A STUDY OF ORAL HYGIENE AND THE HEALTH OF GINGIVA IN GERIATRIC PATIENTS

by

MARIE H. REITZ, B.S.

A THESIS

Presented to
the University of Oregon School of Nursing
and the Graduate Council
of the University of Oregon Medical School
in partial fulfillment
of the requirements for the degree of
Master of Science

June 11, 1971

APPROVED:

[redacted]

Lucile Gregerson, M. Ed., Associate Professor, Thesis Adviser

[redacted]

Maxine Patrick, Dr. P. H., Professor of Nursing, First Reader

[redacted]

James Bennett, DMD, MS, Associate Professor, Second Reader

[redacted]

John M. Brookhart, Ph. D., Chairman Graduate Council

This study was supported by a United States Public Health Service Traineeship from Grant Number NT-35-C12S. 1

ACKNOWLEDGMENTS

The writer wishes to express sincere appreciation to all those who contributed to the completion of this study: to Miss Lucile Gregerson for patience, encouragement and help throughout the study, to Mrs. Majorie Boufford for initial direction and assistance, to Dr. Maxine Patrick for assistance in formulating the proposal, to Miss Wilma Pope for help in data collection, to the nursing staff of the institution in which the study took place for cooperation and help, to Dr. James Bennett and his staff for the advice and assistance that made this study possible, and to the patients without whom the study could not have been developed.

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CHAPTER I

INTRODUCTION

Statement of the Problem

For older patients, good oral health is vitally important in helping to maintain an adequate diet, to be physically and emotionally comfortable and to eliminate added strain of oral infection (16). Therefore one of the most important nursing needs of patients in nursing homes is oral hygiene. But this aspect of patient care if often neglected. Although persons may have kept the mouth comparatively clean throughout their lifetime, they may find it difficult to maintain good oral hygiene when they grow older. Chronic disease may cripple the patient's hands so that it is difficult to manipulate a toothbrush. If he had had a stroke, food may collect in the paralyzed side of his mouth which he is unable to sweep away by actions of cheek and tongue. Disorientation and confusion may cause him to neglect mouth care even though he is still physically capable of performing such care. Many patients need assistance with mouth care but the oral hygiene given by nursing personnel is often haphazard and inadequate due to lack of time, motivation and/or education. As a result, teeth become coated with materia alba, plaque and calculus,

periodontal disease is enhanced or extended and the end result may be severe periodontal disease and decay with the loss of teeth.

Oral hygiene measures are definitely nursing measures and should be carried out by the nurse. It is

> . . . the unique function of the nurse to assist the individual, sick or well, in the performance of those activities, contributing to health or its recovery (or to peaceful death) that he would perform unaided if he had the necessary strength, will or knowledge (12, p. 63).

What can be done to improve oral hygiene given to patients in nursing homes? If lack of time is one of the main reasons why oral care is neglected, what can be done to save time? Is it necessary that dental care be given at least twice a day as is recommended by most nursing textbooks?

Purpose of the Study

The purpose of this study was to determine if oral hygiene could be given only twice a week without endangering the health of the gingiva. The hypothesis tested in the study was: If clinical signs of gingivitis are present but have been reduced and stabilized, thorough oral hygiene twice a week will prevent the extension of inflammation.

Research Design

Selection of Participants

This study was done on older people who were patients in a 189

bed, Medicare approved, extended care facility. The University of Oregon Dental School has been providing dental service to the patients in this private, religious agency.

Criteria were established for the selection of the participants. Each study patient had at least three remaining anterior maxillary teeth and three remaining anterior mandibular teeth and the gingiva surrounding these teeth exhibited clinical signs of chronic gingivitis. The anterior teeth did not exceed class II mobility, nor did their pocket depths exceed six millimeters. Each patient was able to cooperate with the researcher. Patients who met these criteria were asked if they would be willing to participate in the study. Only patients who consented were included. Excluded from the study were seriously ill patients in need of frequent oral care because of their physical condition. Excluded also were patients known to have a blood dyscrasia and patients receiving dilantin because of the gingival changes that occur in these two situations.

Permission to do the Study

The administrator and the nursing service director of the nursing home were contacted for permission to conduct the study. Written permission was obtained from the 16 patients who were included in the study (see permission form, Appendix A). The cooperative attitude of both staff and patients facilitated the conduct of

the study.

Collection of Data

After the patients to be included in the study had been selected, information regarding sex, age, diagnosis, diet, and medications was obtained from nursing home records.

Before treatment was begun, the gingiva was inspected by a dental hygienist, the researcher and another nurse (who was the same person throughout the study). Intraoral photographs were taken by the researcher or the dental hygienist. A dental hygiene student inspected the teeth of each study patient for dental plaque, tooth mobility and depth of gingival crevice. These were recorded on the form found in Appendix B. She then brushed the teeth thoroughly. Following the initial inspection and brushing, each study patient had a complete dental prophylasix done by a dental hygiene student. This was a procedure in which all tooth surfaces were scaled and polished using scaling instruments, brushes and pumice. Acidulated flouride phosphate topical gel (1.23% fluoride) was applied to all tooth surfaces.

Following prophylaxis, the researcher provided thorough oral hygiene on a daily basis. The latter included the following procedure: The mouth was rinsed with cold water to remove food debris; then using a soft nylon bristle tooth brush and a mixture of one-half sodium

bicarbonate and one-half sodium chloride, the teeth were brushed thoroughly. The sulcular method of brushing was used, that is, the brush bristles were vibrated horizontally at the gingival sulcus and then were swept vertically toward the crown of the tooth. After all lingual and buccal or labial surfaces of the teeth had been brushed in this way, the occlusal areas were brushed. The mouth was again rinsed well with water and the interproximal spaces were cleaned with nylon yarn.

When the clinical signs of gingivitis had disappeared or had become stabilized in the treatment and control areas of the mouth, oral hygiene was given only twice a week, Monday and Thursday. The decision as to when clinical signs of gingivits had disappeared or become stabilized was made by the researcher in conjunction with the dental hygienist and was based on the fact that no change in color and texture of the gingiva had occurred for three days.

All areas of the mouth were given twice weekly oral hygiene treatments except for the control area. The control area was either the maxillary anterior teeth (labial aspect) or the mandibular anterior teeth (labial aspect). The control and treatment areas were randomized so that 50% of the patients had the maxillary anterior teeth as control and the mandibular anterior teeth as treatment area and 50% of the patients had the mandibular teeth as control. Randomizing with replacement was done by drawing names from a container containing

the names of all 16 patients on separate slips of paper. The first eight names drawn were patients whose control area was to be the maxillary anterior teeth and gingiva; the last eight were reverse.

When oral hygiene was instituted on a regular twice weekly basis, the patient and nursing home staff were given no directive as to oral care between treatments. If the patient asked, he was advised to continue his customary oral care.

