

**ORAL HEALTH PROBLEMS
OF
ELDERLY WOMEN IN AUSTRALIA
AN HOLISTIC APPROACH**

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SUMMARY

This thesis aims to explore the existing problems relating to oral health care facilities for elderly women in Australia, and some possible ways of solving those problems. While doing so, it also looks at the demography of the aged in Australia. *It explores people's attitudes towards the aged, (especially those responsible for caring for them), aged people's own attitudes towards oral health, how these attitudes are formed early in life, and reinforced throughout life by various media, and how these attitudes can and do impinge on the quality of care provided.* The writer has placed special emphasis on why it is very important to have an holistic approach when attempting to solve the oral health problems of elderly women. The necessary changes required in oral health health education with regard to providing care for elderly women are also discussed.

The writer draws conclusions by tying in the facts which have been presented in the review sections of the thesis. Among the many factors, the most important ones are:

- ☉ The aged population is increasing in number.
- ☉ Today's elderly live longer, are healthier and more mobile, and are economically better off.
- ☉ Elderly people are keeping their natural teeth longer. Edentulousness is no longer a norm for the elderly population, especially in an industrialised country like Australia. Natural teeth for life is becoming a social norm now.
- ☉ There is an ever increasing demand for both simple and complex dental treatment amongst the elderly population.
- ☉ Today's oral health health care workers are not ready to meet the needs of the ever increasing elderly population.
- ☉ Changes are needed in dental manpower planning, dental education curriculums, and most of all, in the approach towards solving the oral health problems of the elderly population of Australia.

- ☉ The institutionalised aged only represent 5% of the total elderly population. Government policy is to keep them in the community as long as possible with the help of domiciliary services.
- ☉ Different age cohorts have different expectations. These are influenced by their life experiences and their relation to historical time, and their cultural background.
- ☉ This thesis does not focus solely on dentistry. It notes the liaison that the dental profession requires with sociologists, psychologists, nurses, voluntary care personnel, administrators, demographers, statisticians, doctors involved in extended care, policy planners, nursing home supervisors and the aged themselves. From this diversity of individuals, the writer has become aware not only of oral health problems, but a real social issue which should concern all of the profession.
- ☉ From the research project conducted, the writer comes to the conclusion that dentists in NSW do not take an holistic approach while dealing with the elderly patients
- ☉ And finally the writer explains why it is very important to have an holistic approach while attempting to solve the oral health problems of elderly women. Without such an approach the solution to oral health problems stays incomplete.

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1 INTRODUCTION

The elderly could be defined as that cohort of persons who are 65 years of age or older. However, utilisation of only a chronological criterion for the categorisation of these individuals is inappropriate because there is great variation in physical, medical and mental conditions among elderly persons. Therefore, a geriatric dental patient can be defined as a physically or mentally compromised older adult, who may or may not be over 65 years old. Two further groups can be identified within the geriatric population: those frail persons who, although at risk, can still live in the community if provided with adequate support services; and the functionally dependent persons who have lost support systems and as a result have been institutionalised or are housebound.

While solving a patient's problem or while dealing with a patient the writer considers that two different types of attitudes can be taken or adopted by the dentist.

1 **Problem Solving Strategies:** In this type of approach the dentist's only view is the patient's oral health problem. Dental pathology is the dentist's only concern. The only goal of the dentist is to solve the patient's dental problem or to correct the dental pathology

2 **An Holistic Approach:** In this type of approach while dealing with the patient the dentist has to have a holistic view of health care.

- The whole person is treated through an integrated approach
- Each individual is treated as unique, representing a complete interaction of body, mind and spirit.
- The patient and dental practitioner share responsibility for the healing and preventive process.
- This approach involves creation of a lifestyle conducive to health maintenance and personal fulfilment and goes beyond the limited scope of pathology correction.
- In this approach the practitioner must come to know each patient as a human being.
- In this type of approach the dentist has to look beyond the patient's mouth or denture.

The dentist has to realise that what this individual reflects today is a build up of all of his past experience. If today's problem is to be solved completely the dentist will have to bring all this into consideration.

The writer considers the holistic approach of dental care is superior to the problem solving approach. The latter gives a temporary and partial solution to the problem while the holistic approach gives a long lasting, complete and more satisfying solution.

- In this thesis a number of questions have been posed as the writer intends to find out whether the dental health professionals take a holistic approach while dealing with the elderly patients with dental problems.
- A literature review needs to be carried out to look into the common oral health problems of the elderly women and to point out how important it is to have an holistic approach to solve these problems satisfactorily.
- The demographic profile of the ever increasing elderly population, especially of elderly women in Australia, needs to be confirmed.
- A review of the literature needs to be done to confirm the fact that the elderly do indeed have problems that are wide in scope.
- It is also of utmost importance to find out whether the dentists who are dealing with these elderly patients do, or do not, take a wider approach towards solving the oral health problems of these elderly patients.
- This thesis needs to look into the attitudes of the oral health professionals and the society towards the elderly, and also the attitudes of the elderly themselves towards their own oral health.

While discussing the current dental services and dental workforce available to provide dental services to the elderly population in Australia, many questions can be asked:

- *Do the dental workforce today have enough knowledge or educational background to deal with the elderly patients satisfactorily?*
- *Are the dental services today well equipped to meet the ever increasing needs of the elderly population?*

The principal goals of this thesis are:

- to find out whether there is a need for the dentists in Australia to take an holistic approach while dealing with their elderly women patients;
- to discuss why it is very important for the dentist to take this holistic approach; and
- to determine whether, in fact, the dentists do appear to take an holistic approach while dealing with their elderly patients.

Questions which may be asked in relation to the holistic approach:

- a. Do the dental health workers today have enough knowledge or educational background in dealing with elderly?
- b. Do health workers and care takers have negative attitudes towards the elderly, and is this negative attitude a build up from the social bias against old age, and hence the elderly?
- c. Do the elderly themselves have negative attitudes or lack of interest towards their own oral health? Do most of the elderly believe that bad oral health, or oral health problems are a consequence of old age?
- d. Does society itself have negativity towards the elderly?

One can also ask if changes are necessary and important in the following areas?

- a. The approach of the oral health workers while dealing with a problem of their elderly patients.
- b. Bringing in changes in current dental health services so that they are well equipped, more accessible and tailor made to meet the ever increasing needs of the elderly.
- c. The dentistry curriculum, so that health workers have adequate knowledge to give satisfactory solutions to oral health problems of the elderly.
- d. Steps being taken to bring in changes in the attitudes of the health professionals, care takers and the society itself towards the elderly.
- e. The emphasis given towards changing the attitudes of the elderly themselves towards oral health.

