# A SURVEY OF THE ORAL HEALTH STATUS OF THE INSTITUTIONALISED ELDERLY WHITE PEOPLE IN THE CAPE PENINSULA AREA OF THE REPUBLIC OF SOUTH AFRICA

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Thesis presented for the Degree of Master of Science in Dental Science at the University of Stellenbosch.



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December 1979

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ACKNOWLEDGEMENTS

This study would have been impossible without help and guidance and I wish to record my thanks and appreciation to the following:

Prof. C.J. Thomas, promotor and head of the Department of Dental Prosthetics, University of Stellenbosch. His help with the survey, his patience, guidance and encouragement ensured that this study came to fruition.

Prof. C.W. van Wyk, head of the Department of Oral Pathology, University of Stellenbosch and Director of the Oral Epidemiology Research Unit of the Medical Research Council on whose initiative and inspiration this survey was undertaken.

Dr. P. Kemp who helped with the survey.



Mrs. A. Weir and Miss. E.M. Müller for their friendly and willing co-operation in assisting and recording data obtained at the old age institutions.

The Medical Research Council for financial support and the use of equipment.

Miss. M. Hugo and Mrs. J.A. Smith, Department of Oral Pathology for assistance with statistics and sorting out of data.

The matrons, staff and residents of the different institutions for receiving us and for their co-operation.

Mrs. S. Gerner who had the difficult task of typing the dissertation and who was friendly and helpful at all times.

Finally, to my life-long friend Dr. Julius Jacobson and my wife Colleen for their help and encouragement.

# CHAPTER I

## GENERAL INTRODUCTION

### 1. The inevitable process of aging

Aging is a biological process under the influence of genetic and pathological factors which can be more or less advanced in different individuals with the same chronological age. Silverman (1961) defined age as a three-dimensional phenomenon wherein there is a constant interaction between chronologic age, physiologic age and psychologic age. Vinton (1964) also points out that there are physiologic, pathologic, psychologic and sociologic changes which are unique to the latter span of life. These changes are not synonomous with illness as long as they fall within the physiologic limits of normality. If these limits are exceeded the changes are pathological in character.



### 2. Problems to be faced by the aged

Age is a phase of life which brings about changed circumstances and a new pattern of life which must be adapted to and accepted. This may necessitate an invironmental change which causes a loss of friends and social standing and may bring about a feeling of insecurity in some people, suppressing the incentive to live for the future. To counter these emotions it is imperative to create a quality of life in which the aged can be productive within the limits of their physical abilities and which will give them the assurance that they are still needed by society.

### 3. Population-shift

Life expectancy is determined by the circumstances under which people live. The average age of life expectancy during the Roman period and

the Middle Ages was 25 to 30 years; today it is 70 years (Sharry 1974). Nature normally maintains an equilibrium between young and old so that each can provide for the other's needs. Modern science and technology however have upset that balance and brought about new developments in medicine which have succeeded in increasing the average life expectancy and reducing infant mortality, causing the so-called population explosion. This has brought about a situation where 10 million humans are born and only 3 million die every month; thus the inflow into life far exceeds the outflow and there is consequently a global increase of 80 million people per year. At this rate the world population will double itself by the end of this century (Pistorius 1978). Birth control has been encouraged as a counter measure to this and the result has been a marked drop in the birth rate, especially in the more advanced countries of the world. This changing relationship between the birth and death rates is referred to as the population-shift.



In the U.S.A. 4% of the total population was over the age of 65 years at the beginning of this century. In 1975 the figure was 10% and at the present rate of population-shift will be 20% by the end of this century (Winkler 1977). In England and Wales 6% of the total population was over the age of 65 years in 1931, 10% in 1951 and 12% in 1962. In Scotland 7% was over the age of 65 years in 1931, 9% in 1951 and 10% in 1962 (Storer 1965). In Canada 4,8% of the total population was over the age of 65 years in 1921 and 7,8% in 1971. The average life expectancy was 50 years in 1900 and 70 years in 1960 (Sherman 1970). This pattern of change is also evident in the Republic of South Africa but there is a marked variation in the different ethnic groups (White, Asian, Coloureds and Blacks) making up the South African population. Because

of a comparatively high birth rate among the non-white races the percentage of population over the age of 65 years is lower than the other figures given (Table 1.1.).

Table 1.1.

Comparable percentages of population groups of 60 years and older

| Years | POPULATION GROUPS | | | |
|---|---|---|---|---|
| | Whites | Asians | Coloureds | Blacks |
| 1951 | 9,65 | 3,56 | 5,50 | 4,43 |
| 1970 | 10,45 | 5,63 | 4,83 | 5,53 |
| 2000 | 11,92 | 5,79 | 5,31 | 5,56 |
| 2020 | 15,56 | 9,53 | 7,85 | 7,50 |

Republic of South Africa, Department of Statistics (1970).



In the past it was traditional for the younger generation to attend to the needs of the elderly; even taking them into their homes. The population-shift has now complicated this situation in society and a declining number of younger people have to care for an ever increasing number of old people. This has necessitated the erection of institutions to accommodate and care for the senescent population.

With the international trend towards the socialisation of health services the provision for the needs of the elderly is no longer viewed as a charitable act but as a duty to the community which must be catered for by the State.

4. The influence of the past on the future

The degree of edentulousness in the aged is a measure of the dental

services available to them in their youth. A high incidence of edentulousness is a reflection of the standard of dentistry available and the economic circumstances which precluded many from professional dental services. While the dental profession must undoubtedly play a role in establishing and maintaining a reasonable oral health status in the aged it bears a great responsibility in providing the quality of service to the younger part of the population which will ensure a good oral health status during its old age. Silverman (1961) stressed that good oral health is not ruled out by age. Provided the patient has the ability to accept physically the required procedure, has the desire and ability to utilise the prosthesis, and has the capacity to handle the related economic factors, prosthetic rehabilitation is not only feasible but readily justifiable. We are morally obliged to accept this approach but with due regard for the economic factor which in retirement is one of the overriding facts of life. The importance of the economic factor is confirmed by Vinton (1964) who states that: "According to figures available from Public Health sources, the average income per capita per year of this age group barely exceeds 1,000 dollars." If that was the figure in the U.S.A., it can be accepted that it is markedly lower in the Republic of South Africa.



## 4.1. Situation in the Republic of South Africa

Today the more senior members of the population, 75 years and older, had their childhood during or just after the Anglo-Boer War. A great part of this country was ravaged and as a result some of the people were of the poorest in the world at that time (Millin 1951). The younger group of old people, 60 to 75 years, had their youth during and after the First World War and the subsequent depression years in

the early 1930's. The youth of that period, irrespective of ethnic grouping, was exposed to extremes of deprivation and poverty in parts of South Africa. Health treatment of any kind was restricted to that costing a minimum and in dental treatment this was naturally just the extraction of teeth. Dentists were not usually available and medical practitioners or even lay people were called upon to perform these services. The Register of the South African Medical and Dental Council shows that only 278 dentists registered during the period 1901 - 1930.

The availability and accessability of dental treatment in the past has created the needs of the aged of today. The extent of these needs is unknown because there are insufficient surveys available to provide the necessary information. This lack of knowledge and insight into the state of gerodontics has led to inadequately planned treatment at unnecessary cost and expenditure.

# CHAPTER II

## LITERATURE REVIEW

### 1. Biological influences

#### 1.1. Oral function and systemic needs

Normal health is maintained by the ingestion of food through the oral cavity but a dentition, natural or artificial, is not essential to the process. The presence of teeth may however be necessary to assist in the enjoyment of food and prevent a gradual change to a diet of softer foods which require little or no chewing and are easy to swallow, thus causing an increased consumption of carbohydrates and fats to the detriment of the protein intake (Vinton 1964, Winkler 1977). This is applicable not only to the sick but also to many of the aged who are in comparative good health. Surveying a group of people living at home, Hobson and Roseman (1953) found that there is no material difference in the intake of animal protein between those with adequate and those with inadequate dentitions.



Nutritional factors have a direct effect on the oral tissues needed to support dentures or retain the natural teeth. Anderson and Storer (1973) state that although it has not been proved conclusively that imbalance in the ingestion and metabolism of vitamins, carbohydrates, proteins, minerals and electrolytes is specifically due to a patient's inability to adapt to, and tolerate dentures, a dietary investigation may provide a solution to denture problems. For instance a potassium deficiency may be manifested in signs of apathy, muscle weakness, depression or mental confusion which is directly related to control and co-ordination of denture movements.

Under-exposure to sunlight, especially in the case of elderly women, causes a vitamin D deficiency with the resultant osteomalacia which may be manifested in the mandible. This is a condition which often makes the pressure of the denture base on the underlying alveolar bone intolerable. A shortage of vitamin C also affects the mucosa adversely for both dentures and natural teeth. Pickett, Appleby and Osborne (1972) point out that gingival tissues are especially sensitive to avitaminosis C. Ascorbic acid is essential to the synthesis of amino acids from which collagen is formed and a deficiency will affect bone formation and make the tissues more susceptible to infection. They further point out that successful prosthodontic treatment for many patients will result only after close consultation, co-operation and treatment by both the dentist and the physician.

1.2. Physical changes

Franks and Hedegard (1973) state that: "the actual causes of the aging process have not yet been established, but certain changes are evident. After the age of 25 - 30 years the body undergoes a gradual retardation which extends until death. Throughout this period there is a gradual loss of cells, and by the age of 65 this loss has averaged 30%." It is likely that this includes the masticatory muscles and the oral mucosa, leading to loss of tone and masticatory ability and thinning of the mucosa. According to Tallgren (1972) resorption in the anterior part of the lower alveolar ridge is about four times greater than that of the maxillary ridge. This process leads to a raising of the origin of the mentalis, buccinator, mylohyhoid muscles and the mental foramen relative to the crest of the residual ridge. The area that can be covered by the hard inflexible denture base is reduced resulting in masticatory forces

being unfavourably concentrated and further complicating the lower denture problem. Nedelman and Bornick (1978) determined by means of histological and histochemical methods that age brings about irreversible morphological changes to the denture bearing oral tissues. It is doubtful whether the tissues can regain their extendability and rebound capacity when dentures are removed or if treated with tissue conditioners. Kydd, Daly and Nausen (1974) contend that age does not affect the compressive loading response of tissues, except that in youth recovery is within minutes whereas in the aged it takes hours.

1.2.1. The tongue

Enlargement of the tongue is often found with the aged and this is probably due to the transference of some of the masticatory and phonetic functions to the tongue as a result of the loss of teeth. Such enlargement has an adverse effect on stability and retention of the lower denture. In addition there is a reduction in the number of taste buds and the loss of taste is often blamed on the dentures (Winkler 1977, Baikie 1975, Pickett 1972).



1.2.2. Salivary glands

Salivary glands are subjected to atrophic age-changes which cause asialhorrea and a resultant xerostomia. The reduction or absence of salivary flow contributes to plaque formation and favourable conditions for the growth of cariogenic bacteria and the retentive property of dentures is adversely affected (Winkler 1977, Baikie 1975, Sharry 1973). Baikie (1973) points out that patients with generalised auto-immune diseases such as Sjögren's syndrome and rheumatoid arthritis are prone to a xerostomia which is intractable. A similar condition follows the

administration of antihistamine and anti-depressant drugs which block the parasympathetic mechanism.

### 1.2.3. Facial appearance

Facial appearance is one of the most noticeable aspects of age. The facial contour changes owing to the characteristic grouping of skin tissues to form folds and pouches. Atrophy of the facial and masticatory muscles with an associated fibrosis results in the shortening of the fibres and a change in the facial features (Franks and Hedegard 1973). Alteration in facial height owing to tooth attrition or denture collapse also aggravates this change in facial features (Baikie 1967, 1975). Degeneration in the oral mucosa is very similar to that taking place in the skin namely, loss of moisture, fat and elasticity leading to thinness and avascularity.



## 1.3. Neurological changes

Unlike the decline in the oral and facial structures which serve as a prognostic guide when making new prostheses the neurological decline, which affects the ability to memorise and learn, is difficult to determine. Previous unsuccessful treatments may be indicative of a problem in this area.