Before each treatment on Monday and Thursday, intraoral photographs were taken and the gingiva was inspected for color and texture by the researcher in conjunction with the other registered nurse. Once a week, on Monday, a plaque determination was also done by the researcher. She was taught the procedure by a dental student so that the method used to determine plaque was the same method used by the dental hygienists. The method used was developed by Podshadley (22) for scoring the amount of dental plaque present on teeth.

After application of disclosing solution, the examiner mentally divided the teeth into five sections, each of which was examined for pink-stained plaque. If no plaque was present, the value of zero was given to that subdivision. A value of one was given if plaque was present. The plaque score for each tooth was determined by adding the values of each subdivision. The mean plaque score was calculated by dividing the sum of the scores by the number of teeth examined.

The twice weekly treatment, inspection and photograph routine was continued for six weeks on each patient.

At the conclusion of the study, a final assessment was made which included: 1) an inspection of the gingiva, 2) plaque determination, 3) measurement of gingival crevice and tooth mobility, and 4) intraoral photographs. The final gingival crevice and tooth mobility measurements were made by dental hygienists. The assessment of the changes in gingival condition made from the photographs was done by a gerodontologist.

Overview of the Study

Chapter I contains the statement of the problem, purpose of the study, hypotheses and the research design.

Chapter II includes a review of the literature and related studies that deal with the problem of chronic periodontal disease and the relationship of oral hygiene to the prevention of chronic gingivitis.

Chapter III consists of a report of the study, findings, analysis of the data and the interpretation of the findings of the study.

Chapter IV contains the summary of the study, the conclusions drawn and recommendations for further study.

CHAPTER II

REVIEW OF THE LITERATURE AND RELATED STUDIES

Introduction

Literature and studies related to those aspects of oral care and chronic gingivitis relevant to this study were reviewed. The review includes: the normal changes that occur in the mouth due to aging, the characteristics of normal gingiva, the clinical signs of chronic gingivitis, the etiology of the disease, the scope of the problem and the role of oral hygiene in its management.

Normal Mouth Changes due to Age

The salivery, mucous and other enzyme-producing glands of the mouth decrease in their ability to produce secretions, particularly during rest periods. One of the functions of teeth is to stimulate the salivary glands and the glands of the upper respiratory system. When the teeth have been removed, the alveolar process atrophies thus reducing the masticatory ability of the jaw. This in turn reduces the salivary flow (15). In a study of 130 subjects done by Balogh and Lelkes (4) to determine the tongue changes that take place in old age, 3.8% of the tongues tested were dry to filter paper. If saliva secretion

is markedly reduced, the saliva becomes mucoid, sticky, web-like, bubbly and frothy rather than thin and watery. As a result of diminished secretions, much of the protective and cleansing action of the oral fluids is lost.

There is a wearing away of teeth as a result of tooth-to-tooth contact in mastication. This is seen only on the occlusal, incisal and proximal surfaces of the teeth. In some people the teeth may be worn down almost to the gingiva. Tooth attrition causes the dental arch to become shorter and also decreases the space between the chin and nose. Calcification of dentinal tubules occurs which makes the dentin harder and decreases the sensitivity of the tooth. The gingiva recedes and may expose the cement which is softer than enamel and therefore more susceptible to trauma from tooth brush and dentrifice. Calculus formation on the teeth increases with age.

There is reduced keratinization and diminished vascularity of the mucous membrane which atrophies and becomes thinner. As a result, the oral mucosa is more susceptible to trauma and infection and is less tolerant to highly seasoned foods, hot food, tobacco and alcohol. The elastic fibers that hold the mucous membrane to the buccinator muscle lose their elasticity. As a result, cheek biting may frequently occur due to the inward bulge of the cheek membrane.

There is a decline in sensitivity to all four taste substances, salty, sweet, bitter and sour. In the average young adult there are

245 taste buds on each papilla on the tongue but in persons between the ages of 75 and 85 years, there are only 88 taste buds on each papilla (14). An increase in preference for tart taste and a decrease in sweet choices has been found in the elderly aged 50 to 80 (4).

Characteristics of Normal Gingiva

Normal healthy gingiva is described as usually being uniformly coral pink in color although the color varies with the individuals (27). Factors which influence the color of gingiva are the vascularity and density of the connective tissue, the hemoglobin content of the blood, the degree of keratinization and pigmentation of the epithelium, the width of the epithelium and the presence or absence of inflammation. Stones (30) described the free gingiva as that part of the gingiva that surrounds the tooth like a collar and is not directly attached to the tooth surface. It is about 0.5 to 1.5 millimeters wide, is smooth and glossy in appearance and has a thin edge. The interproximal gingiva fills the space between the teeth to the contact points and ends in a knife-like edge. The attached gingiva adjoins the free gingiva from which it is separated by a more or less well defined groove. It is approximately 3 to 4 millimeters wide, is firm and resilient and has a stippled "orange peel" appearance. The gingival crevice or sulcus which is the space between the free gingiva and the tooth, does not normally exceed a depth of 1-1/2 - 2 millimeters.

Chronic Gingivitis

Clinical Signs of Chronic Gingivitis

Authorative references (27, 30) describe a progressive change in color of the interproximal and free inflammed gingiva from pale pink to a deeper pink and then to red or reddish blue.

The interproximal gingiva may have a bulbous appearance and over-fill the interproximal space or there may be a loss of tissue causing the interdental papilla to recede and become blunted. Edema causes the free gingiva to have a spongy, rolled edge appearance. The attached gingiva becomes boggy and loses its stippled appearance. Gentle pressure exerted by a dental probe or a tooth brush causes bleeding from the gingival sulcus. When the free gingiva becomes swollen and its epithelial attachment separates from the tooth, the depth of the gingival crevice increases and a pocket is formed. As the pocket deepens the tooth becomes more mobile and destruction of the alveolar bone occurs (18). Eventually this leads to tooth loss. Often food debris is seen around the gingival margins, in the interproximal spaces and impacted in gingival pockets.

The Etiology of Chronic Gingivitis

Poor oral hygiene is an important local factor in the etiology of chronic gingivitis (27). If dental care is neglected, plaque which is

soft, grossly invisible material consisting of food, mucus and bacteria, forms on the teeth. Cheesy, white debris known as materia alba collects at the gingival margin and between the teeth. Food impacted in the interproximal spaces and in the gingival crevice, becomes a source of mechanical irritation. Microorganisms growing in these media may initiate an inflammatory process in the adjoining gingiva. Calculus is a rough, hard material that is deposited on poorly cared for teeth. During mastication, when pressure is placed on the gingiva, the underlying calculus which moves with the tooth, rubs against the gingiva and irritates it. Microorganisms imbedded in the calculus find entry into the irritated gingival tissues and consequently edema, hyperemia and leukocytic infiltration results. The gingival crevice deepens and a pocket is formed which allows space for more food debris, microorganisms and calculus to accumulate and to irritate.