2 THE AGEING POPULATION

2.1 DEMOGRAPHIC PROFILE

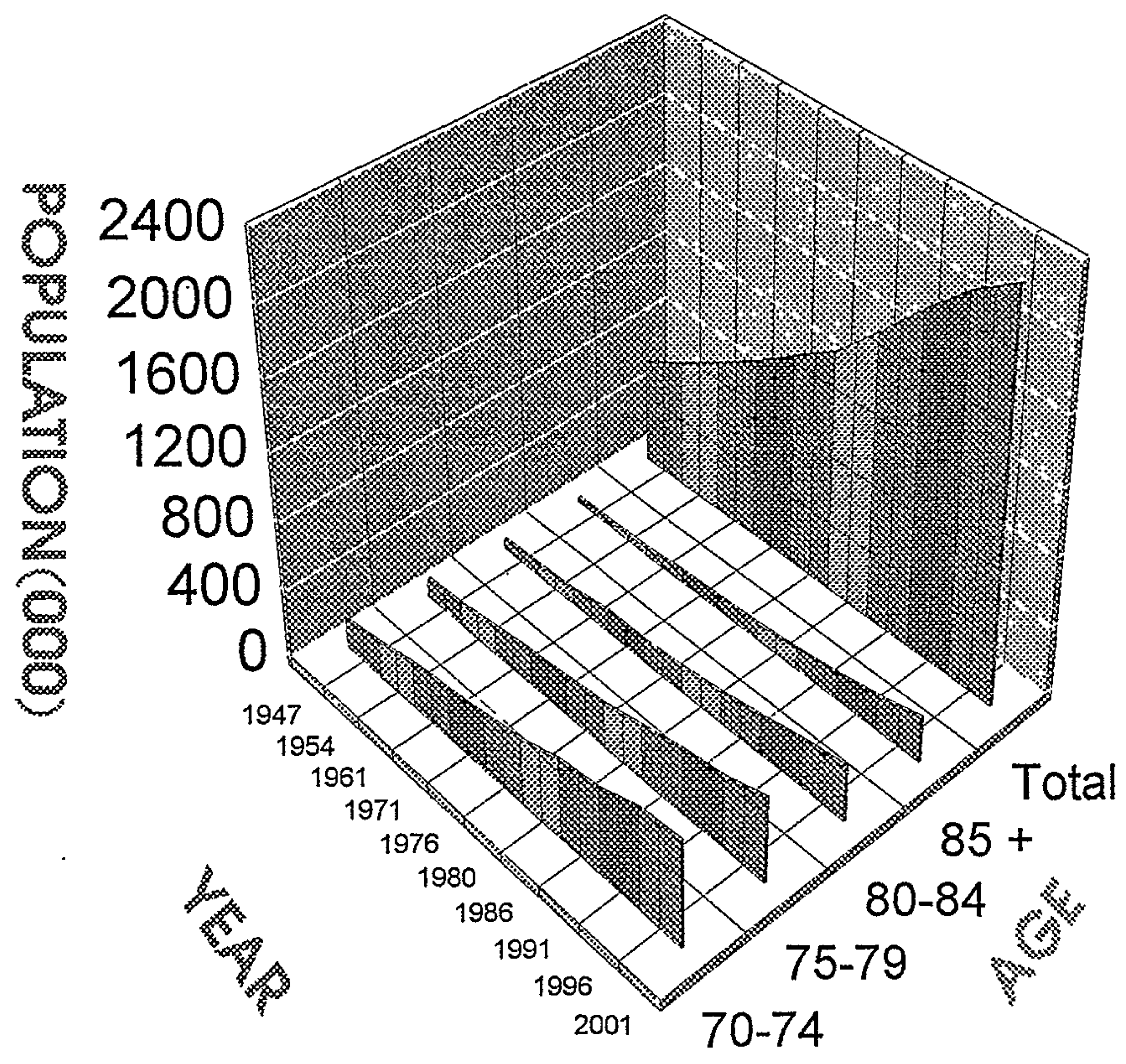
One of the most important social phenomena of the twentieth century is the rapid increase in the proportion of the population which is aged. Demographic studies have shown that the number of elderly people in the world has increased greatly during the last 30 years, and is predicted to continue increasing. According to the United Nations, in the year 1950 it was estimated that there were approximately 200 million persons aged 60 and over throughout the world. By 1975 this number had risen to 350 million. The UN's projection for the year 2000 suggested that this number will increase to 590 million, while by the year 2025 it will rise to over 1100 million. (Howe 1982)

In Australia the aged population had more than doubled from 604,900 in 1947 to the estimated 1,401,500 in June 1980. The Australian Bureau of Statistics (1984) indicated that by the year 2001, *the aged population could number 2,338,800*. (Table 1, Figure 1) The age structure of the population 65 years and over is also changing. In 1947, the average age of the elderly population was 71 years. In 1980, this had increased to 72 years. It is estimated that by the year 2001, the median age could be as high as 74 years. As it can be seen, the aged population is itself growing older. In 1947, persons aged 75 and over accounted for less than 1/3 of all elderly people. In 1980, 35.5% of the elderly population were 75 years and over. It is estimated that by the year 2001, the proportion could grow to nearly 46%. As in other parts of the world, women outnumber men in the aged population of Australia. Although Australia is a relatively 'new' country compared with Britain and the United States, the trend towards ageing in the population is similar. (Hugo & Wood 1984) This is partially accounted for by the number of younger migrants in the post war years who survived to become members of the aged population of Australia. Australian Bureau of Statistics figures indicate that the proportion of the population aged 65 and over comprises about 10% of the total population. Currently Australia's population aged 65 years or more is growing at a rate of 2.5% per annum, nearly twice as fast as the population as a whole (Hugo & Wood 1984). This 'ageing' of Australia's population in the 1980's was forecast by the demographers writing a decade previously, but the population projections significantly underestimated the rate of growth of the aged population.

Table 1 Aged persons in Australia by age and sex: Actual and projected (000)
Source: Australian Bureau of Statistics 1984

AGE GROUP (YEARS)						
	65-69	70-74	75-79	80-84	85 And over	Total
MALE						
1947	115.5	76.2	50.5	26	11.6	279.8
1954	143.1	95	55.1	28	14.1	335.3
1961	149.1	116.9	69.2	33.1	15.8	384.1
1971	161.4	127.3	77.8	44.4	21.5	432.4
1976	215.3	147.9	87.7	43.6	23.9	518.4
1980	240.7	169.1	101.7	49.8	27	588.3
1986	263.2	202.7	128.4	67	34.4	695.7
1991	311.5	221.3	152.2	83.7	46.3	815
Projected						
1996	325.8	265	170.2	102.3	62.4	925.7
2001	312.6	280.7	207.5	118.1	82.4	1001.3
FEMALES						
1947	125.8	89.7	60.6	32.4	16.6	325.1
1954	160.2	115.4	72.7	40.5	21.9	410.7
1961	184.7	148	95.7	52.6	29	510
1971	209.3	170.8	128	79.1	47	634.2
1976	245.1	188	139.4	88.3	56.9	717.7
1980	280.2	213.7	152.2	100.4	66.7	813.2
1986	301.8	261.6	189.7	119.8	88.1	961
1991	345.5	279.1	225.8	146.9	109.3	1106.6
Projected						
1996	353.3	324.1	243.9	177.9	141.3	1240.5
2001	313	330.8	285.7	196	181.8	1307.3
PERSONS						
1947	241.3	166	111	58.4	28.2	604.9
1954	303.3	210.4	127.8	68.4	36	745.9
1961	333.8	265	164.9	85.7	44.8	894.2
1971	356.4	297.6	205.8	123.5	68.5	1051.8
1976	460.4	336	227.1	131.9	80.8	1236.2
1980	520.9	382.8	253.9	150.2	93.6	1401.4
1986	565	464.3	318.1	186.8	122.5	1656.7
1991	660	500.5	378	230.6	156.1	1925.2
Projected						
1996	679.1	589.1	414.1	280.2	203.3	2165.8
2001	655.7	611.6	493.2	314	264.3	2338.8

Figure 1 Increasing trend in the aged population in Australia
Source: Australian Bureau of Statistics 1984