Boitel (1971) stresses the importance of the neurological aspect in the senescent population. He points out that there is no difference between the oxygen and glucose metabolism of the young and the old brain but that the brain weight decreases from the age of 20 years and stabilises at the age of 70 years. Brain proteins and fats decrease by one fourth up to the age of 80 years. The water content in the

brain increases and the intracerebral spaces are enlarged accordingly while the number of nerve cells diminishes throughout life. These biological processes are of special interest to the prosthodontist because of their effect on the ability to memorise and to learn which plays an important role in the adaptation to any form of prosthesis.

In old age there is an irrevocable decline in certain neural functions. The memory formation, particularly short term memory, the assimilation of new experience and the formation of new neuromuscular reflexes are all slowed down. Adaptation to complete dentures requires the learning of intricate chains of muscle reflexes and patterns, in contrast to natural teeth. Where the prognosis for the retention of natural teeth is unfavourable a transitional form of treatment must be considered. When replacing dentures, adherence as closely as possible to the shape, form and pattern of function of the old dentures is desirable (Boitel 1971, Basker and Chamberlain 1971 and Culver and Watt 1973).



The after-care of an aged patient who has received new dentures is often more difficult than the actual treatment and unfortunately a more appropriate choice of treatments often makes itself obvious during this after-care period. For example, modification of an existing prosthesis was probably preferable to the construction of new dentures (Fellman 1976). Accommodating to new dentures that have deviated from the old is often beyond the ability of old patients and retention of at least some of the features of the old prosthesis can be helpful because they act as neuromuscular points of reference in the adjustment to a change. Proper evaluation of all the relevant factors before starting treatment are imperative to prevent unnecessary problems and squandering of

public or private funds.

## 2. Surveys

### 2.1. International Surveys

A survey of Adult Dental Health in England and Wales was carried out by Gray, Todd, Slack and Bulman in 1968. They found that the dental health status at that time was not a reflection of the existing policies but rather a reflection on policies and attitudes of the past when treatment had not been available to children at the time that decay of the teeth started. A warning is also sounded against drawing national conclusions on a survey of a localised area. Dental treatment and other factors influencing oral health simply vary too much from one region to another. They accept that the initial indication of the dental health status of a community is the proportion of people who are edentulous. A survey of the population from the age of 16 years onwards showed that this was 36,8% while in the elderly (65 years and more) it was 83,3%. Comparative figures available for the population of the U.S.A. at that time showed that in the age range from 18 to 79 years 18,1% was edentulous while in the elderly group (65 to 79 years) it was 54,85%. Fellman (1976) states however that according to the Commission on Chronic Illness 75% of the American population over the age of 70 years was edentulous. Gray et al (1968) also established that total tooth loss varies with age, sex, social class and region but that these factors do not influence tooth loss in the elderly groups to such an extent.

Garrish, Yardley, Stafford & Bates (1972) did a survey of the dental needs of 327 people living in 15 residential homes for the aged in Cardiff, Great Britain. Of this number 258 people had had complete

dentures at some time and 213 were wearing complete dentures at the time of examination. Twenty six never had dentures, 40 had some natural teeth left and 3 were wearing partial dentures. The examiners assessed that 152 (46%) needed new or replacement dentures, 33% of the edentulous patients confirmed that they needed new dentures and 28 (9%) of the total refused any form of treatment. Approximately half the sample slept with dentures in the mouth and nearly half of this number suffered from some form of denture stomatitis.

In a similar survey carried out by Martinello (1976) in homes for the aged in Chatham, Ontario, Canada, 208 people served as a sample. The incidence of edentulousness in both arches was 76,4% and in one arch 85%. Over 71% of maxillary dentures and 93% of the mandibular dentures were absent or inadequate and 79% of the dentures had been in use for over 10 years. More than one third of the edentulous group needed dentures or a replacement of the old dentures. Of the 23,6% who had natural teeth standing, 50 teeth required restorations, 58 teeth needed extraction and virtually all the patients needed some form of periodontal treatment.



Hobson and Roseman (1953) did a survey of a group of old people living in their own homes in Sheffield. They found that the dietary intake of people is not necessarily adversely affected by inadequate dentitions and some were well nourished notwithstanding their edentulous and dentureless state. Elderly people of the higher social strata retain more of their natural teeth than the lower. They found that there is a definite sex difference in the attitude to any form of prosthesis and that more men retain natural teeth than women and more men masticate

without dentures than women, giving a higher percentage of women (87%) who wear dentures than men (62%). They also confirmed the results of other surveys where a high percentage of the old people needed new or replacement dentures (41%) and extraction of natural teeth (77%). Based on these figures the authors estimated that 8 million extractions and over 21 million upper and lower dentures were required in Britain to render the senescent population dentally fit.

Having noted these phenomenal figures it is fitting to quote Ritchie's (1973) remarks in the discussion of his survey on geriatric patients: "The aim of modern medicine is not solely to prolong life for a greater number of people, but to improve the quality of living so that more people are maintained in the best possible state of health and social independence in old age" and "it is important to make a clear distinction between the statistical need for treatment, as shown by most surveys, and the realistic necessity for treatment, that is, treatment that is feasible to attempt to carry out."



Ritchie (1973) undertook this survey to assess the dental state and the need for treatment of a group of 300 elderly people in London. He also set out to determine to what extent it would be feasible to carry out the necessary treatment. Two hundred people in the sample were out-patients attending the University College Hospital Dental School with an average age of 70,5 years. A hundred were in-patients hospitalised in the geriatric wards of St. Pancras Hospital with an average age of 81,3 years. Thirty percent of the out-patients and 20% of the in-patients were partly dentate, periodontal disease was rife particularly among the in-patients whe were older than the out-patients. Nearly half of the

patients required tooth restorations, 70% required 2 or 3 extractions and over 90% needed some form of prosthesis. Two hundred and six patients were totally edentulous, 11% had no dentures, 20% had complete upper dentures with no lower denture. Of those who had complete dentures, 30% of the upper and 50% of the lower dentures were found to be unsatisfactory. Denture stomatitis was present in 17% of the cases.

This survey also showed an extensive need for the replacement of old dentures. Many of the individuals needed specialist treatment and it was impractical to attempt treatment for about 50% of the in-patients. In the partly dentate group an average of 1,6 fillings, 2,7 extractions and 1,4 dentures were required per head.

In planning treatment the prognosis is important and must include consideration of the likely benefit to the patient, the accessibility of treatment to the patient, and the availability of professional manpower and facilities.



2.1.1. Factors to be considered in treatment of the aged

The dentate or partially dentate elderly people must be made fully aware of the advantages of retaining their own teeth, and must be motivated to seek the necessary treatment. Very often the practitioner cannot decide whether to retain teeth or to extract and resort to a prosthesis (Boitel 1971, Franks & Hedegard 1973).

To make a proper diagnosis different factors must be considered. A thorough intraoral examination with radiographs will be a guide. It must be a consideration that failing eyesight and loss of co-ordination

contribute to a decline in home dental care and oral hygiene. Consumption of sweets is often increased. It will be wrong therefore to embark on extensive conservative treatment if the possibility exists that the patient will outlive the life of his natural dentition. On the other hand the patient must understand very clearly that the deteriorated state of the teeth may influence his or her health. Where at all possible the change over from natural to artificial dentition must be carried out by means of a transitional procedure, particularly in the mandibular dental arch (Boitel 1971, Fish 1975, Franks & Hedegard 1973).

It is important to establish the factors that influence satisfaction with dentures. Langer et al (1961) embarked on such a project in Israel amongst old people. Institutionalised geriatric patients in four old age homes were surveyed. The group of patients consisted of 127 men and women, ranging in age from 61 - 86 years. They were selected from the same cultural background to minimise variability in the sample. The inmates of these old age homes were treated by four dentists, who supplied the full dentures to the patients and who were not aware that their work was going to be evaluated. This was done by two prosthodontists during a period ranging from 3 months to 1 year. Eighty-eight patients were surveyed and statistical analysis indicated that 69% were satisfied and using their dentures fully, 19% had minor complaints and 12% were dissatisfied. Patient satisfaction was based on:

1. Successful use of the lower denture.
2. Efficiency and comfort in chewing, speaking and other oral activities with the dentures in the mouth.
3. Patient/dentist relationship.

It was further found that:

1. There was no significant difference in sexes as far as satisfaction or dissatisfaction was concerned.
2. There was no significant difference in the use of porcelain or acrylic resin posterior teeth.
3. Chewing tests did not reflect the ability of the dentures to masticate normally.

There was no correlation between the patient's opinion of the dentist and the dentist's appraisal of the patient's co-operation.

2.1.2. Treatment planning of the aged

Storer (1965) defines gerontology as the study of biological and pathological changes of senescence and geriatrics as the treatment of diseases of old age. It appears to be wrong therefore to generalise and refer to old people as the geriatric population. Attending to this group does not necessarily involve the treatment of a pathological condition but is rather an attempt to assist the function of a degenerating stomatognathic system and preventing the occurrence of pathological conditions. Storer also stresses that aging must be regarded as a normal life process and not as an illness or a disease. Within the range of normality conditions can exist where oral tissues lose their adaptability, tolerance to irritant factors and their potential for repair.

Treatment planning for this group, according to Storer (1965), is not necessarily to provide optimum function, but rather to maintain a good standard of oral health. If loss of teeth is inevitable during the life span after the age of 55 years it will probably be preferable to replace

the natural teeth with a prosthesis at that age while the oral musculature can still adapt itself to a complete prosthesis. However, rushing the patient into this state is also inadvisable and retention of some teeth for a transition to complete dentures is definitely preferable. It should not be overlooked that moderately mobile teeth in old people are able to respond to periodontal treatment. If a decision is made to resort to complete removal of natural teeth however it is essential to replace them immediately with a prosthesis so as to avoid interruption of the function of the oral musculature. Utilisation of tissue conditioners can be a great asset in tiding patients over this critical period. Duplication of the old dentures, when they must be replaced, is advisable in order to retain arch form, tongue space, polished surfaces, vertical and horizontal relationships of the dentures. A free-way space of 4 - 6 mm is preferable to the standard 2 - 3 mm and shallower cusped teeth can be an asset in the adaptation to new dentures. Glaser (1966) defines habituation as a gradual diminution of responses to continued or repeated stimuli and acceptance of a full prosthesis is definitely dependant on this process of habituation which includes:

(i) adaptation, the ability to accommodate a change,

(ii) learning, the acquisition of new activity or a change of an existing one and

(iii) muscular skill, the capacity to co-ordinate muscular activity.

Habituation depends upon afferent and efferent nervous impulses emanating to and from denture bearing tissues and muscles of mastication. The process as a whole loses efficiency with increasing age and any change from old to new dentures must be in a form of gradual transition, as follows:

(i) Renew fitting surface and periphery of old dentures.

(ii) Restore vertical dimension by a repetition of self-curing acrylic resin occlusal onlays.

(iii) When the modified existing dentures are satisfactory produce new dentures by means of a duplication technique (Fish 1969).

Garverick et al (1977) point out that the aged are subjected to ever-accumulating mental and physical losses resulting in declining ability to adjust to or to deal with stress. To mitigate this aging process it is imperative to be circumspect with any contemplated changes in the oral environment, especially as far as dentures are concerned. It is well to remember that "teeth do not chew, people do", the patient, not the dentist, has to exercise final control over the joint effort involved in treatment.



## 2.2. National Surveys

### Oral Health in the Republic of South Africa

The problems exposed by surveys and research in other countries are mostly those of a homogeneous population. The heterogeneous population of the Republic of South Africa will mean an exaggeration of these problems because of different socio-economic standards, education and approach to oral health found in the country's ethnic groupings. Only limited data are available at present and extensive surveys and research on the needs and demands of the ethnic groups of the population will be required before a treatment strategy can be evolved.

