinician's name)

3. "Today I am going to clean your teeth to remove
   all the plaque in your mouth."

4. "First I am going to look and feel inside your
   mouth." (perform oral exam as directed)

5. "Some of the plaque has hardened on your teeth--
   now I am going to remove the hardened plaque off
   your teeth." (perform scaling procedures)

6. "Now I am going to remove the rest of the plaque
   off your teeth:
   "I am going to start on the outside of your last
   top right tooth in the same place that you learned
   to start brushing your teeth in the toothbrush room."
   (clinician begins rubber-cup prophy; throughout
   procedure verbalize sequence to the child)

   Sequence: I am going to clean around the outside of
   your top teeth until I come to the last tooth on the
   other side of your mouth. Then I am going to clean
   the insides of your top teeth. Next I am going to clean
   the biting surface of your top teeth. Now I am going
   to clean your bottom teeth starting on the outside of
   the last right tooth. Then I am going to clean the
   insides of your bottom teeth. Next I am going to clean
   the biting surface of your bottom teeth.

7. "Now I am going to floss your teeth the same way
   you learned in the toothbrush room." (make a loop
   with the floss)

   Sequence: I am going to start with the last top tooth
   on the right side of your mouth and come around to the
   other side of your mouth flossing between every tooth.
   Next I am going to floss your bottom teeth. I am going
   to start with the last bottom tooth on the right side
   of your mouth and come around to the other side of your
   mouth flossing between every tooth.

8. "The last thing I need to do is put fluoride on your
   teeth to make them strong." (give fluoride treatment)
9. "Do not eat or drink anything for 30 minutes because the fluoride is still working on your teeth to make them harder."

10. Dismiss child. (In the event the child should see the dentist inform the parent and make a note on the chart.) Only refer the child for treatment of gross caries or oral abnormalities that require immediate attention.

II. CLINICIAN'S DIALOGUE: SELF-PROPHYLAXIS

1. "Good morning or good afternoon, ___________________." (child's name)

2. "My name is ___________________." (clinician's name)

3. "Today you are going to clean your teeth to remove all the plaque in your mouth."

4. "First I am going to look and feel inside your mouth." (perform oral exam as directed)

5. "Some of the plaque has hardened on your teeth--now I am going to remove the hardened plaque off your teeth." (perform scaling procedures)

6. Disclose child and seat upright.

7. "Now you will brush your teeth with this special type of toothpaste to remove the rest of your plaque. Brush the plaque off the way you were taught by Ms. Cunningham in the toothbrush room."

Follow sequence: The child was taught to start on the outside of the top of the last right tooth, coming around to the last tooth on the top left side. Next the child brushes the inside of the top teeth coming around to where he/she started from. The biting surfaces of the top teeth are then brushed. The child brushes his bottom teeth beginning with the outside of the bottom right tooth coming around to the last tooth on the bottom left side. Next the child brushes the inside of the bottom teeth coming around to where he/she started from. The biting surfaces of the bottom teeth are then brushed.

8. "Now you will floss your teeth the way you learned in the toothbrush room." (child prepares floss loop)
Sequence: child follows same sequence as used with brushing.

9. "Look in the mirror and do you see any remaining plaque that you need to remove? (clinician guides child as he/she removes remaining plaque.)

10. "The last thing you need to do is put fluoride on your teeth to make them strong. Fill these trays with a small amount of fluoride from this container. After I dry your teeth, place one of the trays on your top teeth. I want you to bite together after I place this saliva ejector in your mouth."

11. "Do not eat or drink anything for 30 minutes because the fluoride is still working on your teeth to make them harder."

12. Dismiss the child. (In the event the child should see the dentist inform the parent and make a note on the chart.) Only refer the child for treatment of gross caries or oral abnormalities that require immediate attention.
APPENDIX K

THANK-YOU LETTER TO PARENTS

May 1979

Dear Parent:

Today's visit to the O.D.U. Dental Hygiene Clinic is the last appointment scheduled for your child in the project. This appointment will include an oral examination and will take approximately 15-20 minutes.

I would like to take this opportunity to thank you for your time and cooperation throughout this project. It was a pleasure to work with your child in order for them to improve their oral health status. Results of this project will be available in July of this year at the Department of Dental Hygiene, Old Dominion University. I would be most happy to forward the results to you upon request. Publication of the results of this project is anticipated in the Fall of 1979. The results to be published will in no way identify your child individually.

Thank you for your participation! I appreciate your concern for your child's dental health.

Sincerely,

Ms. Patricia J. Damon
Registered Dental Hygienist
Old Dominion University
APPENDIX L

CALIBRATION OF INTRA-RATER RELIABILITY

Pearson r Computed Using Two Sets Of Raw Plaque Scores
From Eighteen Elementary School Children

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**Score:**

0 = No sections display debris
1 = Debris present on 1 section
2 = Debris present on 2 sections
3 = Debris present on 3 sections
4 = Debris present on 4 sections
5 = Debris present on 5 sections
## APPENDIX N

### RAW ORAL HYGIENE PERFORMANCE SCORES FOR GROUP RCP

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**RAW PATIENT HYGIENE PERFORMANCE SCORES FOR GROUP SAP**

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BIBLIOGRAPHY