Partial dentures, overhanging ledges of fillings and faulty appliances or bridges may be sources of irritation to gingival tissue. Poorly contoured teeth, irregularly arranged teeth, unopposed teeth, root tips and edges of cavities may irritate the gingiva sufficiently to initiate chronic inflammation. Mouth breathing which dries the oral mucous membrane results in gingival irritation. Drugs such as phenol, silver nitrate, aspirin and volatile oils, if applied locally may be irritating to the gingiva.

Systemic causes of chronic gingivitis may be endocrine dysfunction, nutritional disturbances, specific granulomatous infections or certain drugs given systemically. Gingivitis has been reported to occur with puberty, pregnancy, menopause, and hypothyroidism, all of which are conditions in which hormonal changes occur. A deficiency of the B complex vitamins and/or ascorbic acid may result in gingivitis (3). The gingival tissues of patients with diabetes mellitus have lowered resistance to infection and trauma and may readily become inflammed. The anemia and malnutrition that accompanies all blood diseases affect the periodontal tissues, but the three blood dyscrasias that have a dramatic oral effect are anemia, leukopenia, and leukemia (29). The side effects of certain drugs may involve the oral cavity (20). Analgesics, sedatives, antibiotics, heavy metals or tranquilizers may cause stomatitis. Antihistamines, central nervous system stimulants and tranquilizers cause dryness of the mouth. Excessive bleeding of the gingiva may result from the use of analgesics, sedatives or anticoagulants. Dilantin causes gingival hyperplasia. Corticosteriod therapy results in delayed healing and predisposition to infection. Ulcers in the mouth may be due to chloromycetin, sulfonamides or antimetabolites, especially methotrexate.

Although there are many contributing factors to chronic gingivitis, the most common cause of gingival inflammation is poor

oral hygiene. It has been found that there is a direct relationship between oral hygiene habits and periodontal disease. Studies throughout the world have established an association between mouth cleanliness and periodontal disease which is as definite and predictable as the association between water borne fluorides and dental caries (29).

Scope of the Problem

Studies have shown that disease of the tooth-supporting tissues, or periodontitis, is the most frequent and the most serious oro-dental problem in older persons, and is responsible for the loss of more teeth than all other oral diseases combined. In 1951, Marshall-Day and his associates (27) studied the incidence of periodontal disease in a group of 1279 persons living in Boston, Massachusetts. The ages of the subjects ranged from 13 to 65 years. The investigation revealed that the overall average of incidence of gingivitis was 88% for males and 80% for females. The incidence ranged from 80% at ages 13 to 15 years to 95% at age 60. A national health survey done in 1960-62 revealed that periodontal disease was an ailment of major proportion in the United States and that more than 20 million Americans had lost all their natural teeth (5). About three out of four of the entire adult population, who had at least one permanent tooth, had periodontal disease. In 1963, Dr. Robinson of Kansas City, Missouri, published figures also showing that the incidence of periodontal disease

rises with age. Dr. Robinson found that in the age group 65 to 75 years, the incidence of periodontitis was 62% while at the age of 85 and over the incidence was 73% (25).

The problem of chronic gingivitis is especially significant in the older person because the functional demands made on the teeth and their supporting tissues is greater in later years than in early life. To compensate for diminished secretions within the gastrointestinal tract, food needs to be masticated more thoroughly, and due to loss of teeth because of periodontitis, the remaining teeth are often required to serve as bridge or partial denture abutments (7, 9).

Management of Chronic Gingivitis

The majority of cases of chronic gingivitis are due to local irritation (27). If the irritants are removed before the inflammation spreads to deeper tissues, the edema and hyperemia present will disappear within a few hours or days. This points to the need for early treatment followed by "thorough oral hygiene" and frequent prophylactic measures by the dentist to preserve healthy periodontal tissues. If the tissues do not respond to local therapy, a search must be made for systemic conditions that may be causing the gingivitis.

Oral hygiene is important not only in the treatment of chronic gingivitis but also in its prevention. Good care will preserve periodontal tissues and prevent the loss of teeth, even in old age. It has

been observed that periodontal disease which is usually an asymptomatic and progressive disease process, responds to effective therapy and home care when interrupted sufficiently early in its course and that it can be prevented by conscientious programs of oral care (9).

Foods containing the minerals and vitamins necessary for the maintenance of healthy gums and teeth should be included in the diet. The physical character of the diet also has a bearing on the health of periodontal tissues. The chewing of hard, detergent foods helps to maintain the teeth, gingiva and underlying bone in good condition (21).

Related Studies

A study done by dental hygiene students (7) sought to determine the minimum but optimum oral hygiene care necessary for geriatric patients in a nursing home environment. Six nursing home patients ranging in age from 69 to 82 years, who still had most of their own teeth, were studied. Each patient had gingivitis and/or periodontal disease to some degree and was unable to care for his own teeth. After initial intra-oral photographs were taken, each patient was given a complete dental prophylaxis procedure (as described in Chapter I) followed by daily tooth brushing until the clinical signs of gingivitis had disappeared or were reduced and stabilized. No oral care was then given for four days. If the clinical signs of inflammation had not reappeared, the interval between brushings was increased to five days. If the signs of inflammation did reappear, the interval between brushings was reduced to three days. The clinical signs of inflammation

were determined by visual inspection of the color and texture of the gingiva. Intra-oral photographs were taken during the study to show the condition of the gingiva after brushing intervals. If was found that when gingivitis had been eliminated or stabilized and an oral hygiene program maintained, the interval between oral hygiene treatments could be increased to three or four days without a recurrence of inflammation. In addition to the small sample size, the study was of short (4-6 weeks) duration and photographs were not taken at each visit. Therefore, the value of further study is apparent.

Massler and his associates (19) studied the effects of a non-controlled program of tooth brushing in a group of 154 naval inductees ranging in age from 17 to 22. Each man was given a tooth brush and dentrifice and instructed to brush his teeth on arising and after each meal. The group as a whole was given a single brief demonstration of the technique of brushing but no further instruction or supervision was attempted. The effects of tooth brushing were measured by means of clinical evaluation and standardized color photographs taken at the beginning of the study, at 10 weeks and at the conclusion of the study. The analysis was quantitated by rating the cleanliness of the enamel and by scoring the gingivitis as mild, moderate or severe and localized or generalized. One examiner observed the gingiva clinically and two examiners independently assessed the photographs.

A P-M-A (papillary, marginal and attached) index was used to assess the amount of gingivitis present. It was concluded that the rating of cleanliness and gingivitis was more exact, objective and accurate when made from the color photographs than when made from the visual inspection. These data showed that only 9.7% of the entire group showed objective visual evidence of improved gingiva after the 15 week period. It was concluded that improved tooth brushing does not, per se, always result in improved gingiva because calculus lodged in the gingival crevice or crowding of teeth may be sources of constant gingival irritation.