Van Wyk, Farman and Staz (1977) conducted a study to assess the oral health status and need for dental treatment among elderly Cape Coloureds

resident in homes for the aged in the Cape Peninsula area of the Republic of South Africa. A total of 585 people, ranging in age between 54 to 85 years were surveyed. The edentulous group included 65,5% of the sample of which 29% had maxillary as well as mandibular dentures, 5% had maxillary dentures only and 0,5% had mandibular dentures only; 66,5% of the edentulous group had no form of prosthesis. Lesions of the oral cavity and lips were common and in the dentate group there was a gradual but erratic trend towards fewer natural teeth with increase in age. A third of the teeth were decayed and only two teeth in the whole group had been restored. Almost one in five of the surviving teeth were carious and required extraction and a high proportion of the less carious and sound teeth could have been extracted because of periodontal involvement.

Davidow (1973) investigated the age distribution of patients seeking denture prosthetic treatment at the School of Dentistry, University of the Witwatersrand. The sample consisted of 100 people, 28 men and 72 women, with a mean age of 62 years ranging from 30 to 80 years. Davidow found that the average age at which dentures were first required was 44 years and the average period they retained their dentures was 17 years with a tendency of the older age groups to wear their dentures for a longer period. From the age of 60 years onwards the average denture age was 18 years. In this survey data also showed that the older people take better care of their dentures than the younger group because 60% of the younger group and only 34% of the older group had their dentures repaired more than once. There was also evidence that males wear their dentures a longer time than females.

Baikie (1967) investigated denture age in a group of edentulous Caucasians and Negroes in the age range of 20 to 90 years. In the older age range from 60 years upwards the average age of dentures for Caucasians was 23,5 years and for Negroes 9 years. The smallness of the mean denture age value in the latter is attributable to economic factors.

Van Reenen and Wingrin (1963) studied the denture age of 562 people, without specifying ethnic grouping, ranging in age from 15 to 88 years. The average age at which dentures were inserted was 34 years. In the age group of 60 years plus, the average denture age was 23,2 years.

A study by Dreyer (1978) of the Cape Malays, a social sub-group of the Coloured ethnic group, included a sample of 747 persons ranging in age from 10 years upwards in which 42% were edentulous with 45,5% wearing dentures. In the 65 years plus age group 78,9% of the males and all the females were edentulous.



These surveys in the R.S.A. are too limited to determine the full extent of the dental needs and demands of the aged and further explorations of the dental problems of the aged are imperative.

# CHAPTER III

## PLANNING OF SURVEY AND COMPOSITION OF SAMPLE

### 1. Origin of Survey

The research Group in Dental Epidemiology of the South African Medical Research Council has embarked on an extensive survey of the oral disease pattern of the population of the Republic of South Africa. A certain amount of research has been completed on the Indian, Coloured and Malay population groups. In order to extend the survey a step further and to expose the dental needs and demands of the senescent white population, a survey on the oral health conditions of the elderly institutionalised whites was embarked upon.



### 2. Defining the region of the survey

For the purposes of this survey the area covered was the Cape Peninsula and envirous bounded by the line joining Muizenberg to Kuilsriver, continuing to Kraaifontein, Durbanville and Milnerton (Fig. 1).

### 3. Planning of survey

A list of all the registered old-age homes in this area was obtained from the Department of Social Welfare and Pensions. A random sample of homes was drawn from this list to represent approximately 20% of the institutionalised elderly population of the Peninsula. Letters were then directed to the matrons of the selected institutions explaining the purpose of the research project and requesting their permission to visit the homes.

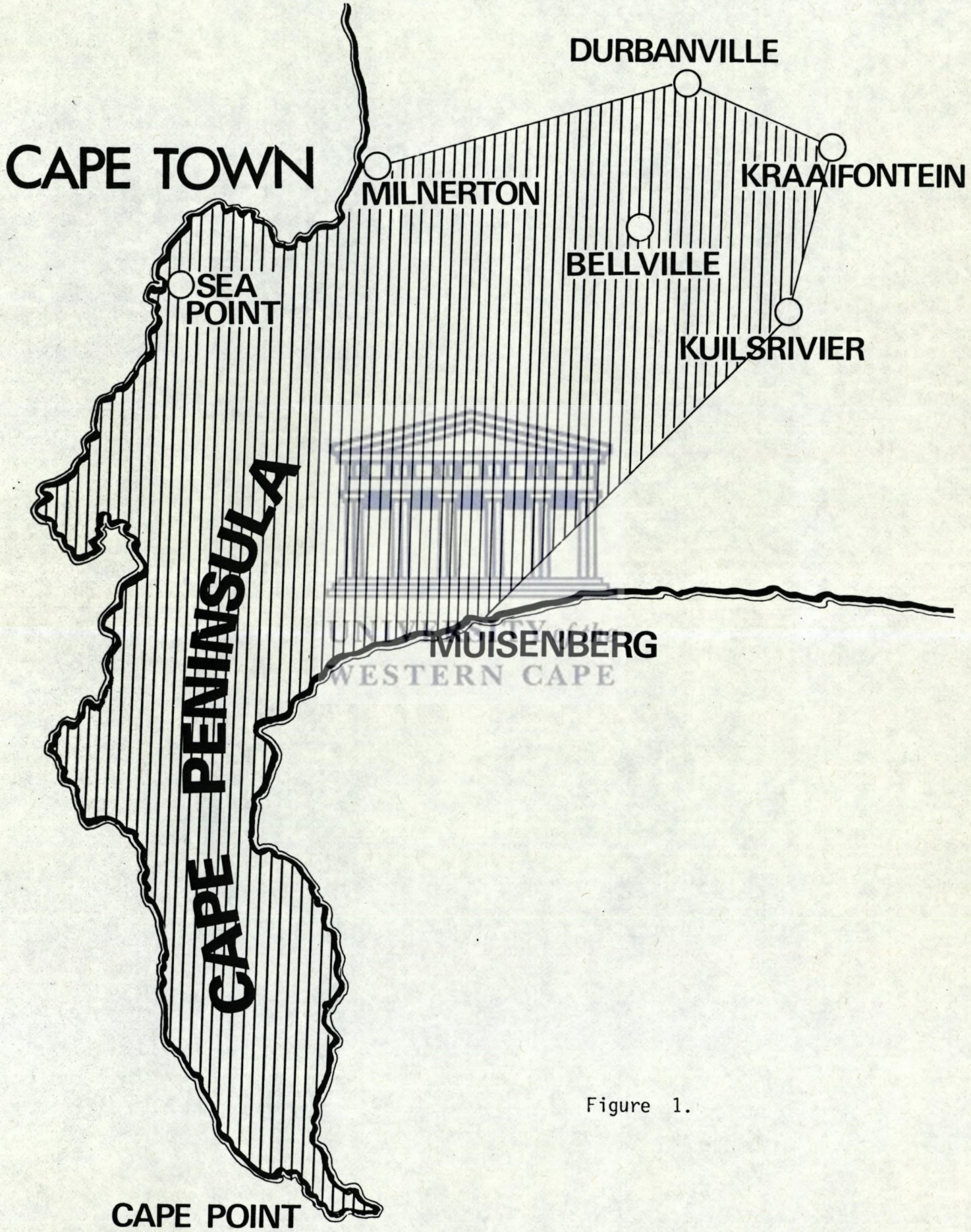


Figure 1.

Two types of home were involved. The State-subsidised homes run by various welfare organisations and the private homes run by individuals for personal gain. Both types of home however are subjected to supervision and inspection by the Department of Social Welfare and Pensions. State-subsidised homes accommodate residents in the sub-economic and economic income classes and the State contributes to the erection of the buildings, and subsidises the boarding and the health care of the sub-economic group. The residents in the economic group of the subsidised homes and the residents of private homes are personally responsible for their board and lodging and health-care expenses.

4. Methods employed

Telephonic appointments were made with the matrons to visit the homes on a specific date and time. They were requested to inform the residents of the purpose of the visit and to make a suitable room with seating available where the examinations could be carried out. Suitable lighting and the necessary instruments were used to examine each individual patient. Bedridden patients were examined in their beds if their condition permitted it.



4.1. Observations recorded

Examination of the residents of these homes was carried out by three dental surgeons with two assistants who helped with the recording of the following observations:

Name; age; sex; home.

(1) Lesions of the oral mucosa and lips.

(a) Lesions present.
(b) Causes of lesions.

(2) Natural teeth (patients with any natural teeth remaining were classified as dentate).

(a) Number of remaining teeth.
(b) Carious lesions.
(c) Restorations.
(d) Periodontal condition.
(e) Partial prosthesis
    (i) If present
    (ii) Required by person
    (iii) Considered necessary by clinician.

(3) Edentulous persons.

(a) Period of edentulousness.
(b) At what stage were dentures provided.
(c) Age of present dentures.
(d) Condition of dentures.
(e) Evaluation of dentures by the owner as well as the clinician.
(f) Method of cleaning dentures.
(g) Cleanliness of dentures.
(h) Sleeping with or without dentures in the mouth.



## 5. The Sample

### 5.1. Composition of the sample

The total population of whites in old age homes in the Cape Peninsula area amounts to approximately 3180. Of this figure 2450 reside in State-subsidised homes and 730 in private homes. Twenty percent of the population was drawn in a random sample of 7 subsidised homes and 4 private homes. Because the response of residents to the request for examination was very poor in some of the homes an additional two subsidised homes were included giving a final total of 9 subsidised and 4 private homes (Table 3.1.).

5.1.1. Identification of homes

To obviate naming the homes each was given a number from 1 - 9 for the subsidised and 10 - 13 for the private homes.

5.1.2. Distribution of data

Table 3.1.

| Subsidised Homes | Total Inmates | Inmates Examined | % Examined | Males Examined | Male % | Females Examined | Female % |
|---|---|---|---|---|---|---|---|
| 1 | 80 | 67 | 84 | 15 | 22 | 52 | 78 |
| 2 | 100 | 46 | 46 | 11 | 24 | 35 | 76 |
| 3 | 50 | 20 | 40 | 1 | 5 | 19 | 95 |
| 4 | 150 | 74 | 49 | 19 | 26 | 55 | 74 |
| 5 | 115 | 45 | 39 | 8 | 18 | 37 | 82 |
| 6 | 90 | 75 | 83 | 8 | 11 | 67 | 89 |
| 7 | 88 | 27 | 31 | 5 | 19 | 22 | 81 |
| 8 | 110 | 48 | 44 | 10 | 21 | 38 | 79 |
| 9 | 95 | 30 | 28 | 4 | 13 | 26 | 87 |
| Total | 878 | 432 | 49 | 81 | 19 | 351 | 81 |
| Private Homes | | | | | | | |
| 10 | 60 | 30 | 50 | 3 | 10 | 27 | 90 |
| 11 | 35 | 12 | 34 | 2 | 17 | 10 | 83 |
| 12 | 60 | 21 | 35 | 16 | 29 | 15 | 71 |
| 13 | 15 | 15 | 100 | 7 | 47 | 8 | 53 |
| Total | 170 | 78 | 46 | 18 | 23 | 60 | 77 |
| Total of all Homes | 1048 | 510 | 49 | 99 | 19 | 411 | 81 |



In order to regard the whole population as homogeneous tests were carried out to search for any bias factors which might have influenced the variables.

## 5.2. Results

### 5.2.1. Response and non-response factor of the residents in the different homes

This factor differs markedly between the individual homes (highly significant at P = < ,0005) (Tables 3.2, 3.3) but not as much between the categories of home (not significant at P = < ,5) (Table 3.4). There is a range variation of 28% to 84% (average 49%) with the subsidised homes and 34% to 100% (average 46%) with the private homes.

Table 3.2.

Subsidised homes

| Homes | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | Totals |
|---|---|---|---|---|---|---|---|---|---|---|
| No. of residents who responded for examination | 67 | 46 | 20 | 74 | 45 | 75 | 27 | 48 | 30 | 432 |
| No. of residents who did not respond for examination | 13 | 54 | 30 | 76 | 70 | 15 | 61 | 62 | 65 | 446 |
| No. of residents in each home | 80 | 100 | 50 | 150 | 115 | 90 | 88 | 110 | 95 | 878 |

$X^2$ = 119,79 d.f. = 8 P = < ,0005

Table 3.3.