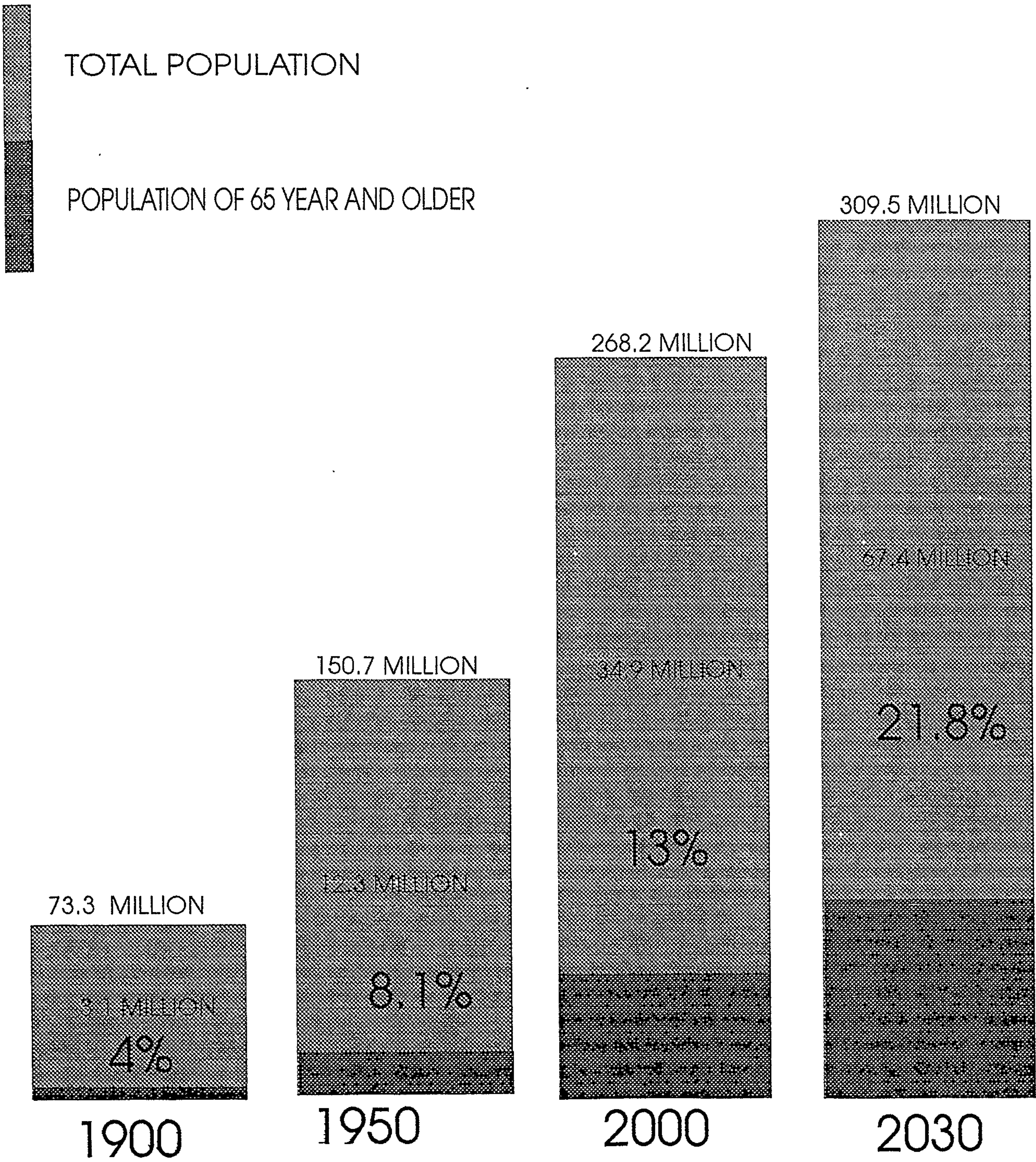
In 1980, the total number of elderly people in the world numbered 375 million, and 35 million or 9% were above the age of 80 years (Hugo & Wood 1984). The number of elderly people in the world has increased quite substantially during the last 30 years-the increase is 75%. The growth has been especially strong among those aged 80 years and above, whose number increased from 15 to 35 million. (Hugo & Wood 1984) This increase in number has been strong in both the industrialised and less developed countries. The **Commission of Oral Health, Research and Epidemiology** of the FDI (1993) noted that while only 1/4 of the world's population lives in the industrialised regions, the elderly population aged over 60 years in these regions constitutes 45% of the total numbers of the elderly worldwide.

The sex distribution of this population is an important consideration. More boys than girls are born, but from middle age onwards, women outnumber men. Today, females constitute more than 60% of the elderly population in industrialised countries, and nearly 70% of these are above the age of 80 years (US Census Bureau 1990). Improved social conditions, advances in modern medical science in the control of infectious and fatal diseases, and more positive medical care account for the current increase in the numbers of the aged or elderly worldwide in both the developed and developing countries. Figure 2 clearly shows the large increase expected by 2030 in those over 65 years in the USA (US Census Bureau 1990).

Future Demographic Trends

The United Nations predictions for the world population until 2025 are based on a set of assumptions concerning fertility and mortality (Howe 1982). Since the beginning of the eighties, the level of fertility has decreased in the industrialised countries. The future trend of fertility in the less developed countries will be determined by their economic and social development and resources allocated to population control. This is predicted to have the effect of a slight rise in population followed by stabilisation of the population. Overall, the fertility rate in the world will be lowered. Due to the low level of fertility, the population of the industrialised countries will only grow by 12% compared with 47% in the less developed countries. In the year 2000, 600 million people in the world will be above 60 years of age, and nearly 60 million above the age of 80 years (Howe 1982). As a stronger growth is anticipated for the very old, the average age among the elderly population will increase. This development suggests a dramatic change in the future age structure of the world's population. Due to the low and declining level of fertility, the ageing of the population will continue in all regions of the world (Howe 1982).

Figure 2 Growth of the population 65 and older in the USA, 1900-2030
Source: U.S. Census Bureau 1990



2.2 SOME PROBLEMS ASSOCIATED WITH AGE

Authors who have presented summaries of problems associated with age include Bates et al 1984; Besdiné 1988; Mitchell & Mitchell 1992; and Widdop 1991. With the ageing of the population in Australia and the increase in the age of the elderly, there is a definite increasing need for oral health services to be provided. Whilst much of the treatment of this group may not be different from that of younger adults, there is change in the dental tissues which affects the mental and physical well being of the elderly. Illness is common in the elderly population and is usually a combination of senescence and the disease process. Senile dementia and psychiatric disorders which introduce obsession-compulsion neuroses can make it difficult to deliver and receive dental treatment. Most elderly patients are on some form of drug therapy and these produce side effects such as reduction in salivary flow or excess production of saliva. Some of the medical conditions present in the elderly can compromise oral health care.

The elderly are certainly a special group who require experienced management which may be in short supply and there are many other barriers which can hinder the elderly from obtaining oral health care. Among these barriers finance is a large one; existing public programs have limited coverage of approximately 20% of eligible health card holders who face unsatisfactory waiting periods for basic dental care and a lack of access of timely preventive and restorative dental treatment (NHMRC 1994). This has resulted in unnecessary loss of teeth. Many of the elderly have mobility problems and need the aid of walkers, walking sticks, and even wheelchairs. A large proportion of the elderly stay in their own homes and travelling to obtain routine oral health care is very troublesome for them. Those who need a special form of transport to obtain oral health care have the problem of arranging for this. It is obvious that a knowledge of the structural and functional changes of the dental tissues that take place with the increase in age, is a prerequisite for understanding the need and type of dental care required by the elderly.

Ageing is a natural process associated with a gradual decline in the efficiency and functional capacities of most organs of the body. Individuals differ widely in their response to ageing, thus a person's chronological age is not an accurate indication of a person's physiological status. The pattern of age changes differs markedly among different organ systems, but is generally due to the progressive loss of functioning cells in specific organs or to a breakdown in integrative and control mechanisms. Genetic factors usually determine maximum life span in any species, but environmental factors [eg. stress] influence the actual life span attained.

2.3 MAJOR HEALTH CHANGES

In general, in elderly people there is reduced microcirculation, reduced cellular reproduction, reduced tissue repair, reduced metabolic rate and increased fibrosis. Degeneration of elastic and nervous tissue results in reduced function of most body systems. Many of the conditions common in those aged over 65 years have been listed on Table 2 (American Association for Retired Persons 1988) and multiple disease processes or conditions in the elderly (Besdine 1988) are listed on Table 3.

It would appear that major health problems associated with age can be summarised as follows:

Systemic Immune System

A reduction in cell-mediated response and a reduction in the number of circulating lymphocytes leads to an increase incidence of autoimmune disease as well as there being a reduction in the older patient's defence against infection. Also an increase in neoplasia is seen. Steroid treatment for autoimmune disease may complicate dental treatment.

Nervous System

Ageing involves both a physiological decline in function, and dysfunction associated with age-related disease eg. strokes, parkinsonism, trigeminal neuralgia.

Cardiovascular System

Hypertension and ischaemic heart disease worsen with age. Anaemia is more common in the elderly. In general, the greatest problems arise when a GA is required.

Pulmonary System

Lung capacity reduces with age and chronic obstructive airway disease increases in prevalence.

Endocrine System

Diabetes is more common in the elderly. Muscles reduce in bulk, have slower contractions and less precision of control occurs.

Nutrition

Poverty, impaired mobility, reduced taste acuity and reduced masticatory function can result in nutritional deficiencies in the elderly. These can manifest as changes in the oral mucosa.

Table 2

Per cent of middle aged adults and seniors with common chronic conditions
Source: American Association of Retired Persons 1988

CHRONIC CONDITIONS	AGES 45-64	AGES 65+
Arthritis	25%	53%
Hypertension	24%	42%
Hearing loss	14%	40%
Heart conditions	12%	34%
Visual impairment	6%	23%
Diabetes	6%	8%

Table 3

Multiple disease processes or conditions in the elderly
Source: Besdine 1988

- | |
|-----------------------------|
| 1. Congestive heart failure |
| 2. Depression |
| 3. Dementia |
| 4. Chronic renal failure |
| 5. Angina pectoris |
| 6. Osteoarthritis |
| 7. Osteoporosis |
| 8. Gait disorders |
| 9. Urinary incontinence |
| 10. Vascular insufficiency |
| 11. Constipation |
| 12. Diabetes |
| 13. Sensory deficits |
| 14. Sleep disturbance |
| 15. Adverse drug reactions |
| 16. Anemia |

2.4 MAJOR ORAL HEALTH CHANGES

There are a number of excellent references in the literature that deal with the major oral health changes that occur with aging. References that have been used as background reading for the summary of major oral health changes in this section have been Bates et al 1984; Besdine 1988; Besdine 1990; Lamey & Lewis 1991; Mitchell & Mitchell 1992; and Widdop 1991.