Tanchester (31) conducted an investigation of the effects of a carbamide peroxide gum-massage preparation on gingivitis. Ninety patients with various degrees of gingival inflammation and hypertrophy were divided into three equal groups. Group 1 used an oral rinse of 3% hydrogen peroxide. Group 2 used a placebo gum-massage paste and Group 3 used carbamide peroxide gum-massage paste. The criteria used for rating gingival inflammation were color of the tissues, amount of bleeding on probing with a cotton applicator, degree of hypertrophy, amount of calculus, degree of necrosis, mouth odor and patients' subjective descriptions of such symptoms as bleeding and soreness. The clinical signs and symptoms were used to rate the degree of gingival hypertrophy and inflammation on a scale of 1 through 4. At the completion of the three week study, all three

treatment groups showed decreased gingival inflammation compared with the status at the beginning of the study. Group 1 showed the least improvement which was probably due to the lack of gingival brushing and massage that was required for application of the pastes. Group 3 showed the most improvement.

Summary

A search of the literature did not reveal as many recent studies or writings dealing with periodontal disease in the aged as could be expected due to the magnitude and seriousness of this problem. Although oral changes due to aging and other local and systemic factors contribute to the development of chronic gingivitis, the most common cause of gingival inflammation is poor mouth care. Thorough oral hygiene plays an important role in the prevention and management of this progressive and usually asymptomatic disease. It has been found that if clinical signs of gingivitis are either absent or have been reduced and stabilized, oral hygiene need not be given every day. In fact, intervals between thorough brushings may be increased to three or four days without a recurrence of gingivitis.

Other studies have been conducted to determine the effect of tooth brushing on the gingiva. It has been found that through clinical observation, the signs of chronic gingivitis are easily distinguishable from the characteristics of normal gingiva. Intraoral photographs

have been found to be a more accurate method of judging the degree of gingivitis and of determining changes in gingival condition. Mouth odor, the amount of bleeding on probing with an instrument and the patient's subjective description of symptoms have also been used to rate the degree of gingivitis. Plaque, although not in itself a sign of gingivitis, may, if not removed, irritate the gingival tissues and predispose to gingivitis.

CHAPTER III

ANALYSIS OF DATA

Introduction

This study was done to determine if oral hygiene given twice a week would be adequate to maintain health of the gingiva in nursing home patients. The hypothesis tested in the study was that if clinical signs of gingivitis are present but have been reduced and stabilized, thorough oral hygiene twice a week will prevent the extension of inflammation. Sixteen patients from a 189 bed nursing home were selected for the study. Each patient had at least some remaining permanent teeth, exhibited clinical signs of chronic gingivitis and was willing and able to participate in the study. Information regarding sex, age, medical diagnoses, diet and medications was obtained for each patient from mursing home records. After an initial teeth and gum assessment, each patient received a complete dental prophylaxis. Oral hygiene was given daily until clinical signs of gingivitis stabilized, then a twice weekly oral hygiene routine was instituted. The gingiva was assessed for color and texture, measurements of gingival crevice and tooth mobility were obtained and intraoral photographs were taken. The study extended over a period of

eight weeks.

Description of the Participants

The sample population consisted of 16 nursing home patients who met the criteria for selection. Each patient had at least three remaining anterior mandibular teeth and three anterior maxillary teeth and the gingiva surrounding these teeth exhibited clinical signs of chronic gingivitis. The anterior teeth did not exceed Class II mobility, nor did their pocket depths exceed 6 millimeters. Each patient was willing and able to participate in the study, was not seriously ill, did not have a blood dyscrasia and was not receiving dilantin.

There were 11 females and five males in the sample population which represents a slightly higher ratio of males to females than is typical of the three to one patient ratio in that institution. The patients ranged in age from 60 to 94 years, as seen in Table 1. The mean age was 80, which is slightly lower than the mean age of 82 found in that institution.

Table 1. Frequency Distribution of Patients by Age.

Ages	Patients	
	N	%
60-69	1	6
70-79	6	37
80-89	6	37
90+	3	19

Most of the patients had a diagnosis related to the vascular system which is a common finding in people of this age range (Table 2).

Table 2. Frequency Distribution of Patients by Diagnosis.

Diagnosis	Patients	
	N	%
Arteriosclerosis with senility	6	37
Arthritis	3	19
Fractured hip	3	19
Cerebrovascular accident	2	13
Diabetic neuropathy	1	6
Tic Douloureux	1	6

Most of the patients received a general diet which included an adequate amount of vitamins, minerals and hard, detergent foods, necessary for the maintenance of healthy teeth and gums (see Table 3).

Table 3. Frequency Distribution of Patients by Diet Received.

Diet	Patients	
	N	%
General	10	63
Diabetic	3	19
Low salt, bland	1	6
Mechanical soft	1	6
Regular 900 calorie	1	6

Although it was not the purpose of this study to determine the effects of oral hygiene on diet intake, another study was conducted by another researcher on the same participants. Her study (23) was undertaken to determine if thorough oral hygiene resulted in improved food and fluid intake. She measured the food and fluid intake of the 16 study patients one week prior to the commencement of this study and two weeks after the twice weekly oral hygiene program had been instituted.

Every patient received at least one medication (see Table 4). The type of drug ordered most frequently was a tranquilizer, a side effect of which is dryness of the mouth. Excessive dryness of the oral cavity may lead to gingivitis. Several of the patients received an analgesic and/or a sedative, a side effect of which is bleeding of the gingiva.

Table 4. Frequency Distribution of Patients by Type of Medications Ordered.

Type of Medication	Patients	
	N	%
Tranquilizer	9	56
Sedative	7	44
Laxative	5	31
Digitalis preparation	5	31
Vitamin preparation	5	31
Analgesic	4	25
Antibacterial	3	19
Other	6	37

Although it was not expected that the study patients care for their teeth, there were seven of the patients who did at least sporadically brush their teeth between treatments. It was observed that some patients, although physically capable of brushing their own teeth, were not able to do so because of confusion and disorientation. Others, although mentally alert, were not able to care for their own teeth because of weakness, paralysis or tremors.

The number of remaining permanent teeth that patients had ranged from 10 to 27. The mean number of remaining teeth was 18 (Table 5).

Table 5. Frequency Distribution of Patients by Number of Teeth.

Number of Teeth	Patients	
	N	%
25 or more	3	19
20-24	7	44
15-19	2	13
Less than 15	4	25

A complete dental prophylaxis was given each patient at the beginning of the study. This was a procedure in which a fluoride preparation was applied to the teeth after all tooth surfaces had been scaled and polished (as described in Chapter I). Thorough oral hygiene (Chapter I) was then provided on a daily basis until the clinical signs of gingivitis were stabilized. The minimum number of

daily oral hygiene treatments necessary to stabilize gingival inflammation on any one patient was three (Table 6).