Private homes

| Homes | 10 | 11 | 12 | 13 | Totals |
|---|---|---|---|---|---|
| No. residents who responded | 30 | 12 | 21 | 15 | 78 |
| No. residents who did not respond | 30 | 23 | 39 | 0 | 92 |
| No. of residents in each home | 60 | 35 | 60 | 15 | 170 |

$X^2$ = 21,9 d.f. = 3 P = < ,0005

Table 3.4.

Subsidised homes compared with private homes

| | Private Homes | | Subsidised Homes | | Totals |
|---|---|---|---|---|---|
| | No. | % | No. | % | |
| Responded | 78 | 46 | 432 | 49 | 510 |
| Non-response | 92 | 54 | 446 | 51 | 538 |
| | 170 | 100 | 878 | 100 | 1048 |

$X^2$ = ,693 with 1 d.o.f. P = < ,5

Table 3.5.

Males compared with females



| | Private Homes | | Subsidised Homes | | Totals |
|---|---|---|---|---|---|
| | No. | % | No. | % | |
| Males | 18 | 23 | 81 | 19 | 99 |
| Females | 60 | 77 | 351 | 81 | 411 |
| | 78 | 100 | 432 | 100 | 510 |

$X^2$ = 0,874 with 1 d.o.f. P = < ,5

The ratio of males to females in the different categories of homes did not differ significantly (P = < ,5) (Table 3.5).

5.2.2. The dental status in the two types of homes

Table 3.6.

Dentate compared with edentulous residents

| | Private Homes | Subsidised Homes | Totals |
|---|---|---|---|
| Dentate | 17 | 50 | 67 |
| Edentulous | 61 | 392 | 453 |
| Totals | 78 | 432 | 510 |

$X^2 = 6,836$ d.o.f. 1 $P = < 0,01$

There is a significant difference ($P = < ,01$) between the proportions of dentate and edentulous residents in private and subsidised homes (Table 3.6.).



6. Discussion

Of the residents of the private and subsidised homes 17 (22%) and 40 (9%) respectively still had some of their natural teeth. This difference can be attributed to the socio-economic circumstances of the two groups of people. Hobson and Roseman (1953) also found that more natural teeth are retained in the higher social classes than in the lower social strata. There were several factors influencing the composition of the sample:

Communication

The examining team was dependent on the person in charge of the home to convey the purpose of the visit to the residents and encourage them to attend for examination. This person is usually administratively

trained with a qualified nursing sister to assist her. The message that got through to the residents therefore depended on her attitude to oral health and unfortunately sometimes became rather confused and misleading.

Co-operation

In some homes co-operation was given with reluctance and only the few people who were actually suffering from denture problems attended for examination with the misguided idea that treatment was to be provided.

Socio-economic circumstances

Two subsidised homes have flatlets available for married couples who can afford to pay for their board and lodging. The so-called subsidised home sample did not therefore consist entirely of the lower socio-economic group. In two of the private homes it was also obvious that most of the residents had private means to meet their financial obligations. Many of these residents who are regularly attended to by their private dentists viewed the examination by the visiting team as being uncalled for. Again the response varied from home to home depending on the co-operation from the persons in charge.

Health of patients

Some homes accommodated more bed-ridden people than others. The terminally ill patients could not be examined without subjecting them to some degree of discomfort and were omitted from the survey.

Conclusion

Combining the samples of the individual homes into a single population represents approximately 16% of the total population of institutionalised

elderly white people in the Cape Peninsula area. There are two categories of home surveyed which, on the whole accommodate residents of different financial means. The results however suggest they can be included into a single sample.

# CHAPTER IV

## SUMMARY OF RESULTS

### 1. Age

The average age of the sample was 78 years (males 77 years and females 80 years) which is well above the average age of life expectancy.

### 2. Lesions of the oral mucosa

The lesions were classified into four categories.

#### 2.1. White lesions

Any whitish area on the oral mucosa which could not be rubbed off was classified as a white lesion.

#### 2.2. Denture induced lesions

These lesions were directly related to ill-fitting dentures which caused trauma and irritation of the tissues.

#### 2.3. Lesions of the tongue

Any abnormal appearance on the dorsum, lateral or ventral aspects of the tongue were classified under this heading.

#### 2.4. Other lesions

Lingual varices, roots, remnants of roots and benign growths were placed in this classification.

2.5. Prevalence of different lesions

Table 4.1.

| White Lesions | Denture Lesions | Tongue Lesions | Other Lesions | Total Lesions |
|---|---|---|---|---|
| 32 | 227 | 145 | 26 | 430 |

Hundred and thirty five individuals were found with no lesions and the remainder consisting of 375 had 430 lesions indicating that 55 had more than one kind of lesion.

3. Dentate group

Although this group was classified as dentate they were in fact partially dentate, with standing teeth varying in number from 28 to 3 per individual. Eleven percent of the sample were in this category.



Table 4.2.

| No. of Persons | No. partial Dentures | Total No. of Teeth | No. of Carious Teeth | No. of Restored Teeth |
|---|---|---|---|---|
| 57 | 28 | 738 | 173 | 120 |

4. Edentulous group

This group comprised 89% of the sample and the average age at which they became edentulous was 40 years.

Table 4.3.

| No. Edentulous | No. Wearing both Dentures | No. Wearing Upper Denture | No. Wearing no Dentures |
|---|---|---|---|
| 453 | 400 | 32 | 21 |

A clinical evaluation of the oral health status revealed that 343 individuals were in an unsatisfactory dental condition and needed attention. An evaluation by the patients themselves proved that only 199 considered their condition unsatisfactory.

To determine the ability of patients to adjust to new dentures after the age of 65 years a clinical evaluation of the oral health status of the individuals was made. Forty of the 102 cases were found to be satisfactory whereas 71 individuals considered their dentures unsatisfactory.

5. Habits that affect the oral tissues

Instead of having regular clinical examinations the aged are inclined to wear dentures until they suffer discomfort, which is when the tissues often become traumatized and damaged.



5.1. Denture age

In this sample the average age of the dentures in use was 22 years; an age that must have meant that most of the dentures were ill-fitting.

5.2. Sleeping with or without dentures

194 individuals were sleeping with whereas 238 were sleeping without their dentures.

5.3. Cleaning of dentures

Only 22 sets of dentures were considered clean and without plaque.

# CHAPTER V

## LESIONS OF THE ORAL MUCOSA

### Introduction

The etiology of lesions in the oral cavity is mainly due to trauma, irritation and tissue atrophy. The majority of the aged are edentulous and wear dentures which could be a cause of trauma to the oral tissues. In addition irritation can be caused by habits such as smoking and alcohol which presents as a white keratotic or hyperkeratotic lesion. In the process of aging nutrition often contributes to tissue degeneration but this sample consisted of people from institutions where diet is presumably adequate.

### Results

1. Prevalence of lesions



Table 5.1.

Proportions between patients with and those without lesions in age and sex groupings

| | Lesions | | No Lesions | | |
|---|---|---|---|---|---|
| Age | Male | Female | Male | Female | Total |
| - 69 | 13 | 40 | 1 | 9 | 63 |
| 70 - 79 | 31 | 120 | 10 | 64 | 225 |
| 80 - 89 | 30 | 113 | 8 | 39 | 190 |
| 90 - | 5 | 23 | 1 | 3 | 32 |
| Total | 79 | 296 | 20 | 115 | 510 |

$X^2 = 14,172$ d.o.f. = 9 $P = < 0,10$

From the table it can be seen that 375 individuals presented with lesions (79 males and 296 females). The difference between the sexes was not significant (P = < ,10).

2. Types of lesions

2.1. White lesions

Thirty two subjects (18 males and 14 females) had white lesions. The causes could be attributed to:

Dentures. Fourteen cases were found where white lesions were the direct result of chronic irritation from prostheses. This type of lesion is regarded as a frictional keratosis (Table 5.2).

Alcohol. Very few people admitted to taking alcohol and those who did were so abstemious that it could not be considered a significant factor in the cause of any oral lesion.



Smoking. Sixty three subjects smoked (42 males and 21 females). This difference is significant at P = < ,005.

Of the 42 male smokers 12, and of the 21 female smokers 8 had white lesions. The occurrence of white lesions in this group was significantly common compared to the non-smokers (P = < ,005) (Tables 5.3, 5.4).

Table 5.2.

Comparison of white lesions caused by smoking and dentures

| Possible causes | Smoking | Denture Induced | Total Lesions |
|---|---|---|---|
| Males | 12 | 6 | 18 |
| Females | 6 | 8 | 14 |
| | 18 | 14 | 32 |

$X^2$ = 1,94 d.o.f. = 1 P = < 0,250

Table 5.3.

Relationship between the males and females who smoke and do not smoke

| | Smokers | Non-smokers | Total |
|---|---|---|---|
| Males | 42 | 57 | 99 |
| Females | 21 | 390 | 411 |
| | 63 | 447 | 510 |

$X^2$ = 110 d.o.f. = 1 P = < ,005

Table 5.4.

Comparison of white lesions between smokers and non-smokers

| | Lesions | No lesions | Totals |
|---|---|---|---|
| Smokers | 18 | 45 | 63 |
| Non-smokers | 14 | 433 | 447 |
| Totals | 32 | 478 | 510 |

$X^2$ = 60,83 d.o.f. = 1 P = < ,005



2.2. Denture induced lesions

Denture induced lesions have been listed as denture hyperplasia, acute traumatic ulceration and denture stomatitis. Altogether 227 subjects (45%) had such lesions (34 males (34%) 193 females (46%)). The distribution between the sexes was not significant considering that 13% of the edentulous males and 3% of the females did not wear dentures (Table 6.4). Of the various types of lesions denture stomatitis predominated (20%) and there was no significant difference between the proportions of lesions in the different age groups (Table 5.5).

Of 102 cases with denture stomatitis 24 had associated angular cheilitis but there were also six cases of angular cheilitis without denture stomatitis. It was significant that of the 43 cases where upper dentures only were worn 18 (42%) had denture stomatitis.

Table 5.5.

Distribution of denture induced lesions in age groupings (excluding white lesions)

| Age | Denture Stomatitis | Denture Hyperplasia | Denture Ulceration | Total |
|---|---|---|---|---|
| - 69 | 14 | 11 | 8 | 33 |
| 70 - 79 | 47 | 32 | 17 | 96 |
| 80 - 89 | 35 | 30 | 18 | 83 |
| 90 - | 6 | 6 | 3 | 15 |
| | 102 20% | 79 15% | 46 9% | 227 45% |

$X^2 = 1,431$ d.o.f. = 6 $P = < 0,9$



2.3. Tongue lesions

Table 5.6.

Tongue conditions recorded in age groupings

| Age | No. of Patients | Fissured Tongue | Black Hairy Tongue | Atrophic Tongue | Geographic Tongue | Totals |
|---|---|---|---|---|---|---|
| 60 - 69 | 63 | 9 14% | 1 2% | 6 9% | 3 5% | 19 30% |
| 70 - 79 | 225 | 23 10% | - | 17 8% | 8 4% | 48 21% |
| 80 - 89 | 190 | 19 10% | 1 0,5% | 35 18% | 5 3% | 60 32% |
| 90 | 32 | 5 16% | - | 12 38% | 1 3% | 18 56% |
| | 510 | 56 11% | 2 0,25% | 70 14% | 17 3,2% | 145 28% |

The most prevalent tongue conditions were fissured and atrophic tongue.

Whereas the fissured tongue remains more or less static in all age groups there is an increase of atrophic tongue with age (Table 5.6).

## 2.4. Other lesions

### 2.4.1. Lingual Varices

Sublingual varicosities were so commonly observed that they were considered to be non-pathological. Kleinman (1967) states that there is no direct association between these varicosities and other organic diseases and concluded that they are a part of the aging process.

### 2.4.2. Roots

Roots and fragments of roots, visible to the naked eye, were recorded in 16 cases (3%).

### 2.4.3. Growths

Benign growths in the form of polypi were recorded in 10 cases (2%).



### White lesions

The major etiological factors are smoking and ill-fitting dentures (Table 5.2).