- In ageing, the teeth, when present, are usually worn down by use (*'wear and tear'*). Attrition and abrasion account for most of the loss of tooth substance, although it is influenced by other factors. These variables are factors like the type of diet, habits such as bruxism, the hardness of teeth (heredity) and the number and position of the remaining teeth.
- Tooth wear is especially prevalent when partial tooth loss has occurred.
- Tooth wear can be considered an age-related natural phenomenon. As it results in a more favourable crown root ratio, it can even be considered protective.
- In general, teeth become more brittle with increase in age and also darker in colour. Enamel becomes less permeable with age.
- Older teeth appear more brittle, but there is no significant difference between the elastic modulus of dentine in old or young teeth. The rate of secondary dentine formation reduces with age, but still continues. Occlusion of the dentine tubules with calcified material spreads crownwards with age. The dentine becomes sclerotic, and the enamel becomes brittle and stained.
- Loss of water content in the enamel accounts for the brittleness and absorption of potent staining agents such as tobacco, tea and spices, which accounts for the colour changes.
- More secondary dentine and cementum is laid down, and in many cases the pulp becomes occluded and the teeth may turn non vital.
- Pulpal changes including sclerosis and reduced repair capacity also occur.
- Dental pulp has increased fibrosis, and reduced vascularity mean that the defensive capacity of the pulp reduces with age. Pulp capping is less likely to succeed in aged people.
- A decrease in the thickness of the oral epithelium, mucosa and sub-mucosa is seen.
- Taste bud function is reduced.

Dental Caries Problem

- Root caries can occur following exposure of root surfaces by gingival recession, in association with changes in diet, reduced self-care and salivary flow.

Periodontal Problems Include

- Increased fibrosis, reduced cellularity, reduced vascularity and reduced cell turn-over are found with increased age.
- Reduced manual dexterity makes oral hygiene procedures difficult.
- The periodontal membrane may react to the ageing process in two different ways. If oral hygiene is poor, periodontal disease ensues, resulting in mobility or extensive exposure of root surfaces due to recession and bone resorption. At the other end of the spectrum, the narrowing of the periodontal membrane space and cementum deposition can result in firm attachment of the teeth.

Mucosal Diseases More Common With Increasing Age

- Oral cancer.
- Lichen planus.
- Herpes Zoster is more common with increased age due to a diminution of T-cell function. Neuralgia occurs more frequently after an attack in the elderly.
- Benign mucous membrane pemphigoid.
- Pemphigus
- Candida is seen more frequently due to an increased proportion of denture wearers in the older age-groups and immune deficiencies.

Prosthetic Problems Include

- Reduced adaptive capacity.
- Age changes in the denture-bearing areas include bone resorption, mucosal atrophy, increased incidence of ulcer and candida, infection.

3 HEALTH AND ORAL HEALTH PROBLEMS OF ELDERLY WOMEN

Common health problems with oral health implications that are reported in the literature are discussed in this chapter along with their aetiology, symptoms and treatment. Summaries of drug induced conditions (Table 4 - Swapp 1990), the proportion of persons with prescribed medicines (Table 5 - National Centre for Health Services Research 1982), and the types of medications commonly prescribed for seniors (Table 6 Swapp 1990) are presented.

3.1 BURNING MOUTH SYNDROME

Patients with Burning Mouth Syndrome often report attendance at a number of different practitioners and specialist clinics for treatment of their symptoms, usually with little success. Increasing awareness of the multifactorial aetiology of this common condition and adoption of the multidisciplinary approach outlined here, should lead to successful treatment of the majority of patients. The principal references used in this section are Lamey & Lewis (1991) and Mitchell & Mitchell (1992).

The term '*Burning Mouth Syndrome*' (BMS) is now in widespread use, although in the past, terms such as '*glossopyrosis*', glossodynia, stomatopyrosis, stomatodynia and '*oral dysaesthesia*' have been used to describe patients complaining of an intra-oral burning sensation. Postal surveys have suggested that as many as 14% of post-menopausal women reply positively when asked if they have oral symptoms of burning (Lamey & Lewis 1991 p11). However, this figure should be viewed with caution, since patients were not examined and therefore other causes of a burning sensation in the mouth such as erosive lichen planus or geographic tongue may have been present, rather than BMS.

Lamey & Lewis (1991) note that the *signs and symptoms of BMS* are easily described, since the oral mucosa is entirely normal. Indeed, it is not unusual for patients to report that they have been to several doctors or dentists, all of whom have examined the patient's mouth and pronounced it apparently healthy. This in turn may lead the patient to suspect that their complaint is either imaginary or has a psychiatric basis. Interestingly, it is extremely unusual

to find a patient suffering from BMS who has ever heard of anyone else with the condition (a factor which heightens cancer-phobia and anxiety). BMS affects women much more frequently than men, with a ratio of about 7:1. The mean age of patients is around 60 years and the condition has never been reported in children. (Lamey & Lewis 1991)

The *site of burning* is variable, but most often affects the tongue, followed by the palate/upper alveolus, lips and the lower denture-bearing area. More than one site is affected and there is nearly always a bilateral involvement. The distribution of symptomatic areas can give a clue to possible aetiological factors, for example the involvement of the tip and lateral margin of the tongue suggest a tongue thrusting habit, while the symptoms from the dorsum of the tongue suggest tongue posturing, perhaps to hold a non-retentive denture in position.. Xerostomia (dry mouth) which is very common in elderly patients could be a very important cause of BMS. (Lamey & Lewis 1991)

The nature of the *symptoms of BMS* tends to fall into three broad *categories called Type 1, Type 2 and Type 3*. (Lamey & Lewis 1991)

- In *Type 1 BMS*, the patient suffers no symptoms on waking, but the burning begins and increases in severity as the day goes on.
- In *Type 2 BMS*, the burning is present on waking and throughout the day. In both Type 1 and Type 2, symptoms are unremitting and present every day. in contrast to with Type 3.
- In *Type 3 BMS* they have symptom free days and also complain of involvement at unusual sites, such as the floor of the mouth or the throat.

Aetiological factors known to be involved in BMS include Vitamin B-complex deficiencies, haematological disorders, undiagnosed diabetes, xerostomia, parafunctional habits (such as clenching or tongue thrusting), cancer-phobia, anxiety, depression and the climacteric. In a minority of patients, the presence of allergy to materials or foodstuffs may be contributory.

The *multifactorial aetiology of BMS* lends itself to a *team approach* to care. (Lamey & Lewis 1991)

Therefore, there are advantages to holding clinics restricted to patients with BMS and staffed by a team of clinicians, including an oral physician, a prosthodontist, a psychiatrist, a clinical psychologist, a dermatologist, and a hypnotherapist. Access to laboratory facilities to process blood samples (full blood count, vitamin B1, B2, B6 and B12, corrected whole blood folate, ferritin, and venous plasma glucose) and microbiological tests (oral rinse and swabs) is invaluable.

Although BMS can occur either in dentate or edentulous patients, it is not unusual for patients with a denture to report that the onset of burning coincided with provision of new prostheses. In such circumstances, patients are often convinced that they are allergic to the denture material. However, in practice, allergy to acrylic is rarely proven and it is much more likely that involvement of the dentures is due to lack of free way space, restricted tongue space or inadequate base extension, with resultant overloading of the denture bearing tissues. The replacement of faulty dentures alone will help about 25% of patients suffering from BMS. (Lamey & Lewis 1991) Other factors such as haematological deficiency, candidal infection or a degree of xerostomia, which compromise the mucosa, are often also contributory. These problems must also be eliminated, or the condition will persist despite the provision of adequately designed dentures.