Table 6. Frequency Distribution of Patients by Number of Daily Oral Hygiene Treatments Received to Stabilize Gingivitis.

Number of Treatments	Patients	
	N	%
6	3	19
5	4	25
4	6	37
3	3	19

After the gingivitis had become stabilized, oral hygiene was provided twice a week for a period of six weeks. However, because some of the patients were hospitalized briefly during the time of the study, and because others were transferred to another institution before the study was completed, the number of twice weekly treatments received varied among the patients (Table 7).

Table 7. Frequency Distribution of Patients by Number of Twice Weekly Oral Hygiene Treatments Received.

Number of Treatments	Patients	
	N	%
11	2	13
10	6	37
9	6	37
7	1	6
3	1	6

The depth of the gingival crevice was measured at the beginning of the study and again at the completion of the study to determine if thorough oral hygiene would effect a change in gingival crevice depth. Using a periodontal pocket probe, the crevice was measured in millimeters, distally, bucally and mesially, on the labial aspect of each treatment and each control tooth. Final measurements were obtained on only 14 patients because two patients had been transferred to other institutions. A comparison was made between crevice depth before and after treatment by computing the mean difference between the before and after crevice measurements of the control teeth and the mean difference between the before and after crevice measurements of the treated teeth. Two mean differences were computed for each patient, one for the control area and one for the treated area. Then a total mean difference was computed for the combined treatment areas of all 14 patients and another total mean difference was computed for the combined control areas of all 14 patients. The total mean difference computed for the treatment area was -1.2 and for the control area was -0.6. T-tests were done to determine if there was a significant difference between the before and after measurements. No significant differences were found for either the control teeth ($t = 0.40$; $> .05$) or treatment teeth ($t = 0.48$; $> .05$). See Appendix C for measurements on individual patients. The reason that no significant change took place in crevice depth of the treatment teeth may be

because more frequent oral hygiene over a longer period of time may be necessary to decrease pocket depths.

Tooth mobility was measured at the beginning of the study and again at the conclusion of the study to determine if thorough oral hygiene would effect a change in tooth mobility. Tooth mobility was measured by exerting gentle pressure on the tooth with the handle of the dental explorer. A rating of I was given if the tooth could be moved bucally and lingually only, a rating of II if the tooth had mesial, distal movement also, and a rating of III if the tooth could be moved bucally, lingually, mesially, distally and could be depressed into its socket. A comparison was made of the before and after mobility measurements by computing the mean difference of the mobility of the control teeth and a mean difference in the mobility of the treatment teeth. It was found that there was a total mean decrease of 0.1 in mobility in the control teeth and a mean increase of 0.2 in mobility in the treatment teeth. There were no significant differences found between the before and after mobility scores of the treatment teeth ($t = 0.30$; $>.05$) or of the control teeth ($t = 0.13$; $>.05$). An increase in mobility of treatment teeth was not expected and may be due to error in measurement because before and after measurements were not done by the same person.

Plaque scores were computed at the initial inspection, once a week during the study and at the completion of the study to determine

if thorough oral hygiene twice a week would reduce the amount of plaque accumulation. Each tooth was mentally divided into five sections and each of these subdivisions was examined for the presence of plaque. If no plaque was present, 0 was assigned to that section. If plaque was present, 1 was assigned. The plaque score for each tooth was determined by adding the values of each of the five subdivisions. A plaque score could range from 0 to 5. A mean plaque score was obtained for the control area and for the treatment area by adding each tooth's plaque score and dividing by the number of teeth. At the completion of the study a total mean score was computed for each patient for the treatment area and for the control area. The overall mean scores computed were 1.6 for the control areas and 1.7 for the treatment areas. No significant difference was found between groups ($t = 0.2$; $> .05$). The reason that there was no significant difference between plaque scores of the treatment teeth and the control teeth is probably due to the fact that dental plaque accumulates within a few hours, therefore more frequent oral hygiene would be necessary to reduce the amount of plaque present on teeth.

Test of the Hypothesis

The hypothesis tested in the study was that if clinical signs of gingivitis are present but have been reduced and stabilized, thorough oral hygiene twice a week will prevent the extension of inflammation.

The hypothesis was tested by the use of visual inspection of the gingiva and intraoral photographs. Visual inspections of each patient's gingiva were made throughout the study by the researcher and the other nurse involved in the study. The three areas of the gingiva, interproximal, attached and free, were inspected as to color and texture. In all of the patients, a change was noted in that the color improved and edema subsided after the complete prophylaxis had been given and daily tooth brushings instituted. It was difficult, however, to distinguish between the control and treatment areas of the gingiva, after the twice weekly routine had been established. This subjective measure coincides with the findings of the photograph evaluations in that in 50% of the cases the control and treatment areas could not be differentiated. Had the study extended beyond six weeks, a difference might have been distinguishable between the control and treatment areas.

Photographs of the anterior teeth and gingiva of each patient were taken at the beginning of the study, on each treatment day during the twice weekly oral hygiene regime and at the completion of the study. A 35 mm camera with a built-in oval flash attachment and Kodachrome II film were used. The film was developed at Eastman Kodak Company in Palo Alto, California. There was a slight variation in the color of the different photographs because each roll of film was developed separately. Some of the photographs taken did not

turn out due to camera difficulties, therefore there were no less than four and not more than nine photographs for any one patient. Each patient's photographs were evaluated by a gerodontologist, using the initial photograph and three others selected by the researcher from each patient's set of slides. The clearest pictures were selected and coded so that there was no way of knowing the sequence of the photographs or which were study or control areas. The pictures were evaluated by the gerodontologist to determine:

1. which photograph showed the initial gingival condition;
2. which gingival area had been the control area, maxillary or mandibular;
3. if the oral hygiene program had been at least minimally adequate to maintain the health of the gingiva.

In 75% of the cases, or 12 out of 16, the initial photographs were correctly identified. Of the four patients in which the initial photograph was not identified correctly, one had clinical signs of mild gingivitis and the condition of the gingival tissues remained about the same throughout the study; one had severe gingivitis which did not improve during the course of the study; one had deep-seated periodontal disease, the treatment of which would extend beyond oral hygiene; one patient had his twice weekly oral hygiene regime interrupted by a stay in the hospital (Table 8).

Table 8. Frequency Distribution of Patients by Initial Photograph Identification.

Photo evaluation	Patients	
	N	%
Initial photo identified	12	75
Initial photo not identified	4	25

The photographs were also evaluated to determine which gingival area had been the control area, maxillary or mandibular. In 50% of the cases, or eight out of 16, the area of the mouth that had been used for the control area was identified correctly (Table 9).

Table 9. Frequency Distribution of Patients by Control Area Identification.