### Discussion

In contrast to the observations made in this survey van Wyk et al (1977) found in institutionalised elderly Cape Coloureds that close to 100% of them had some or other form of white lesion. Social and economic circumstances however, which often dictate certain habits, such as smoking and chewing tobacco, are so different between the white and coloured ethnic groups that probably the only common denominator is advanced age.

Denture-induced Lesions

The percentage of people who are edentulous is an indication of the dental health of the community (Gray et al 1970). Although the loss of teeth is not an inevitable part of growing old circumstances of the past have created a situation where age is synonymous with edentulousness. An oral prosthesis thus becomes necessary at a time when the degenerative changes in the oral tissues make the tissues less suitable to support artificial dentures. In addition, the aged are often unable to afford proper denture care and have to persevere with ill-fitting dentures which aggravate the situation. Denture-induced lesions consequently predominate over other oral lesions (Table 5.6).

Ulceration and hyperplasia caused by dentures.

The placement of new dentures with over-extended flanges may cause an acute traumatic ulceration. If the patient can tolerate the discomfort, and many do, it will develop into a chronic hyperplastic condition. A similar condition can develop directly into a sub-acute form where the denture flanges become relatively over-extended due to the gradual resorption of the ridge supporting the denture which presents as an epulis fissuratum. Shafer, Hine and Levy (1974) point out however that such a hyperplasia of the oral mucosa is not confined to the peripheral denture base areas only but occurs with any chronic irritation of the gingiva, buccal mucosa or any other area imposed on by the denture.

Denture stomatitis.

All the stages and forms of denture stomatitis were included under this heading and were mainly associated with trauma from ill-fitting dentures.

Anderson and Storer (1973) state that trauma of the oral mucosa probably predisposes to a secondary infection of Candida Albicans. The 24 cases of denture stomatitis in this survey with an associated angular cheilitis was probably due to an extension of the infection of the Candida Albicans from the oral cavity. Overclosure of the inter-maxillary distance or a deficiency of Vitamin B, might have been the cause in those cases with angular cheilitis only.

Denture stomatitis is one of the lesions which was commonly encountered (Table 5.5) and was mostly confined to the palatal area of the maxilla. Clinically, a high percentage of the dentures were ill-fitting causing trauma of the tissues and contributing to this condition. Budtz-Jørgenson and Bertram (1969) state: "Quite certainly traumatic lesions of the oral mucosa predispose to Candida growth, and Candida infections were seen under presumably non-traumatic dentures. It still remains a question as to which factors are responsible for the specific clinical picture of the granular inflammation, but probably both trauma and infection with Candida Albicans are involved." McKendrick (1968) mentioned that there is a tendency for denture stomatitis to be associated with denture age, dirty dentures and with the habit of night-wearing.

These authors obviously acknowledge the presence of the traumatic factor in this condition. In the 43 cases where only upper dentures were worn 18 (42%) had denture stomatitis. The maxillary dentures were ill-fitting but the forces caused by occlusion with a mandibular denture, which could be traumatic, were absent. It can therefore be concluded that in the process of mastication and swallowing, which in the absence of the mandibular denture is taken over by the tongue, the tongue, a fairly

strong and active muscular organ has the ability to convert some foods into a pulp against the palatal and occlusal surface of the upper denture. In the process of swallowing pressure is exerted on the upper denture by the tongue which must cause considerable displacement of the maxillary denture when it is ill-fitting and thus lead to trauma and possibly then a denture stomatitis.

Referring to McKendrick's statement about dirty dentures and stomatitis, cases were found where the fitting surface of the dentures were neatly moulded by depositions of plaque and calculus but with a comparatively healthy mucosa underneath. It can therefore be questioned whether there is in fact a relationship between dirty dentures and denture stomatitis.

Tongue Lesions

Fissured Tongue.



Witkop and Borros (1963) found an increase in the prevalence of fissured tongue with advancing age. This was observed from 40 years onwards with the likelihood of an incidence increase with age. In this survey 56 cases (11%) were recorded (Table 5.6). Dreyer (1978) found that in the Cape Malays the highest prevalence was found from 60 years upwards.

Atrophic Tongue.

The highest number of cases of generalised atrophy of the tongue papillae was recorded in the age above 90 years. Of the 70 cases noted 38% fell in this age group (Table 5.6). The indications are that like fissured tongues, atrophic tongues are one of the clinical manifestations of age unless associated with a definite systemic condition. This viewpoint

is substantiated by Dreyer (1978) among the Cape Malays in whom he noted that the prevalence of this condition probably increases with age. Unfortunately due to the smallness of his sample he could not verify his statement.

# CHAPTER VI

## THE DENTATE GROUP

Although this group in the survey is referred to as dentate they were only partially so and a wide range of tooth combinations was encountered.

### Results

#### 1. Categories of function

Out of the sample of 510, only 57 (11%) people, 13 males and 44 females, still had some of their own teeth. In age groups the composition of the sample was as follows:

Table 6.1.

| Age | Male | Female | Total |
|---|---|---|---|
| 50 - 59 | 2 | 1 | 3 |
| 60 - 69 | 0 | 7 | 7 |
| 70 - 79 | 6 | 23 | 29 |
| 80 - 89 | 5 | 12 | 17 |
| 90 | 0 | 1 | 1 |
| Totals | 13 | 44 | 57 |

The sample of dentate people could be divided into three categories based on masticatory function. Category A functions satisfactorily without a prosthesis, category B cannot function satisfactorily without the assistance of a prosthesis which may include a complete denture opposing the natural teeth and category C comprises that group whose oral health would be improved if the teeth were removed.

Table 6.2.

Comparative figures in the different categories

| Category | Males | Females | Total |
|---|---|---|---|
| A no prosthesis | 3 | 9 | 12 |
| B prosthesis needed | 8 | 29 | 37 |
| C dentectomy needed | 2 | 6 | 8 |
| | 13 | 44 | 57 |

Of the eight males in category B, 4 wore complete upper dentures, of which 2 required partial lower dentures. Clinically none of these dentures were satisfactory and only one individual had no complaints. The remaining 5, including those in category C were happy to be without any form of prosthesis and preferred retaining their teeth as they are.

Of the females, 13 wore complete upper dentures, of which 5 needed partial lowers, and only two individuals wore complete lower dentures against partial uppers. There were only two dentures that were clinically satisfactory and 10 individuals were satisfied with their oral condition. Of the remainder, 12 wore partials, of which only 5 cases were clinically satisfactory and 10 women were satisfied with their existing state. The remainder managed with what they had in their mouths.

2. Teeth retained in different categories

Table 6.3.

| | No. of Teeth | | |
|---|---|---|---|
| | Males | Females | Total |
| Category A | 65 | 196 | 261 |
| Category B | 71 | 321 | 392 |
| Category C | 34 | 51 | 85 |
| Total | 170 | 568 | 738 |

$X^2$ = 21,44 d.o.f. = 2 P = < ,0005

There was a significant difference (P = < ,0005) between the number of teeth retained in the different categories and the majority of teeth which were present in category B (Table 6.3).

3. Decayed and restored teeth



Table 6.4.

Comparison of the conditions of the teeth between males and females

| | Males | Females | Total |
|---|---|---|---|
| Decayed teeth | 45 | 128 | 173 |
| Restored teeth | 32 | 88 | 120 |
| Sound teeth | 93 | 352 | 445 |
| Total | 170 | 568 | 738 |

Most of the teeth were periodontally involved to some degree, even to the extent of marked mobility. In addition 23% of the teeth were

decayed.

4. Removable partial dentures

On examination 37 subjects required partial dentures. Twenty seven of these had dentures but all were unsuitable (see Table 6.5).

Table 6.5.

Comparative analysis between those who use and do not use partial dentures

| | Males | Females | Total |
|---|---|---|---|
| Use a partial denture (unsuitable) | 4 | 23 | 27 |
| Function without partial denture | 4 | 6 | 10 |
| Total who need a partial denture | 8 | 29 | 37 |

5. Mucosal lesions in the partially dentate



Table 6.6.

Comparison of the different oral lesions

| | Males | Females | Total | % |
|---|---|---|---|---|
| Denture lesions | 2 | 11 | 13 | 23 |
| White lesions | 1 | 2 | 3 | 5 |
| Tongue lesions | 1 | 11 | 12 | 21 |
| Other lesions | 1 | 2 | 3 | 5 |
| No lesions | 8 | 18 | 26 | 46 |
| Totals | 13 | 44 | 57 | |

$X^2 = 3,338$ d.o.f. = 4 $P = < 0,50$

Forty-six percent of the dentate individuals were without oral lesions. The figure would be higher if the tongue lesions (21%) were reclassified as a normal aging phenomenon. The majority of the denture-induced lesions (23%) were due to standing lower incisors opposing complete upper dentures. There was no significant difference between the incidence of the various lesions ($P = < ,5$) (Table 6.6).

6. Evaluation of masticatory function

Persons who were able to do without any form of prosthesis were generally satisfied with their oral health status, although clinically the reverse was true. In an old-age institution the favourite topic of conversation often centres round prosthetic problems and this is often the reason why the elderly are reluctant to part with their teeth.

The subjects with partial dentures could be grouped into:

(a) Those who do not wish to replace their partial dentures although clinically unsatisfactory (satisfied).

(b) Those who do wish to replace their partial dentures which are indeed clinically unsatisfactory (dissatisfied).



Table 6.7.

| | Clinical evaluation | | Patients evaluation | |
|---|---|---|---|---|
| | Numbers | Percentage | Numbers | Percentage |
| Satisfied | 23 | 40% | 38 | 67% |
| Dissatisfied | 34 | 60% | 19 | 33% |

Discussion

The participants in this survey had adopted an attitude of resignation

to the condition of the remaining teeth. Those who had received regular attention will probably continue to seek treatment but the others who have retained their teeth by virtue of factors beyond their control cannot be persuaded at this stage to seek dental attention even though they would wish to retain them. The attitude of the aged towards their teeth is dictated by circumstances and dental education during their youth and at this stage in life there is a reluctance to face the changes associated with the loss of teeth.

There are definite indications that there are less oral lesions present in the partially dentate than in those with complete dentures (Table 6.6, 5.5). This may be attributed to:

(i) not wearing dentures

(ii) trauma to the tissues is reduced due to the retention and stability provided by the standing teeth to the prosthesis

(iii) people are more conscious of oral health if they have natural teeth to attend to.



Many of the individuals who clinically need a partial removable denture for proper masticatory function, but who do not demand it, manage without it with no visible detrimental effects. Considering the degenerative processes of the oral tissues with increasing age and the consequent inability to support an oral prosthesis satisfactorily the advisability of encouraging the wearing of a partial prosthesis if it is not really needed, is doubtful.

The dentally uneducated public assumes that the loss of teeth is a part of the process of aging. A common assumption is that teeth will

inevitably be lost in the future so the ordeal may as well be endured now thus eliminating the further expense and discomfort of dental treatment. It can be assumed that the members of the present group, with an average age of 78 years, do not hold this view any more, and have a desire to retain their remaining teeth as long as possible. For many this is unfortunately impossible. Caries and periodontitis are the major threat to the retention of the natural teeth and in this elderly sample the facilities to counteract these diseases are decidedly lacking. For many of these aged the few standing teeth are the barrier between a reasonable masticatory function and no function at all because of potential inability to adjust to the substitute artificial dentures which might be contemplated.

The elderly person is often treated in a routine manner and sight is lost of the declining ability to adapt to changes in the functional pattern of the stomatognathic system. There is a reduction in the ability to accommodate changed proprioceptive signals and convert memory responses into motor reactions. Therefore any major changes in oral function must be carried out in a transitional form to provide the nervous system with time to adapt to a new functional pattern (Franks & Hedegard 1973).

For normal masticatory function with or without a prosthesis, or for transition from natural teeth to artificial teeth, the standing teeth are of inestimable value. Winkler (1977) draws attention to the radical approach of a large segment of the dental profession who convert dentate patients to a dentured state in advanced age. This is an approach that cannot be justified even if the loss of all the remaining

teeth is inevitable. A conservative approach modifying existing partial dentures by adding teeth or making an overlay denture gives the patient a better opportunity to adapt to the new functional pattern to be acquired for the use of artificial dentures.