Lamey & Lewis (1991) suggest that all patients who present with BMS should be asked to score three aspects on a scale of 0-10. The first question asked is '*How bad is the burning?*' The patient is told that a score of 0 would correspond to '*no burning*' and a score of 10 would indicate '*intolerable burning*'. Such rating is useful in assessing the success of subsequent treatment and is also helpful in terms of determining possible aetiological factors. If the patient has undergone the menopause and all other factors have been considered, the BMS score should be low (approximately 2), since a high score of 9 or 10 cannot be attributable to the climacteric alone. The second question asked concerns the presence of cancer-phobia. Patients are asked '*Do you think that the burning is due to cancer in your mouth?*' On this occasion, the patient is informed that they should consider a score of 0 to indicate '*no fear of cancer*', whereas a score of 10 equals '*overwhelming fear*'. Approximately 20% of BMS patients are cancer-phobic and all need reassurance (Lamey & Lewis 1991). The final question deals with home circumstances and 0 means '*things could not be worse*' concerning their family/friends/finance/housing situation, and 10 indicates that '*things could not be better*'.

The advantage of employing the home circumstances scale is that it overcomes the problem of the patient feeling that the dentist is prying. (Lamey & Lewis 1991) If a patient gives a score of say 6, then they can be asked a subsequent question: '*What would have to happen to make your score 10/10?*' This type of questioning greatly increases the likelihood of identifying causes of anxiety or depression, since it permits the patient to voice their own concerns in their own words.

Full psychiatric assessment has a place in the management of patients with BMS, but it is not practical for routine use in every patient. However, the general dental practitioner may use the *Hospital Anxiety and Depression* (HAD) scale (Lamey & Lewis 1991), which can be completed within a few minutes. This scale asks the patient to select one of four answers to 14 apparently innocuous questions. Summation of the scored answers gives a rating which indicates the likelihood of the presence of either anxiety or depression. A score below 8 for anxiety or depression indicate that it is unlikely to be present. A score between 8 to 10 is borderline and a score over 10 indicates likely presence. Use of the scale is also beneficial in patients recording abnormally low score, since suspicion may be aroused about the truthfulness of their responses. Examples of the use of the HAD scale are shown in Figure 3.

Management of patients with BMS is straightforward once known aetiological factors have been investigated. Experience has shown that in deficient patients, a course of vitamin B1 (300 mg once daily) and vitamin B6 (50 mg tid) for 4 weeks can improve symptoms in the majority of such patients. Subsequently, detection of haematological abnormalities such as iron, B12 or folic acid deficiency need appropriate further investigation and replacement therapy in conjunction with the patient's medical practitioner. (Lamey & Lewis 1991)

Similarly, patients found to have undiagnosed diabetes mellitus need referral for advice on adequate glycaemia control. It is important to realise that mucosa may appear clinically normal. An oral rinse technique is the preferred method for detection of candidal infection, since it permits quantification of the candidal load. If the oral rinse yields a significant growth, then antifungal therapy and advice on denture hygiene should be given.

Reduced salivary gland function can be qualified relatively easily in a hospital setting, although it is unlikely to be practical in general dental practice. Clinical studies (Lamey & Lewis 1991) have shown that two questions can be very helpful in determining the difference between the presence of dryness and/or burning. First, ask the patient '*does your mouth feel dry?*', and secondly, '*Are dryness and burning the same thing?*', If the answer to these questions is '*yes*', then the patient is also likely to report that a drink of water will relieve both dryness and the burning. A variety of saliva substitutes including *Saliva Ortana*, *Glandosane* and *Luborant* are available for patients with xerostomia and reduced salivary gland function.

Figure 3 Anxiety and depression as major causes of BMS
Source: Lamey & Lewis 1991

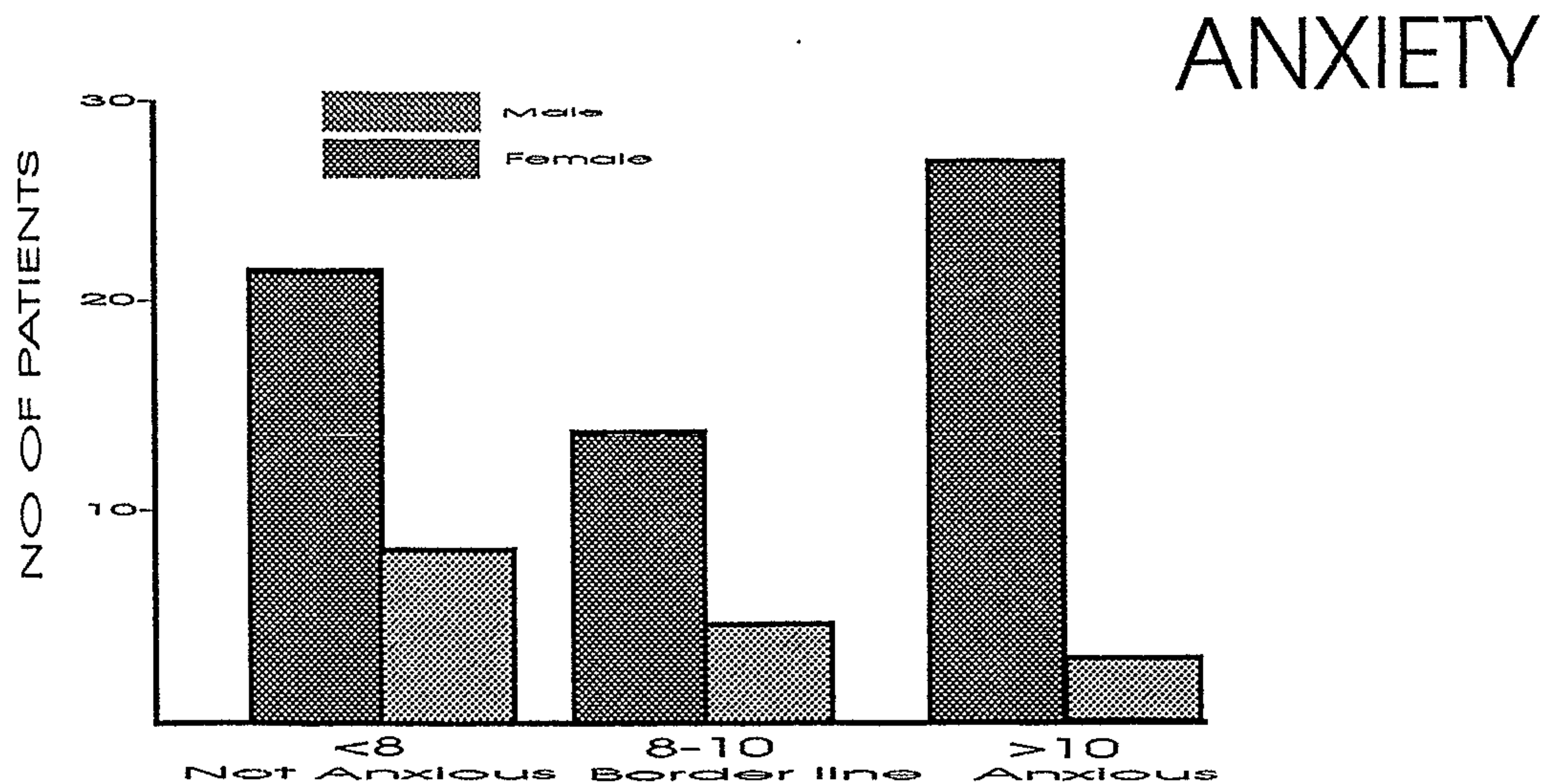


Figure showing anxiety scores by HAD scale in a group of 74 patients suffering from BMS