Photo evaluation	Patients	
	N	%
Control area identified	8	50
Control area not identified	8	50

Among the group in which the control area was not identified correctly, there were two patients who brushed their own teeth between treatments. In the group in which the control area had been identified correctly, there were four patients who brushed their own teeth between treatments. The reason that the control area could not be identified in all cases may be that the complete prophylaxis done by the dental hygienist at the beginning of the study and the daily oral hygiene given before the twice weekly regime was begun stabilized the

gingival inflammation for the period of time that the study was in progress. Had the study continued beyond six weeks, the difference between the control and treatment areas might have been more noticeable. A final photograph assessment was made to determine if the oral hygiene program had been at least minimally adequate to maintain the health of the gingiva. For two of these patients the oral hygiene program was not adequate. Of these two, one was a patient whose physical condition was deteriorating. She was weak, was a mouth breather and had limited fluid intake. The other patient was receiving large doses of Mellaril, a side effect of which is dryness of the mouth which may lead to gingivitis (Table 10).

Table 10. Frequency Distribution of Patients by Assessment of Oral Hygiene.

Photo evaluation	Patients	
	N	%
Oral hygiene adequate	14	88
Oral hygiene not adequate	2	12

In 88% of the group, or 14 of 16 participants, the oral hygiene program had been at least minimally adequate to maintain the health of the gingiva. This supports the hypothesis that if clinical signs of gingivitis are present but have been reduced and stabilized, thorough oral hygiene twice a week will prevent the extension of inflammation.

CHAPTER IV

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary of the Study

A review of the literature revealed that chronic gingivitis is a serious problem in older people and that if the disease process is not halted, deep periodontal disease will ensue with eventual loss of teeth. It has been shown that although oral hygiene is effective in the prevention and treatment of this disease, mouth care is one aspect of patient care that is often neglected. A study done in 1970 by dental hygiene students at the University of Oregon Dental School showed that oral hygiene need not be given daily; in fact, intervals between brushings may be extended to three or four days without recurrence of inflammation, if the care given is thorough.

This study was done to test the hypothesis if clinical signs of gingivitis are present but have been reduced and stabilized, thorough oral hygiene twice a week will prevent the extension of inflammation. The 16 subjects selected for the study were patients in a 189 bed extended care facility. They were patients who had at least three anterior mandibular teeth and three anterior maxillary teeth

remaining. The gingiva surrounding the anterior teeth showed signs of chronic gingivitis and the teeth did not exceed Class II mobility nor did their crevice depths exceed 6 millimeters. The patients were willing and able to cooperate with the researcher. Excluded were patients who were seriously ill, had a blood dyscrasia or were receiving dilantin. Information regarding sex, age, diet, medications ordered, and diagnosis was obtained from nursing home records for each patient.

Before the study was begun, an initial assessment of the anterior teeth and gums was made which included intraoral photographs, visual inspection of the gingiva for color and texture, measurements of gingival crevice and tooth mobility, and plaque determination. A complete dental prophylaxis and thorough brushing was then given by a dental hygienist. Following the dental prophylaxis, the researcher administered thorough oral hygiene on a daily basis until the clinical signs of gingivitis had become stabilized. Oral hygiene was then instituted on a twice weekly basis leaving one area of the mouth as control (either the anterior mandibular teeth and gingiva or the anterior maxillary teeth and gingiva). Visual inspections of gingiva and intraoral photographs were taken before each twice weekly oral hygiene treatment and plaque determinations were done once a week. At the completion of the study a final assessment was made which included: 1) intraoral photographs, 2) gingival crevice and tooth

mobility measurements, 3) plaque determination, and 4) visual inspection of the gingiva. The study extended over a period of eight weeks. The intraoral photographs were evaluated by a gerodontologist to determine: 1) which photograph showed the initial gingival condition at the beginning of the study, 2) which gingival area had been the control area, maxillary or mandibular, and 3) if the oral hygiene program had been at least minimally adequate to maintain the health of the gingiva. The data were then analyzed and conclusions were made.

The 16 study patients ranged in age from 60 to 94, most of them had a diagnosis related to the vascular system and most of them were receiving a general diet. All of them had at least one medication ordered and the type of drug ordered most frequently was a tranquilizer. About one-half of the patients were physically capable of brushing their own teeth and did so sporadically between oral hygiene treatments. The number of remaining permanent teeth that patients had ranged from 10 to 27. The mean number of remaining teeth was 18.

Gingival crevice depth and tooth mobility measurements were obtained at the beginning of the study and again at the completion of the study to determine if thorough oral hygiene would effect a change in either crevice depth or tooth mobility. No significant differences were found in the before and after measurements of either gingival crevice

or tooth mobility. This was probably due to the fact that pocket formation and Class II or III mobility is a result of deep periodontal disease which requires treatment beyond oral hygiene.

Plaque determinations were done throughout the study to determine if thorough oral hygiene twice a week would lessen plaque accumulation on teeth. No significant difference in plaque scores was found between treatment and control teeth. The fact that plaque accumulates within a few hours, might be the reason that no significant difference was found in plaque scores between treatment and control teeth. Had oral hygiene been given more frequently, a difference might have been noted.

Visual inspections of the gingiva were made for color and texture throughout the study. A change in color and texture of the gingiva was noticeable after the complete dental prophylaxis had been given but it was difficult to distinguish between the control and treatment areas once the twice weekly oral hygiene regime had been instituted. Had oral hygiene been given more frequently or had the study extended for a longer period of time, a noticeable difference might have occurred between the treatment and control areas.

A gerodontologist assessed the condition of the gingiva by evaluating four color photographs from each patient, the initial photograph and three others which had been coded so that there was no way for the evaluator to know the sequence of the pictures. The

evaluations showed that in 75% of the cases, the initial photograph was identified and in 50% of the cases the control area was identified. The reason that in one half of the patients the evaluator did not identify the control area may be because the complete dental prophylaxis done at the beginning of the study stabilized the gingival inflammation for the period of time that the study was in progress. Had the study extended over a longer period of time, a distinguishable difference might have occurred between the control and treatment areas. In 88% of the group, the oral hygiene program had been at least minimally adequate to maintain the health of the gingiva.

Conclusions

The findings of the study support the hypothesis that if clinical signs of gingivitis are present but have been reduced and stabilized, thorough oral hygiene twice a week will prevent the extension of inflammation. Because the study was limited to 16 patients in one nursing home for a period of eight weeks, it cannot necessarily be concluded that oral hygiene twice a week is adequate for nursing home patients. Further studies testing the same hypothesis would have to be conducted before definite conclusions could be made. However, the study did point out that thorough oral hygiene is effective in the prevention and treatment of chronic gingivitis. This fact has implications for nursing in that an assessment of the condition of teeth and

gums should be made on all patients and thorough oral care provided for those patients who are unable to care for their own teeth. If this is not being done, measures should be taken to inform nursing personnel about the seriousness and the prevalence of chronic gingivitis. Furthermore, oral hygiene procedures in hospitals and nursing homes should be reviewed and updated if necessary.