Boitel (1971) points out that memory formation (short-term memory particularly), the assimilation of new experience and the formation of new neuro-muscular reflexes are all slowed down with age. Changing from natural teeth to complete dentures, or to new dentures, requires the ability to form intricate chains of muscle reflexes and patterns. The aged patient is often unable to form such a new engram and therefore a transitional solution must be found to give time and opportunity for adaptation to any form of change.

To preserve or to extract natural teeth can be a difficult decision in the aged. Anderson and Storer's (1973) approach to this problem is that patients beyond the age of 55 years should be carefully assessed for prognosis of tooth retention and premature aging. If the loss of natural teeth is inevitable during the patient's life the teeth must be removed at an age when he/she can still adapt. The alveolar ridge will be preserved in cases of persistent periodontal disease if the teeth are removed. If teeth are removed at a young age for this reason resorption of the ridge will take place through the following years in any case. It is a debatable point whether the ridge is actually preserved by the extractions or whether natural resorption of the alveolar bone would do what the periodontally involved teeth would have done in any case. If the teeth were retained they may have saved the patient many years of denture discomfort and provided an invaluable medium for transitional

dentures when the teeth had to be removed. This would probably have coincided with the time the patient would have required new dentures if extractions had been done earlier. Winkler (1977) advocates that it is better to retain natural teeth for as long as possible and accept the complete dentures with their decreased efficiency eventually thus decreasing the span of edentulous life.

Retention of natural teeth provides the aged with an oral status that can never be emulated by artificial means. The oral mucosa responsible for the support of an oral prosthesis becomes progressively more unsuitable for the function it must perform as age advances (Winkler 1977, Baikie 1975, Tallgren 1972, Nedelman & Bornick 1978). Retained teeth can lessen the load on the deteriorating mucosa by supporting and stabilising a denture. In addition it can provide retention for the prosthesis thereby increasing stability and decreasing the possibility of trauma to the tissues. This is well illustrated by the fact that 46% of the dentate group of this survey showed no mucosal lesions. If the 21% who showed tongue lesions, which are probably part of the process of aging are grouped under "no lesions" it is found that 67% of this part of the sample have no lesions and that only 33% possess some form of oral lesion (Table 6.6).

# CHAPTER VII

## THE EDENTULOUS STATE

The edentulous state is accepted as a normal condition for the aged today and the majority have lost their teeth when they reach their sixties.

### Results

#### 1. Age of extractions

The general trend at the time when most of the members of this sample had their teeth removed was to wait for a few months before the placing of artificial dentures. The lapse of time and memory since then has made it difficult for the individuals to remember the dates of extractions and placement of dentures with accuracy. Individuals who could not supply a reasonably accurate date were not included in the statistical calculations and thus the extraction data of 77 males and 349 females were used. The average age of extractions for the males was 40,34 years and the females 38,85 years.

Table 7.1.

Mean age of extractions and dispersion of figures between males and females

| Sex | No. of individuals | Range | Mean age | SD |
|---|---|---|---|---|
| Males | 77 | 16 - 66 | 40,34 | 13,85 |
| Females | 349 | 14 - 81 | 38,85 | 12,89 |

2. The edentulous state in age and sex groupings

No significant difference existed between males and females with regard to the numbers of edentulous subjects (Table 7.2) and an increasing incidence of edentulousness was apparent with increasing age (Table 7.3).

Table 7.2.

Comparison of edentulousness in the different sexes in age groupings

| | Males | % | Females | % | Total | % |
|---|---|---|---|---|---|---|
| - 69 | 12 | 14 | 41 | 11 | 53 | 12 |
| 70 - 79 | 35 | 41 | 161 | 44 | 196 | 43 |
| 80 - 89 | 33 | 38 | 140 | 38 | 173 | 38 |
| 90 - | 6 | 7 | 25 | 7 | 31 | 7 |
| Total | 86 | | 367 | | 453 | |

$X^2 = 0,623$ d.o.f. = 3 $P = < 0,70$



Table 7.3.

Percentages of edentulousness of the total sample, in sex and age groupings

| | MALES | | | FEMALES | | |
|---|---|---|---|---|---|---|
| | Edent. | Total sample | % edent. of total sample | Edent. | Total sample | % dent. of total sample |
| - 69 | 12 | 14 | 86 | 41 | 49 | 84 |
| 70 - 79 | 35 | 41 | 85 | 161 | 184 | 88 |
| 80 - 89 | 33 | 38 | 87 | 140 | 152 | 92 |
| 90 - | 6 | 6 | 100 | 25 | 26 | 96 |
| Total | 86 | 99 | 87 | 367 | 411 | 89 |

3. Dentured status

Table 6.4.

| | MALES | | FEMALES | | | |
|---|---|---|---|---|---|---|
| | No. | % | No. | % | Total | % |
| Wearing no dentures | 11 | 13 | 10 | 3 | 21 | 5 |
| Wearing upper dentures only | 5 | 6 | 27 | 7 | 32 | 7 |
| Wearing both dentures | 70 | 81 | 330 | 90 | 400 | 88 |
| | 86 | | 367 | | 453 | |

$X^2 = 9,248$ d.o.f. = 2 $P = < ,010$

There is a significant difference in the pattern of using dentures between males and females. Thirteen percent of the men and only 3% of the females did not wear dentures and upper dentures only were used by 6% of males and 7% of females.

4. Objective and subjective evaluation of dentures

The criteria by which the owner judges the efficiency of dentures often differ from those of the clinician. It would be ideal for both owner and clinician to be satisfied with a prosthesis but this is rare in the aged who are often proud of the antiquity of their dentures.

Table 7.5.

Comparison of Patient's and Clinician's evaluation

| | Patient's Evaluation | | | | | Clinicians Evaluation | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Satisfied | | Not satisfied | | Total | Satisfied | | Not satisfied | | Total |
| Males | 48 | 56% | 38 | 44% | 86 | 20 | 23% | 66 | 77% | 86 |
| Females | 206 | 56% | 161 | 44% | 367 | 90 | 24% | 277 | 76% | 367 |
| | 254 | 56% | 199 | 44% | 453 | 110 | 24% | 343 | 77% | 453 |

There was a marked difference, 56% compared with 24%, between the number of cases considered satisfactory by the patients and by the clinicians respectively.

4.1. Replacing or receiving dentures after the age of 65 years

During the survey it was noticed that the people were mostly satisfied with dentures that had served them for many years. On the other hand many of those who had recently received new dentures were dissatisfied, especially with the lower denture. A subjective and objective evaluation was made of dentures received after the age of 65 years.

Results showed that, by comparison with the results in Table 7.5, there existed a marked difference, 30% as against 61%, between satisfied patients and "satisfied" clinicians.



Table 7.6.

Placement or renewing of dentures after the age of 65 years

| | Total No. of cases | Patient's Evaluation | | | | Clinical Evaluation | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Satisfied | | Not Satisfied | | Satisfied | | Not Satisfied | |
| Males | 26 | 10 | 38% | 16 | 62% | 16 | 62% | 10 | 38% |
| Females | 76 | 21 | 28% | 55 | 72% | 46 | 60% | 30 | 40% |
| | 102 | 31 | 30% | 71 | 70% | 62 | 61% | 40 | 39% |

Discussion

The findings in this survey indicate that the majority of people received dentures during their 3rd and 4th decade. This period is more or less similar to those given by Davidow (1973) and van Reenen & Wingrin (1959).

There is a further indication that women have their teeth extracted at an earlier age than men (Table 7.1). Dreyer (1978), although doing a survey of a different ethnic group, mentions that females start wearing dentures at an earlier age than males, a phenomenon found in the female sex which could be due to a greater consciousness of body image. It is possible that the same holds true for this sample.

Males and females in this study show a progressive pattern of increased edentulousness with advancing age (Table 7.3) which is probably due to the lack of treatment facilities. Similar patterns have been noticed elsewhere. Gray et al (1968) found in a survey in England and Wales that 77,6% of the males and 79,6% of the females between the ages 65 - 74 years were edentulous. Above this age group, 87,7% of the males and 88,3% of the females were edentulous. In a comparative study the same authors found that in the U.S.A. only 45,1% of the males and 53,0% of the females were edentulous in the age group of 65 - 74 and 55,7% and 65,6% males and females respectively above that age group. According to Fellman (1976) however 75% of the American population over the age of 70 years are edentulous. Ritchie (1972) found that 66% of patients visiting the Dental School (average age 70,5 years) were edentulous. Another group who were hospitalised patients (average age 81,3 years) were 80% edentulous. Manderson and Ettinger (1975) found that 91% of institutionalised elderly persons in Edinburgh were edentulous.

With the removal of teeth and provision of artificial dentures many people, and not necessarily only the elderly, lack the neuro-muscular co-ordination necessary to master these prostheses. Many who experience problems remove their dentures and mastication is carried out on the

bare alveolar ridges with the assistance of the tongue. Others become perennial visitors to the dentist and possess bags full of dentures, never considering that the problem may be their inability to adjust to using dentures. The most difficult denture to master is the complete lower. It is inherently unstable and is directly surrounded by many of the active muscles in the oral cavity during function. Some individuals will compromise with their denture problems by wearing the upper denture only. Very rarely the reverse is true and in this sample there were no cases where only the lower denture was worn.

Van Wyk et al (1977) found that 65,5% of the Cape Coloured community was edentulous, of which 46,6% were without dentures. Dreyer's (1978) study of the Cape Malays showed that of the 89,7% of the elderly section who were edentulous only 76,3% wore dentures; 94,7% of the females and only 57,9% of the males in this age group wore dentures. Garrish et al (1972) in a survey of elderly people in residential homes in Cardiff found that 7,95% of them live without dentures. Ritchie (1972) found that 11% wore no dentures and 30% wore upper dentures without lowers. Thus on a comparative basis the figures range from 6% to 13% and the highest percentage is usually found with males. The males quite clearly do not persevere with dentures for the sake of appearance.

There seems to be a fairly consistent proportion of old people who are unable to adjust themselves to the use of a prosthesis and who are simply dentureless. Psychologically and physically they are probably in a much better state than they would have been if they had to suffer frustrations in an attempt to adjust to dentures.

The importance of dentures, or even natural teeth, for proper nutrition is questioned. Hobson and Roseman (1953) concluded that there is no noteworthy difference in the intake of animal protein between those with adequate and those with inadequate dentitions. Winkler (1977) supports this statement and states that: "An adequate dentition, either natural or artificial, is not essential for sufficient food intake for maintaining a good nutritional balance during normal health." He mentions though that a dentition of some kind may be necessary to support the extra demands of illness, especially as an aid to the enjoyment of food. If adjusting to dentures during health is difficult it is doubtful that it could occur during illness. Farrell (1956) concluded that the actual mastication of food is not essential for proper nutritional balance. These views are also confirmed by Franks et al (1971).

It must be accepted therefore that a person who has difficulty in accepting dentures and can reconcile himself to the disadvantages of denturelessness should be left dentureless. It is often the insistence of family and friends that forces elderly people to acquire dentures, whereas they had been getting along quite happily without them. The unsuspecting dental practitioner embarks on the treatment without acquainting himself with the motivating factors involved and too often the results are disastrous. There is no justification for trying to persuade elderly people to acquire a prosthesis if they are satisfied without them. This view is also supported by Winkler (1977).

The norms on which dentures are evaluated by the clinician and the patient are different and the figures are influenced by age. In this survey it was found that 70% of the individuals were not satisfied with their

dentures but only 39% were clinically unsatisfactory. This indicates that some dentures which were clinically satisfactory were found unsatisfactory by the wearers. If tables 7.5 and 7.6 are compared it is found that the figures of the clinical evaluation and the patients evaluation of the dentures are reversed.

Special attention was paid to the vertical and horizontal relationships of the occlusions, the fit, support of the facial features by the dentures and the functional efficiency of the dentures. The latter, however, could only be judged by the owner.