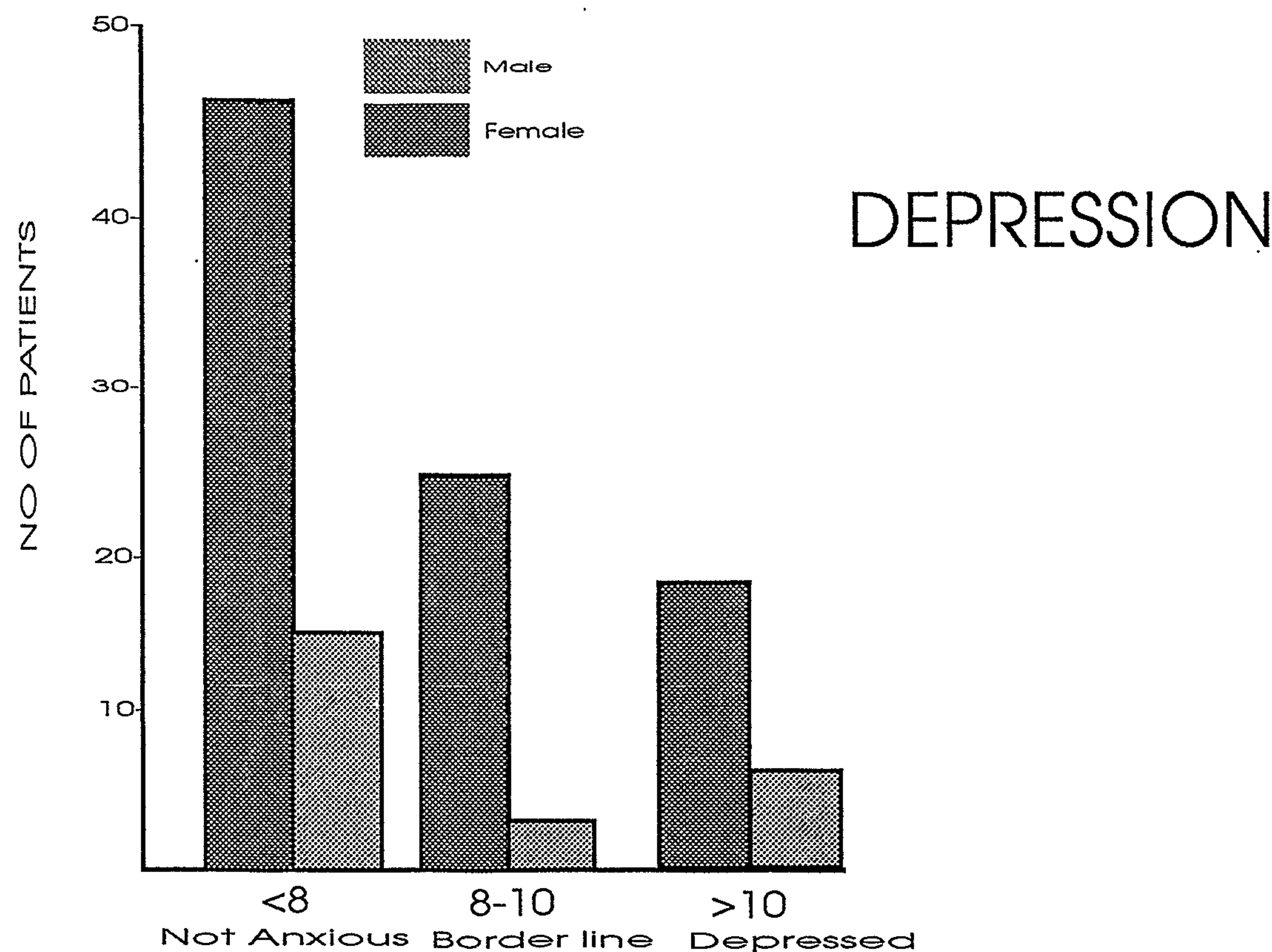


Figure showing Depression score recorded by HAD Scale in a group of 74 patients suffering from BMS

Parafunctional habits can be difficult to detect, since patients are often not aware of a tongue thrusting or clenching habit. However, examination of dentures, if worn, can provide a clue, as there may be evidence of abnormal occlusal wear. Approximately 20% of patients with BMS have a parafunctional habit, and it is in this respect that hypnotherapy or tricyclic antidepressant can be useful (Lamey & Lewis 1991 p12).

Patients suffering from *cancer-phobia* respond well to reassurance, and in some cases this may be sufficient treatment, provided that other factors involved in BMS have been eliminated. Anxiety is a more important psychological factor in BMS than depression. In these patients, drug therapy, in conjunction with a psychiatric opinion or consultation with the patient's general medical practitioner, can be very effective. *Dothiepin* which has both anxiolytic and antidepressant properties is the drug of choice.

The aetiological factors described above are applicable to all patients with BMS. Two additional factors, *food allergy and emotional instability*, appear to be particularly important in patients with Type 3 BMS. Suspected allergy to foodstuffs (usually flavourings, colourings or preservatives) or denture base materials should be investigated by a consultant dermatologist with a special interest in patch-testing. A clinical psychologist can be of great value in the management of patients who are suffering emotional instability.

The main reason for *unsuccessful treatment of BMS* appears to be failure to assess all aetiological factors. Adoption of the treatment approach described here in conjunction with the patient's medical practitioner and specialists should allow the dental practitioner to achieve a 70% cure rate (Lamey & Lewis 1991). Patients with *Type 2 BMS* would appear to be the most difficult group to treat. A possible explanation for this is that anxiety arising from internal conscious or unconscious threat is often a major component in these patients.

Failure of treatment in Type 3 BMS may occur if patients are unable to eliminate proven allergens from their environment. Generally, however, once a patient has been found to have an allergy to substances such as sorbic acid, propylene glycol, benzoic acid or cinnamon, they endeavour to avoid these allergens. Individuals found to have an allergy to acrylic dentures can benefit from replacement appliances made from either nylon or polycarbonate. Similarly, patients with allergy to chrome or nickel can be given dentures employing gold or nickel-free alloys. An emotionally unstable individual who develops *Type 3 BMS* is difficult to treat. As

with patients with Type 2 BMS, the anxiety component is usually related to conscious or unconscious threat and this often precedes episodes of burning. Lamey & Lewis (1991) give an example of this for one such patient, telephone calls from her daughter who lived overseas coincided with episodes of BMS, because the daughter had developed breast cancer and the mother was understandably anxious as to the outcome of treatment.

The dental practitioner, in liaison with medical colleagues, has much to offer patients who suffer BMS. It is important that the history is gained in an unhurried and sympathetic clinical environment, along with subsequent investigations. *With such an holistic approach, rather than pathology solving approach, it is possible to successfully treat the majority of patients with BMS, a condition which at first may seem a very difficult problem to manage.*

3.2 XEROSTOMIA

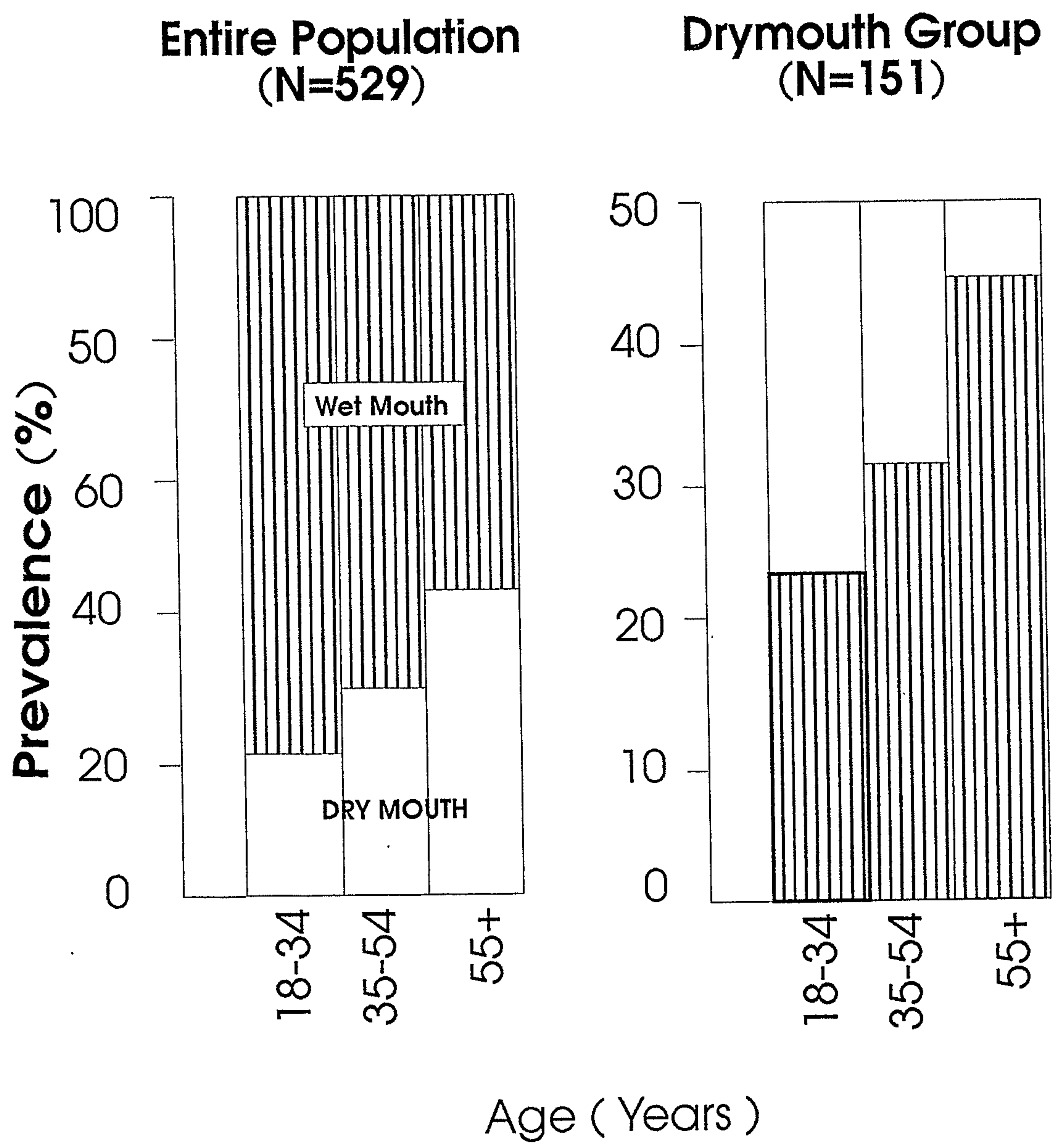
Xerostomia, the subjective feeling of oral dryness, is primarily caused by a marked decrease in the function of the salivary glands. Although not a disease, it may herald the onset, or signal the presence, of a number of serious systemic diseases and conditions. Among these are the *intake of xerogenic drugs, autoimmune diseases, and radiation to the head and neck*. Moreover, it may profoundly affect the soft and hard tissues of the mouth and interfere with alienation and speech. A **Study at State University of New York 1987** showed that the prevalence of dry mouth increases with age (**Figure 4**)