Recommendations

It is recommended that this study be repeated using a larger sample and extending the study over a longer period of time. Changes in the design of the study such as: 1) providing thorough oral hygiene on alternate days instead of twice a week, 2) stipulating that no oral care be given study patients other than that provided by the researcher, 3) having all gingival crevice depth and tooth mobility measurements done by the same person, 4) having all photographs developed at the same time, and 5) having two people evaluate the photographs independently, to provide for a check on reliability, would enhance the accuracy of the findings.

BIBLIOGRAPHY

1. Allington, Herman, "Dryness of the Mouth," Archives of Dermatology and Syphilology (December 1950) 62:6:829-850.

2. Alvarez, Walter C., "The Elderly Dental Patient," Journal of American Society of Geriatric Dentistry (April 1970) 5:3:3.

3. Arnow, L. Earle, Introduction to Physiological and Pathological Chemistry, Seventh Edition, St. Louis, C. V. Mosby Co., 1966.

4. Balogh, K. and K. Lelkes, "Changes of Tongue in Old Age," Dental Abstracts (September 1963) 8:8:545-546.

5. Berland, Theodore, "Dental Care," Today's Education (May 1970) 59:5:59, 61-62.

6. Bunting, Russell, Oral Hygiene, Third Edition, Philadelphia, Lea Febiger, 1957.

7. Falaschetti, Luana, Anne Jennings and Kathi Engle, Programming Dental Care for the Nursing Home Patient, Unpublished Project, University of Oregon Dental School, Portland, March 1970.

8. Fones, Alfred C., Mouth Hygiene, Fourth Edition, Philadelphia, Lea and Febiger, 1934.

9. Freeman, Joseph, Clinical Features of the Older Patient, Springfield, Illinois, Charles C. Thomas, 1965.

10. Gillespie, George M., "The Problems and Needs of the Chronically Ill and Aged Dental Patient," Journal of the Georgia Dental Association (October 1964) 38:2:15-17.

11. Harmer, Bertha and Virginia Henderson, Textbook of the Principles and Practice of Nursing, New York, The Macmillan Co., 1960.

12. Henderson, Virginia, "The Nature of Nursing," American Journal of Nursing (August 1964) 64:8:62-68.

13. Hirschfeld, Isador, "The Why and How of Toothbrushing," Journal of American Dental Association (January 1945) 32:1:80-85.

14. Jacobs, H. Lee, "Psychologic and Social Problems of Aging," Journal of American Society for Geriatric Dentistry (April 1968) 3:2-4.

15. Klaptocz, Bronislaw, "Loss of Teeth and Gland Function," Dental Abstracts (September 1964) 9:9:557.

16. Law, Frank E., "Dental Hygiene for the Chronically Ill and Aged," Journal of American Dental Hygienists Association (July 1963) 37:7:132-134, 140.

17. Marshall-Day, C. D., "The Epidemiology of Periodontal Disease," Journal of Periodontology (January 1951) 22:1:13-22, 59-60.

18. Marshall-Day, C. D., R. G. Stephens and L. F. Quigley, Jr., "Periodontal Disease: Prevalence and Incidence," Journal of Periodontology (July 1955) 26:7:185-203.

19. Massler, Maury, Henry M. Rosenberg, William Carter and Isaac Schour, "Gingivitis in Young Adult Males: Lack of Effectiveness of a Permissive Program of Toothbrushing," Journal of Periodontology (February 1957) 28:2:111-124.

20. Mitchell, David F., Oral Diagnosis/Oral Medicine, Philadelphia, Lea and Febiger, 1969.

21. O'Rourke, J. T., "The Relation of the Physical Character of the Diet to the Health of the Periodontal Tissues," American Journal of Orthodontics and Oral Surgery (September 1947) 33: Sec. Oral Surg. 687-700.

22. Podshadley, A. G. and J. V. Haley, "A Method for Evaluating Oral Hygiene Performance," Public Health Reports (March 1968) 83:3:259-264.

23. Pope, Wilma, A Study of Oral Hygiene and the Food and Fluid Intake of Geriatric Patients, Unpublished Masters Thesis, University of Oregon School of Nursing, Portland, 1971.

24. Raybin, Murray, "Disclosing Solutions, Their Importance and Uses," Dental Outlook (April 1943) 30:4:159-162.

25. Robinson, Hamilton, "Dental Care for the Aging Patient," Post-Graduate Medicine (February 1963) 33:2:196-199.

26. Robinson, Hamilton, "Oral Diseases and the Aging Patient," Journal of the American Geriatric Society (February 1963) 11:2:120-130.

27. Shafer, William G. Maynard K. Hine and Barnet M. Levy, A Textbook of Oral Pathology, Second Edition, Philadelphia, W. B. Saunders, 1963.

28. Silverman, Sidney, Oral Physiology, St. Louis, C. V. Mosby Co., 1961.

29. Steele, Pauline, Dimensions of Dental Hygiene, Philadelphia, Lea and Febiger, 1966.

30. Stones, H. H., Oral and Dental Diseases, Fourth Edition, Baltimore, The Williams and Wilkins Co., 1962.

31. Tanchester, D., "Tissue Oxygenation in the Treatment of Gingivitis," Journal of the American Geriatric Society (February 1963) 11:2:140-146.

APPENDICES

APPENDIX A

Form for Permission to do Dental Work

Dental Health Maintenance Program

I. Preventive Care

One of the outstanding health problems faced by older people is that of maintaining the mouth in a reasonable degree of cleanliness and function. The problem exists in the person who has all, some, or a few teeth, as well as in the person who has dentures. Many of our elderly people now desire to maintain their teeth or dentures in a reasonable state of health and function, but this goal is extremely difficult when there are other health problems involved.

The purpose of our Preventive Dental Care Program is to assist the person to maintain a reasonable degree of oral hygiene, to teach better care of their mouths, and to slow down or halt the existing disease conditions such as dental caries (decay) and diseases of the gums (pyorrhea).

- -

We request permission to provide a Preventive Dental Care Program to: _____.

The attention to be given to the oral cavity will consist of the following items:

_____

_____

The estimated relative value of preventive care services is presently given as $_____.

Other conditions or limitations associated with this Preventive Dental Care Program are given as follows:

A record of food and fluid intake to be kept and an oral hygiene program instituted to determine the minimal optimal oral hygiene necessary to maintain gingival health.

Permission is hereby granted by the undersigned to initiate and carry out the procedures designated above. It is further understood that such procedures do not constitute nor necessarily finalize a dental care program for the designated individual.