Langer et al (1961) point out that dentures are often judged successful if certain technological standards are met, whereas wearers evaluate dentures from the point of view of subjective aesthetics, mastication comfort, speech and their ability to manipulate the dentures.



Garrish et al (1972) in a survey of residential homes for the elderly in Cardiff, found that 33% of the residents were dissatisfied with their dentures while 44% of the dentures were clinically inadequate. Hobson and Roseman (1953) in a survey of elderly people living at home found that 41% of the dentures were inadequate. Martinello (1976) in a survey of residents in a home for the aged in Chatham, Ontario, found that 71% of the maxillary dentures and 93% of the mandibular dentures were either absent or less than adequate. Ritchie (1972) found that 30% of the upper and 50% of the lower dentures were unsatisfactory. The statistical data obtained from these authors confirms that well over half of the old people have to cope with dentures that are inadequate. It is interesting to see that Winkler (1977) states that many people without dentures are

nutritionally better off than those with inadequate dentures. Although loss of teeth can be associated with lack of treatment van Wyk et al (1977) reveal in a study of institutionalised elderly Cape Coloureds in the Cape Peninsula area that 65,5% of the age group 54 - 85 years are edentulous. The authors however mention that the 34,5% who are dentate must be seen as an indication of dental neglect rather than as an index of dental care because most of them would have been in a healthier dental state without natural teeth.

The undesirable situation where so many elderly people have to cope with inadequate new dentures could in many cases have been prevented by modifying the existing dentures in preference to providing new dentures. The confident assumption by a dentist that deficiencies and inadequacies in old dentures can be overcome with new dentures may be the cause of insoluble problems. The neurological adjustments needed to adapt the wearer to new dentures are unpredictable. Modification of existing dentures, while retaining the pattern of function which the patient has acquired may prevent problems. Therefore before new dentures are supplied to this age group the implications and possible problems should be seriously considered.

# CHAPTER VIII

## DENTURE HABITS AND THE EFFECT ON ORAL TISSUES

### Introduction

The degenerative effects of age on the oral tissues can be aggravated by undesirable denture habits. These can cause the premature and unnecessary loss of natural teeth in the case of partial dentures, or hasten the resorption of edentulous alveolar ridges in the case of complete dentures. Escalating denture problems are often due to a lack of regular clinical examinations as well as bad denture habits such as sleeping with and improper cleaning of dentures. Education and guidance in the correct manner of denture use are essential prerequisites to good oral health in the aged.



### Results

1. Denture Age

It was found that the majority of subjects had their dentures for more than 10 years while several had them for 40 years and longer (Table 8.1).

Table 8.1.

Denture age

| Sex | No. of individuals | Range | Mean age of dentures | SD |
|---|---|---|---|---|
| Males | 68 | 1 - 62 | 22,31 | 13,78 |
| Females | 343 | 1 - 64 | 21,83 | 15,65 |

2. The wearing of dentures at night

Almost half the people slept with their dentures and there was no significant difference between the sexes (P = < ,90) (Table 8.2). When the correlation between this habit and the occurrence of denture stomatitis was investigated a significant relationship was found (P = < ,005) (Table 8.3).

Table 8.2.

Sleeping with and without dentures

| Sex | Sleep with | % | Sleep without | % | Total |
|---|---|---|---|---|---|
| Males | 33 | 44 | 42 | 56 | 75 |
| Females | 161 | 45 | 196 | 55 | 357 |
| | 194 | 45 | 238 | 55 | 432 |

$X^2$ = ,0273 d.o.f. = 1 P = < ,900



Table 8.3.

Denture stomatitis in relation to sleeping habits

| Sleeping habits | No. lesions | Stomatitis | Totals |
|---|---|---|---|
| With dentures | 124 | 70 | 194 |
| Without dentures | 207 | 31 | 238 |
| Totals | 361 | 101 | 432 |

$X^2$ = 28,7 d.o.f. = 1 P = < ,005

3. Cleaning of dentures

All the denture wearers affirmed that they clean their dentures. Methods varied from some form of brushing with toothpaste or soap to the use of

a chemical solution. It was evident though that either the information supplied was not always accurate or that many old people are unable to clean their dentures effectively because only 5% of the dentures were considered clean and without plaque.

Discussion

Mucosal health can only be maintained by a free flow of saliva over the oral tissues, an unimpaired blood supply and the massaging action of the tongue. Dentures interfere with these requirements. The alveolar ridge, which supports the fitting surface of the denture, undergoes resorption after the natural teeth are removed and the pressure of a denture accelerates this process. This harm occasioned by dentures can be reduced by nearly half if dentures are removed from the mouth during the sleeping hours. For many people it is a distressing experience to be without their dentures at night and they would rather face the consequences than comply with this advice. In this survey there was no significant difference between the proportions of males and females sleeping with or without their dentures and taken overall more people slept without their dentures (Table 8.2).

There appears to be a relationship between denture stomatitis and dentures retained in the mouth day and night. Of the 102 individuals with denture stomatitis 70 slept with their dentures (Table 8.3). Garrish et al (1972) found that close on 50% of the old people in a survey conducted by them who sleep with their dentures suffered from some form of denture stomatitis. Stephens (1974) states: "The majority of patients who have denture sore mouth wear their dentures during sleep. This allows no opportunity for the tissues to recover from overloading or to be bathed in saliva. It

also provides the opportunity of grinding the teeth during sleep which can cause considerable trauma."

Garrish et al (1972) in a survey of people living in residential homes found that 56% of the inmates sleep without dentures and that of the 44% who sleep with their dentures 48% had denture stomatitis. These authors confirm the fact that sleeping with dentures has an adverse affect on the oral tissues and predisposes to denture stomatitis. Basker et al (1975) point out that successful treatment of denture stomatitis in many cases necessitates removal of dentures at night. Ignorance is probably one of the major causes of this habit and can be rectified by education.

Some people complain that their dentures are loose fitting in the mornings if left out at night. This phenomenon can be attributed to the regression of oedema in abused tissues during a night's rest.



Unfortunately some members of the dental profession still contend that it is preferable to sleep with dentures in the mouth and patients are advised accordingly. Nursing staff in hospitals, in a misguided attempt to prevent the loss of dentures, likewise advise patients to retain dentures at night.

Denture age is of importance, not because of what happens to dentures, but because of what happens to the residual alveolar ridges. The tissue changes cause a denture to become ill-fitting and the ill-fitting denture in turn can be the cause of pathological conditions in the tissues. A vicious circle is thus established which is gradual and often unnoticed.

Many authors have stated the optimum period dentures should be worn. Hobdell et al (1970) recommend a change of dentures after 5 - 7 years. If this statement is acceptable it must be assumed that tissue changes must be fairly constant from person to person. Tallgren (1972) however states that the magnitude and pattern of alveolar bone loss shows great individual variation. This statement is confirmed by observations in this survey where dentures that had been worn for many years were still well-fitting, whereas dentures that had been worn for a short time were ill-fitting and traumatic. It is considered impossible to predict how long dentures should or could last. This can only be determined by regular clinical evaluations.

To overcome this problem it is recommended that the placing of a denture is not the termination but only a phase in the treatment of the edentulous patient. De Van (1974) stresses the importance of seeing a patient regularly for the first six months, stating that the dentist can rarely be certain of the correctness of the vertical dimension until the patient has functioned comfortably with dentures for this period. After 6 months he recommends that the patient return for yearly visits.

The fact must be faced that the life of a denture is unpredictable and patients must be dissuaded from wearing them for excessively long periods without attention. Tissue damage and the consequent need for new dentures often only becomes apparent at an advanced age when people may experience increasing difficulties in adjusting to a change of dentures.

Ritchie (1972) points out that one of the major problems with the senescent population is that many of them enter the later stage of life

wearing poorly fitting dentures that are 10 to 20 years old. He found that 30% of the dentures in his survey were older than 10 years. Davidow's (1973) sample (average age 62 years) showed that most of the patients wore their dentures for 17 years. Bulman et al (1968) found that the age of dentures increases proportionately with the age of the wearer, 81% of the dentures being over the age of 15 years in the age group 66 - 70 years. Baikie (1967) found that the age averages of the dentures were 15,55 and 17,43 years respectively in a sample where average ages were 56,3 years and 53,17 years for males and females respectively.

Ignorance of the physiological processes associated with the loss of teeth and the wearing of dentures make people unaware that denture age and ill-fit are directly related. Instead there is pride in the length of time a set of dentures is worn while often advanced oral damage has occurred before the patient seeks advice.

# CHAPTER IX

## GENERAL SUMMARY AND CONCLUSIONS

### 1. Summary

#### 1.1. The sample

The sample studied represented 16% of the institutionalised Caucasian aged of the Cape Peninsula area and was taken randomly from 13 different old-age homes. Ninety nine males (mean age 77,5 years) and 411 females (mean age 78,5 years) were examined. The term aged was applied to people above the age of 65 years.

#### 1.2. Oral lesions

Of the 510 people surveyed 135 were without oral lesions. The remaining 375 had a total of 430 lesions, indicating that 55 persons had more than one type of lesion. Forty two percent of the males and 5% of the females smoked and there was a significant relationship between smoking and the presence of white lesions. Two hundred and sixty one lesions were denture-induced. The prevalence of tongue lesions, such as fissuring, mucosal atrophy and sublingual varices, indicated that they were clinical manifestations of age. Three percent of the sample had root remains in the mouth and 2% had less common oral lesions in the form of benign growths.

#### 1.3. Natural teeth

Thirteen males and 44 females (total 57) still had natural teeth. Only one person could be considered completely dentate and had 28 teeth in

his mouth. Of the remaining, 11 could function properly without the provision of a prosthesis, 25 had partial dentures and 20 needed partial dentures although some of them were considered better served with a complete dentectomy. There were a total of 738 natural teeth standing of which 173 were decayed and 120 had been restored. Most of the cases needed some form of periodontal treatment. Indications were that the socio-economic factor played a role in the retention of natural teeth. The lower economic group might have favoured having natural teeth replaced by dentures.

1.4. The edentulous group

Eighty six (87%) of the males and 367 (89%) of the females were edentulous. Eleven (12%) of the males and 10 (3%) of the females, were functioning without dentures. It could be concluded that the men reconcile themselves more easily than women to living without dentures. It appears that the women who have denture problems would rather compromise by wearing upper dentures only. Twenty seven of the females and 5 of the males wore upper dentures only and there were no cases where only lower dentures were worn.



The average age of extractions for the males was 40,34 years and 38,85 for the females.

1.4.1. Evaluation of dentures

People have the ability to function with dentures that are considered clinically unsatisfactory. This statement was confirmed by the 254 persons who considered their dentures satisfactory whereas clinically only 110 cases were classified as such. In total only 199 cases were

dissatisfied with their dentures whereas clinically 343 needed attention. The figures for those who received their dentures after 65 years show a reverse trend with 71 being dissatisfied with their dentures while 40 were clinically unsatisfactory.

1.4.2. Denture age

The denture ages of 68 males and 343 females were used and the mean age was found to be 22,31 $\pm$ 13,68 and 21,83 $\pm$ 16,65 years respectively with a range varying from a few weeks to 60 years. It was clear that denture age as a variable factor is only valid when related to the state of the supporting tissues which may or may not be related to the age of the denture wearer.

1.4.3. Sleeping with dentures

Forty five percent of the sample retained their dentures in the mouth during the night and of this number 36% had denture stomatitis. Of the 55% who slept without their dentures only 13% had denture stomatitis.



1.4.4. Cleaning of dentures

The general impression was given that dentures are regularly cleaned either by the wearers, or if they are incapable of doing so, by one of the institution attendants. Only 5% of the dentures however were considered to be in a reasonably hygienic state.