It has been reported that, when questioned, as many as 10% of *unselected patients will report that they suffer from a dry mouth*, although the majority of these individuals are likely to have normal salivary gland function (**Study at State University of New York 1987**). A true reduction in salivary function can be either due to primary gland disease, such as Sjogren's syndrome, or post operative radiation damage, or be a secondary phenomenon of anxiety, dehydration or drug therapy.

Patients who suffer from a prolonged reduction of saliva are likely to complain of difficulty in swallowing and talking, altered taste and, if worn, poor retention of their dentures. Reduced levels of saliva will also predispose to opportunistic oral infections, particularly candidiasis, and lead to an increase in periodontal disease and caries. Clinical examination of healthy patients should reveal saliva pooling in the floor of the mouth, whereas if xerostomia is present the amount of saliva is not only reduced but may also appear frothy. A useful test is to place a mirror against the buccal mucosa and this should lift off easily when saliva is present in normal amount. Degrees of stickiness during this manoeuvre is a useful indication of reduced saliva production.

Treatment of patients with xerostomia is based on achieving adequate levels of saliva in the mouth by the use of artificial saliva substitutes, such as *Saliva Orthana, Luborant and Glandosane*. (**Lamey & Lewis 1991**) In addition, intensive preventive measures should be instituted in dentate individuals along with prompt treatment of oral candidiasis or bacterial salivary gland infection. The design of any dentures should be optimised in edentulous individuals in order to minimise trauma of the atrophic oral mucosa. Xerostomia symptoms may receive little attention. Because the complaint may be considered trivial by both doctor and patient, its prevalence may be underestimated.

Figure 4 Relationship between prevalence of dry mouth and age
Source: Study at State University of New York 1987



3.3 AUTOIMMUNE DISEASES

References that have been used as background reading for the summary of autoimmune diseases in this section have been Bates et al 1984; Besdine 1988; Besdine 1990; Lamey & Lewis 1991; and Mitchell & Mitchell 1992.

Pemphigus

Pemphigus is an uncommon vesiculobullous disorder which occurs in four forms: *pemphigus vulgaris*, *pemphigus foliaceus*, *pemphigus vegetans* and *pemphigus erythematous*.

Pemphigus vulgaris is the most frequently encountered form of pemphigus and classically affects middle-aged or elderly women, although rare cases have been reported in childhood and adolescence. Oral lesions are most common in pemphigus vulgaris and often precede skin lesions. The clinical onset of pemphigus is insidious, developing over several weeks and, interestingly, approximately half of the cases first present with oral lesions. The features may be linked to non-specific mucosal erosions, although these are soon accompanied by cutaneous changes. Confirmation of the clinical diagnosis is based on histopathological examination, preferably accompanied by immunofluorescent investigations on frozen tissue.

Unfortunately, it is not possible to predict which individuals with pemphigus will develop extensive skin involvement, with associated risk of rapid alterations of protein and electrolyte balance. Therefore, whenever pemphigus is diagnosed, the patient requires immediate hospitalisation. In the past, pemphigus was fatal, but with the advent of potent systemic corticosteroid therapy, prognosis has been dramatically improved. Treatment is now based on the institution of high *prednisolon* to bring the disease under control. Once control is established, the patient can be maintained on a low steroid dose on a daily basis. Use of the immunomodulatory drug daily can be considered, since this has the advantage of allowing the steroid therapy to be further reduced. Indirect immunofluorescence is helpful in monitoring the effectiveness of treatment, since the serum titre of intra-epithelial IgG reflects the degree of disease activity.

Pemphigoid

As a generalisation, two forms of pemphigoid are recognised: *bullous pemphigoid* and *mucous membrane pemphigoid*. In bullous pemphigoid, cutaneous lesions dominate the clinical picture whilst in mucous membrane pemphigoid cutaneous lesions occur infrequently. *The oral*

features of mucous membrane pemphigoid are non-specific but often involve irregular areas of ulceration or desquamative gingivitis. Pemphigoid is commonest in females over 60 years of age. (Lamey & Lewis 1991) It presents as mucous membrane bullae which rupture and heal with scar formation. Conjunctiva may be affected and if scarring occurs, can lead to loss of vision, therefore it is important to regard oral signs as a warning to prevent ocular damage.

Histopathological examination of the mucosa of a patient with pemphigoid will reveal a subepithelial split and direct immunofluorescence will show deposition of IgG and complement in the basal region.

Treatment of pemphigoid is based on the use of topical steroid preparations, although systemic therapy may be required in severe cases. When there is extensive oral involvement *cyclophosphamide*, in conjunction with steroids, may be helpful. It is important that all patients who have been diagnosed as having mucous membrane pemphigoid receive a consultant ophthalmic opinion, since ocular lesions can accompany the disease. If genital lesions occur, then the patient should also be referred to the appropriate specialist.

Lupus Erythematosus

Lupus erythematosus occurs in two forms, either *systemic or discoid*. Systemic lupus erythematosus usually occurs in women under 30 years of age. Discoid lupus erythematosus is also more common in women than men, and tends to occur in the third or fourth decade.

Oral lesions consisting of white patches which resemble lichen planus both clinically and histologically may occur in either form of lupus erythematosus. Treatment of oral lesions is symptomatic and involves the use of topical steroid preparations.

Table 4 **Drug induced oral conditions in the elderly**
Source: Swapp 1990

CONDITION	DESCRIPTION	CLASS	GENERIC/BRAND NAMES
Xerostomia	dry, smooth, shiny oral mucosa	Diuretics Antihistamines Antidepressants Antihypertensives Antiarrhythmics AntiParkinson	Triamterene HCZ/Dyazide Diphenhydramine/Benadryl Imipramine/Tofranil Reserpine/Serpasil Atropine sulfate/Atropine Benztropine/Bensylate
Trigeminal neuralgia	sharp, stabbing pain, aching of teeth and of lower jaw	Beta blockers Tricyclic antidepressants Cardiac glycosides	Propranolol/Inderal Nortriptyline HCL/Aventyl Digoxin/Lanoxin
Glossitis, stomatitis	lesions on tongue, small multiple ulcers	Anticoagulants Salicylates Barbiturates	Warfarin/Coumadin Aspirin/Bayer Pentobarbitol/Nembutal
Erythema multiforme	vesicles or bullae, fever, impaired physical condition	Antituberculars Anticonvulsants Antibiotics Antianxiety Antibacterial	Rifampin/Rifadin Phenytoin/Dilantin Tetracycline/Vibramycin Meprobamate/Meditran Clindamycin/Cleocin
Lichenoid eruptions	white striations, erythematous patches, erosions, or ulcerations	CNS-drugs Diuretics Antiarrhythmics	Methyldopa/Aldomet Furosemide/Lasix Quinidine/Cin-Quin
Oral candidiasis	(thrush) multiple white patches	Antibiotics Corticosteroids Antifungal	Tetracycline/Vibramycin Prednisone/Orasone Griseofulvin/Fulvicin-U/F
Hairy tongue	elongation of filliform papillae	Corticosteroids Antibiotics Antifungal	Prednisone/Deltazone Tetracycline Griseofulvin/Fulvicin-U/F
Gingival hyperplasia	overgrowth of papilla and marginal gingiva	Anticonvulsant	Phenytoin/Dilantin