Signed _____

APPENDIX B

Form for Recording Data

Inspection Record

Name _____ Date _____

Teeth to be inspected: Maxillary _____

Mandibular _____

	Maxillary area		Mandibular area	
	Color	Texture	Color	Texture
Interproximal gingiva				
Attached gingiva				
Free gingiva				

Depth of gingival crevice

	Maxillary	Mandibular
Tooth no.		
area D		
area B		
area M		

Tooth mobility Class I, II, or III

	Maxillary	Mandibular
no.		

Dental plaque score 0 to 5

	Maxillary	Mandibular
no.		

inspection of plaque done on labial aspect of tooth only

APPENDIX C

Raw Data

Patient no.	Mean difference in depth of gingival crevice in before and after measurements		Mean difference in tooth mobility in before and after measurements		Total plaque scores		Photograph evaluation		
	control	test	control	test	control	test	original photo identified	control area identified	oral hygiene adequate
1					1.9	3.0	yes	no	yes
2	.5	-1.5	1.0	.5	1.8	1.2	yes	yes	no
3	- .5	.3	.3	0	1.7	1.9	no	yes	yes
4	.5	2.2	- .5	0	3.3	1.0	yes	yes	yes
5	2.7	1.0	- .3	- .5	1.9	1.6	yes	no	yes
6	0	0	0	0	2.7	3.1	no	yes	no
7	-1.0	- .6	- .5	- .5	.5	.9	yes	yes	yes
8	0	.8	0	0	1.5	1.0	yes	no	yes
9	2.3	2.5	0	-1.0	.8	1.1	yes	no	yes
10	6.0	3.7	0	0	1.8	2.7	no	yes	yes
11	- .3	-1.0	.3	- .3	.4	.4	yes	no	yes
12	.8	-1.3	- .3	0	1.1	.7	yes	yes	yes
13	4.7	.5	1.0	- .3	1.9	2.8	yes	no	yes
14	.7	.3	.7	- .3	2.4	1.8	yes	no	yes
15	0	1.3	- .3	- .7	1.8	1.9	yes	no	yes
16					2.0	1.5	no	yes	yes
Total mean	1.2	.6	.1	- .2	1.6	1.7			

AN ABSTRACT OF THE THESIS OF

MARIE H. REITZ

For the MASTER OF SCIENCE in NURSING EDUCATION

Date of receiving this degree: June 11, 1971

Title: A STUDY OF ORAL HYGIENE AND THE HEALTH OF GINGIVA IN GERIATRIC PATIENTS

Approved: Lucile Gregerson
(Associate Professor in Charge of Thesis)

This study was done to determine if oral hygiene twice a week would be adequate to maintain health of the gingiva in nursing home patients. Tested was the hypothesis if clinical signs of gingivitis are present but have been reduced and stabilized, thorough oral hygiene twice a week will prevent the extension of inflammation. Sixteen patients from a 189 bed nursing home were selected for the study. Each patient had at least some remaining permanent teeth, exhibited clinical signs of chronic gingivitis and was willing and able to participate in the study. Information regarding sex, age, medical diagnoses, diet and medications was obtained for each patient from nursing home records. After an initial teeth and gum assessment, each patient

received a complete dental prophylaxis. Oral hygiene was given daily until clinical signs of gingivitis stabilized, then a twice weekly oral hygiene routine was instituted. The gingiva was assessed for color and texture, measurements of gingival crevice and tooth mobility were obtained, dental plaque determinations were done, and intraoral photographs were taken. The study extended over a period of eight weeks.

Findings

The 16 study patients ranged in age from 60 to 94, most of them had a diagnosis related to the vascular system and most of them were receiving a general diet. All of them had at least one medication ordered and the type of drug ordered most frequently was a tranquilizer. About half of the patients were physically capable of brushing their own teeth and did so sporadically between oral hygiene treatments. The number of remaining permanent teeth that patients had ranged from 10 to 27. The mean number of remaining teeth was 18.

Gingival crevice depth and tooth mobility measurements were obtained at the beginning of the study and again at the completion of the study to determine if thorough oral hygiene would effect a change in either crevice depth or tooth mobility. No significant differences were found in the before and after measurements of either gingival crevice or tooth mobility. This was probably due to the fact that

pocket formation and Class II or III mobility is a result of deep periodontal disease which requires treatment beyond oral hygiene.

Plaque determinations were done throughout the study to determine if thorough oral hygiene twice a week would lessen plaque accumulation on teeth. No significant difference in plaque scores was found between treatment and control teeth. The fact that plaque accumulates within a few hours might be the reason that no significant difference was found in plaque scores between treatment and control teeth. Had oral hygiene been given more frequently, a difference might have been noted.

Visual inspections of the gingiva were made for color and texture throughout the study. A change in color and texture of the gingiva was noticeable after the complete dental prophylaxis had been given but it was difficult to distinguish between the control and treatment areas once the twice weekly oral hygiene regime had been instituted. Had oral hygiene been given more frequently or had the study extended for a longer period of time, a noticeable difference might have occurred between the treatment and control areas.

A gerodontologist assessed the condition of the gingiva by evaluating four color photographs from each patient, the initial photograph and three others which had been coded so that there was no way for the evaluator to know the sequence of the pictures. The evaluations showed that in 75% of the cases, the photograph that

showed the initial condition of the gingiva, was identified and in 50% of the cases the gingival area that had been used as control was identified. The reason that in one half of the patients the evaluator did not identify the control area may be because the complete dental prophylaxis done at the beginning of the study stabilized the gingival inflammation for the period of time that the study was in progress. Had the study extended over a longer period of time, a distinguishable difference might have occurred between the control and treatment areas. In 88% of the group, the oral hygiene program had been at least minimally adequate to maintain the health of the gingiva.

Conclusions

The findings of the study support the hypothesis that if clinical signs of gingivitis are present but have been reduced and stabilized, thorough oral hygiene twice a week will prevent the extension of inflammation. Because the study was limited to 16 patients in one nursing home for a period of eight weeks, it cannot necessarily be concluded that oral hygiene twice a week is adequate for nursing home patients. Further studies testing the same hypothesis would have to be conducted before definite conclusions could be made. However, the study did point out that thorough oral hygiene is effective in the prevention and treatment of chronic gingivitis. This fact has implications for nursing in that an assessment of the condition of teeth and gums

should be made on all patients and thorough oral care provided for those patients who are unable to care for their own teeth. If this is not being done, measures should be taken to inform nursing personnel about the seriousness and the prevalence of chronic gingivitis. Furthermore, oral hygiene procedures in hospitals and nursing homes should be reviewed and updated if necessary.

Recommendations

It is recommended that this study be repeated using a larger sample and extending the study over a longer period of time. Changes in the design of the study such as: 1) providing thorough oral hygiene on alternate days instead of twice a week, 2) stipulating that no oral care be given study patients other than that provided by the researcher, 3) having all gingival crevice depth and tooth mobility measurements done by the same person, 4) having all photographs developed at the same time, and 5) having two people evaluate the photographs independently, to provide for a check on reliability, would enhance the accuracy of the findings.