2. Conclusions

2.1. The present situation

The average age at which natural teeth of subjects in this sample were

removed was approximately 40 years. The average age of dentures was approximately 22 years. Considering these figures the old person entering an old-age institution still wears his/her first set of dentures. At 40 years, a comparatively youthful stage in life, dentures were placed when oral tissues, muscles and neurological co-ordination could accommodate a prosthesis without difficulty. Years passed without any attention to ensure an acceptable relationship between oral tissues and dentures. The individual was not aware of a progressive deterioration of oral tissues which was in turn aggravated by the wearing of ill-fitting dentures. Awareness of problems with the dentures may unfortunately come at a critical stage of life when it is difficult to adjust to a change in the oral environment caused by replacement dentures. Treatment is sought which too often consists of providing new dentures. With the best intentions the dentist manufactures prostheses that are correct but unsatisfactory to the patient who claims that no problems were experienced with the first set of dentures; the difficulties experienced must be attributed to the lack of skill on the part of the operator. Depending on temperament the patient will probably fall into one of three categories:

(a) Acceptance of the inability to function with the new dentures and returning to the old ones or none at all.

(b) The dentist is blamed for the unfortunate situation and the problems are brought back to his doorstep day after day.

(c) With sufficient financial means available, the patient consults dentist after dentist hoping everytime that each new set of dentures will be the final and perfect one. These are the people

who can present bags-full of dentures without ever being satisfied.

Most of these problems could be prevented if the patient was aware of the degenerative processes of advancing age and their effect on denture wearing and that even the best appliances cannot be made comfortable.

2.2. Recommendations for the future

(a) Mobility and transport are among the major problems of the senescent population. Conveniently situated clinics and facilities in old age institutions, where they can be dentally educated and treated, are therefore essential for the aged.

(b) The arbitrary, often quoted life-span of a denture must be dispensed with because it is a totally unpredictable factor. With the resorption of the alveolar ridge the well-extended denture can be more traumatic to the border seal tissues than the denture with the under-extended periphery, unless it is regularly examined. If a routine of an annual examination can be established any development of an undesirable relationship between tissues and dentures will be timeously observed and the necessary modification to the dentures made.

(c) A lot of private as well as State funds are wasted on dentures that are not used. Rebasing or relining with self-cure acrylic resin or tissue conditioners can be an acceptable form of treatment for many senescent patients. Where dentures are unsuitable for these procedures modifications with eventual duplication of the modified dentures can be carried out. De novo dentures for the aged must be a last resort treatment and then only with the full understanding of the implications by the patient.

(d) Partially dentate patients must be retained in that state for as long as possible. If extractions are necessary they must be carried out in combination with a transitional partial denture.

(e) The edentulous patient who is able to reconcile himself to being dentureless and content to be that way is probably best left in that state. A functional dentition, natural or artificial is not essential for satisfactory nutrition.

(f) Specialisation is a well established trend today and as the dental treatment of the child is specialised, so the treatment of the aged should be specialised. Unfortunately this aspect of dental science has been largely neglected but the escalating numbers of the aged compel a more realistic approach to their needs and demands in the future.

REFERENCES

Adams, C.D. (1961) Gerodontologic aspects of diet and nutrition. Journal of Prosthetic Dentistry, 11, 130-135.

Anderson, J.H. & Storer, R. (1973) Immediate and replacement dentures, 2nd ed., Blackwell Scientific Publications. Oxford.

Baikie, M.W. (1975) The geriatric patient in prosthodontic practice. Journal of the Dental Association of South Africa, 30, 15-17.

Baikie, M.W. (1967) The influence of age and denture age on interalveolar distance on a group of edentulous Caucasoids and Negroids. Journal of the Dental Association of South Africa, 22, 370-396.

Basker, R.M. & Chamberlain, J.B. (1971) A method for duplicating dentures. British Dental Journal, 131, 549-550.

Bates, J.F. & Murphy, W.M. (1968) Survey of edentulous population. British Dental Journal, 124, 125-130.

Bates, J.F., Elwood, P.C. & Foster, W. (1971) Studies relating to mastication and nutrition in the elderly. Geront. Clin., 13, 227-234.

Berry, D.C. & Mahood, M. (1966) Oral stereognosis and oral ability in relation to prosthetic treatment. British Dental Journal, 120, 40-52

Bhaskar, S.N. (1968) Oral lesions in the aged population. A survey of 785 cases. Geriatrics, 23, 137-149.

Boitel, R.H. (1971) Problems of old age in dental prosthetics and restorative procedures. Journal of Prosthetic Dentistry, 26, 350-356.

Budtz-Jørgensen, E. & Bertram, U. (1970) Denture stomatitis. The etiology in relation to trauma and infection. Acta Odontologica Scandinavica, 28, 71-92.

Bulman, J.S., Slack, F.I. & Richards, N.P. (1968) A survey of dental health and attitudes towards dentistry in two communities. British Dental Journal, 124, 549-554.

Commission of inquiry into dental services and the training of non-white dentists (1967) Report, Chairman Van der S. de Villiers, J.F. Pretoria: The Government Printer.

Culver, P.A.J. & Watt, I. (1973) Denture movements and control. British Dental Journal, 135, 111-116.

Davidow, S. (1973) A survey of denture wearing patients. Journal of the Dental Association of South Africa, 28, 394-399.

De Van, M.M. cited by Sharry, J.J. Complete Denture Prosthodontics, 3rd ed., McGraw-Hill Book Company. New York.

Dreyer, W.P. (1978) The pattern of oral disease in the Cape Malay. Thesis presented for the degree of D.Ph.(Odont.) University of Stellenbosch.

Farman, A.G. (1976) Tongue-fissures. A classification and comparative prevalence study among 825 European Caucasian and 605 Xhosa Negro school children. Journal de Biology Buccale, 4, 349-364.

Farrell, J.H. (1956) The effect of mastication on digestion of food. British Dental Journal, 100, 149-156.

Fellman, S. (1976) Treatment of complete denture patients in a geriatric facility. Journal of Prosthetic Dentistry, 35, 512-525.

Fish, S.F. (1969) Adaptation and habituation to full dentures. British Dental Journal, 127, 19-26.

Fish, S.F. (1975) ---------- in a Good Old Age. British Dental Journal, 138, 473-379.

Franks, A.S.T. & Hedegard, B. (1973) Geriatric Dentistry, 1st ed., Blackwell Scientific Publications. Oxford.

Franks, A.S. & Winter, G.B. (1974) Management of the handicapped and chronic sick patient in the dental practice. British Dental Journal, 136, 145-150.

Garverick, C.M. & Ortman, L.F. (1977) The Geriatric Patient. Dental Clinics of North America, 21, 637-645.

Garrish, J.S., Yardley, A., Stafford, G.D. & Bates, J.F. (1972) A dental survey of people living in residential homes for elderly people in Cardiff. Dental Practitioner, 22, 433-435.

Glaser, C. (1966) cited by Fish, S.F. (1969) Adaptation and habituation to full dentures. British Dental Journal, 127, 19-26.

Gordon, D.F. (1970) Are new dentures necessary. Journal of Prosthetic Dentistry, 23, 512-516.

Hobdell, M.H., Sheihman, A. & Cowell, C.R. (1970) The prevalence of full and partial dentures in British population. British Dental Journal, 128, 437-442.

Hobson, W. & Roseman, C. (1953) A dental survey of a group of old people living at home. British Dental Journal, 94, 208-212.

Kleinman, H.Z. (1967) cited by Shafer, W.G., Hine, M.K., Levy, B.M. (1974) Oral Pathology, 3rd ed., W.B. Saunders Company. Philadelphia.

Kydd, W.L., Daly, C.H. & Nansen, D. (1974) Variation in the response to mechanical stress of human soft tissues as related to age. Journal of Prosthetic Dentistry, 32, 493-503.

Langer, A., Michman, J. & Librach, G. (1975) Tooth survival in a multicultural group of aged in Israel. Community Dentistry and Oral Epidemiology, 3(3), 93-99.

Langer, A., Micham, J. & Seifert, I. (1961) Factors influencing satisfaction with complete dentures in geriatric patients. Journal of Prosthetic Dentistry, 11, 1019-1031.

Levin, B. & Lauderson, H.M. (1976) A practical questionnaire for predicting denture success or failure. Journal of Prosthetic Dentistry, 35, 124-130.

Litvak, H., Silverman, S. & Garfinkel, L. (1970) Oral stereognosis in dentulous and edentulous subjects. Journal of Prosthetic Dentistry, 25, 139-151.

Manderson, R.D. & Ettinger, R.L. (1975) Dental status of institutionalised elderly population of Edinburgh. Community Dent. & Oral Epidemiology, 3, 100-107.

Martinello, B.P. Oral health assessment of residents at Chatham, Ontario home for the aged. Dental Journal of the Canadian Dental Association, 42, 405.

McKendrick, A.J.W. (1968) Denture stomatitis and angular cheilitis in patients receiving long term Tetracycline therapy. British Dental Journal, 124, 412-417.

Millin, S.G. (1951) The People of South Africa, 1st ed., Constable & Co., Ltd. London.

Nedelman, C.I. & Bernick, S. (1978) The significance of age changes in human alveolar mucosa and bone. Journal of Prosthetic Dentistry, 39, 495-501.

Nizel, A.E. (1976) Role of nutrition in the oral health of the aging patient. Dental Clinics of North America, 20, 569-584.

Palmer, J.D. (1977) Dental care for elderly patients. British Dental Journal, 143, 59-61.

Pickett, H.G., Appleby, R.G. & Osborne, M.O. (1972) Changes in the denture supporting tissues associated with the aging process. Journal of Prosthetic Dentistry, 27, 257-267.

Pistorius, R.H. (1978) Earth must feed 80-m more in 1978. The Cape Argus, Wednesday, May 10.

Republic of South Africa Department of Statistics. Population Census, 1970. Reports No. 02-05-05 & 02-06-01 Pretoria 1970.

Ritchie, G.M. & Fletcher, A.M. (1976) A modified complete denture for difficult old patients. Quintessenz, 27, 55-59.

Ritchie, G.M. (1972) A report of dental findings in a survey of geriatric patients. Journal of Dentistry, 1, 106-112.

Schabel, R. (1972) The psychology of aging. Journal of Prosthetic Dentistry, 27, 569-573.

Shafer, W., Hine, M.K. & Levy, B.M. (1974) Oral Pathology, 3rd ed., W.B. Saunders Co. Philadelphia.

Sharry, J. (1974) Complete Denture Prosthodontics, 3rd ed., McGraw-Hill Book Company. New York.

Sherman, E.D. (1970) Geriatrics an emerging challenge for the health professions. Journal of the Canadian Dental Association, 36, 60-71.

Silverman, S.I. (1961) cited by Vinton, P.W. (1964) The geriatric complete denture patient. The Dental Clinics of North America, 8, 759-772.

Storer, R. (1965) The effect of the climacteric and of aging on prosthetic diagnosis and treatment planning. British Dental Journal, 119, 349-361.

Tallgren, A. (1972) The continuing reduction of the residual alveolar ridges in complete denture wearers. A mixed-longitudinal study covering 25 years. Journal of Prosthetic Dentistry, 27, 120-131.

Van Wyk, C.W., Farman, A.G. & Staz, J. (1977) Tooth survival in institutionalised elderly Cape Coloureds from the Cape Peninsula of South Africa. Community Dentistry Oral Epidemiology, 5, 185-189.

Van Wyk, C.W., Farman, A.G. & Staz, J. (1977) Oral health status of institutionalised elderly Cape Coloureds from the Cape Peninsula of South Africa. Community Dentistry Oral Epidemiology, 5, 179-184.

Van Reenen, J.F. & Wingrin, D.B. (1963) The influence of age and denture age on the lower facial height in a group of edentulous males and females. Journal of the Dental Association of South Africa, 18, 545-549.

Vinton, P.W. (1964) The geriatric complete denture patient. The Dental Clinics of North America, 8, 759-772.

Watt, D.M. & MacGregor, A.R. (1976) Designing Complete Dentures, 1st ed., W.B. Saunders Company. Philadelphia.

Winkler, S. (1977) The geriatric complete denture patient. The Dental Clinics of North America, 21, 403-425.

Witkop, C.J. & Borros, L. (1963) cited by Farman, A.G. (1976) Tongue-fissures. A classification and comparative prevalence study among 825 European Caucasian and 605 Xhosa Negro school children. Journal de Biology Buccale, 4, 349-364.