Table 5 **People with prescribed medicine**
Source: National Centre for Health Services Research 1982

AGE	PERCENT taking at least one prescription medicine	MEAN NUMBER of prescribed medicines per person taking at least one prescribed medicine
19-24	53%	5
25-54	59%	7
55-64	69%	12
65 and older	75%	14
Total (all ages)	58%	8

Table 6 **Medications commonly prescribed for seniors**
Source: Swapp 1990

CLASSIFICATION	GENERIC NAME	BRAND NAME	INDICATIONS	ADVERSE REACTIONS
Analgesics	Aspirin	Bayer Empirin	mild-moderate pain, fever, inflammation, arthritis, post- extraction pain, thromboses	G.I. upset, prolonged bleeding time, rash, tinnitus
	Ibuprofen	Advil Motrin		G.I. upset, prolonged bleeding time, drowsiness, blurred vision, tinnitus, rash, edema, alopecia
Sedatives				
Benzodiazepines	Diazepam Alprazolam Oxazepam	Valium Xanax Serax	anxiety, tension, muscle relaxant, antiemesis	drowsiness, dizziness, nausea, transient hypotension, abdominal discomfort, xerostomia, ataxia, confusion
Antidepressants				
Tricyclic antidepressants	Nortriptyline	Aventyl	depression	xerostomia, orthostatic hypotension, blurred vision, tachycardia, drowsiness, epinephrine potentiation
	Imipramine Amitriptyline	Tofranil Elavil		
Cardiovascular				
Glycosides	Digoxin	Lanoxin	congestive heart failure, arrhythmias	G.I. upset, trigeminal neuralgia, visual disturbances, arrhythmias, epinephrine potentiation
Antiarrhythmic	Quinidine	Cin-Quin Quinora	arrhythmias	G.I. upset, lightheadedness, pallor, fever, headache, vertigo, hypotension, rash, tinnitus, thrombocytopenia
Beta blocker	Propranolol	Inderal	hypertension, headaches, hyperthyroid, arrhythmias	bradycardia, bronchospasm, tension, xerostomia, fatigue, G.I. upset
Nitrates/nitrites	Nitroglycerin	Nitrostat	angina	fainting, hypotension, severe headaches
Diuretics	Triamterene Triamterene HCl	Dyrenium Dyazide	hypertension, edema	orthostatic hypotension, dizziness, xerostomia, electrolyte imbalance
Neuronal blockers	Reserpine	Serpasil	hypertension	stuffy nose, xerostomia, orthostatic hypotension, depression, hypotension, bradycardia, nervousness, drowsiness, weight gain, G.I. upset
CNS-acting drug	Methyldopa Clonidine	Aldomet Catapres	hypertension, edema	anemia, sedation, edema, weight gain, stuffy nose, orthostatic hypotension, xerostomia, lichenoid eruptions, bradycardia
Anticoagulants	Warfarin	Coumadin Panwarfin	pulmonary embolism, thrombophlebitis	hemorrhage, diarrhea, nausea, dermatitis, mouth ulcers, fever

Lichen planus

Lichen planus is a mucocutaneous disorder which affects the oral mucosa and/or skin. Oral Lichen planus is characterised by the presence of white patches which principally affect the buccal mucosa, lips, tongue and attached gingivae. Traditionally, lichen planus has been divided clinically into a number of subtypes, *including reticular, erosive, plaque-like and atrophic*. However, such clear deviation is often difficult clinically and the mucosa of an individual patient may show evidence of different subtypes at different sites at any one time. In addition, subdivision of oral lichen has little influence on clinical management.

Usually no aetiological factor is identifiable. A minority are due to drugs, graft-versus-host disease, liver disorders (possibly) and reaction to amalgam or gold (possibly). Lichen planus is *common, mainly in middle-aged or elderly females*. *Although lesions may be asymptomatic*. white striate lesions are common, erosions are less common. Lesions tend to be bilateral. Reticular lesions are most often found on buccal mucosa, sometimes on the tongue. Papular lesions affect similar sites. Plaque-like lesions usually affect posterior buccal mucosa. Red lesions of atrophic lichen planus may simulate erythroplasia. Lichen can also cause 'desquamative gingivitis'. Oral lesions are occasionally hyperpigmented. Rash: pruritic, polygonal, purplish papules occur predominantly on flexor surfaces of wrists, and shins, rarely on the face. Alopecia or nail deformities are seen occasionally. Erosions are irregular, persistent and painful, with yellowish slough, and are often associated with white lesions. They have small premalignant potential.

Investigations required include drug history, biopsy. *Diagnosis* needs to differentiate from other causes of white lesions and ulcers, especially discoid lupus erythematosus and keratoses.

If lesion is asymptomatic *no treatment is required*. If the lesion is symptomatic: corticosteroid topically and, rarely, intralesionally or systemically is required. Other drugs such as retinoids, griseofulvin or cyclosporin have not proved reliably superior, or may have adverse effects.

Lichenoid reactions

Lichenoid reactions may be clinically indistinguishable from lichen planus. However, asymmetry and involvement of the palate are suggestive of a lichenoid reaction rather than lichen planus. Patients suspected of having a lichenoid drug reaction will often give a history of drug therapy known to produce such white patches and this can be helpful in diagnosis.

Intra-oral lichenoid reactions may be due either to systemic drug therapy or a local reaction to the mercury component of amalgam restorations. Although the list of *drugs implicated in lichenoid reactions* is long and ever-increasing, the most commonly involved agents are antihypertensives, gold, hyperglycaemics and non-steroidal anti-inflammatory drugs.

Mucosal biopsy is helpful, since an experienced oral pathologist may be able to detect features which are suggestive of a lichenoid reaction rather than those seen in lichen planus. In addition, a haematological specimen in a plain tube can be sent for indirect immunofluorescence examination; a positive '*string of pearls*' effect would support a lichenoid reaction. However, even with information from these investigations, it can sometimes be difficult to prove that a drug has caused a lichenoid reaction. In practice it is often possible to stop a systemic drug, such as an antihypertensive, and observe resolution of symptoms. If the oral lesions are causing concern or discomfort, the option of using a structurally unrelated drug with similar therapeutic effects should be considered, following direct liaison with the patient's medical practitioner. If the suspected drug was responsible and this course of action is followed, then resolution of symptoms should occur within 2 to 3 months.

It has been suggested (Lamey & Lewis 1991) that as many as one in three patients who were originally thought to have erosive lichen planus actually had a patch test confirmed lichenoid reaction to amalgam. Clinically, *reaction to amalgam* usually affects the buccal mucosa or tongue in areas which are closely associated with older corroded amalgam restorations. Patch testing should demonstrate sensitivity to amalgam and specifically ammoniated mercury, which is the usual allergen. Replacement of amalgam restorations with composite materials is likely to produce clinical resolution within weeks. It is obviously advisable to confirm such sensitivity by the use of patch testing prior to subjecting any patient to the replacement of large or numerous amalgam restorations.

At the present time there is no compelling evidence for a link between amalgam restorations and systemic disease such as myalgic encephalitis or multiple sclerosis. It is understandable, however, that patients with these conditions attend the dental surgery if they read or hear about such associations in the general media.

Denture Materials

Adverse reactions to denture materials, such as acrylic or cobalt chromium, are rare. Patients with acrylic dentures who have an allergy to methylmethacrylate confirmed by patch testing will benefit from the provision of replacement appliances constructed of polycarbonate or nylon. Patients with cobalt chromium denture may be found to be sensitive to nickel. In these circumstances, nickel-free cobalt chromium is available for the construction of alternative appliances.

Erythema Multiforme

Erythema multiforme presents with the acute development of widespread oral ulceration, blood-crusts lips and perhaps skin lesions. Unless there are known precipitating factors such as drug therapy or infection, patients characteristically have two or three episodes of reducing severity over a period of 2 to 3 years. However, cases of sensitivity to food preservatives would appear to be an important precipitating factor in cases of recurrent erythema multiforme where severity of symptoms remains constant.

Local Anaesthetics

It is not uncommon for patients to suspect that they have an allergy to local anaesthetics. The scenario is usually of an adverse reaction such as nausea or a feeling of lightheadedness during or immediately following dental treatment. In the absence of changes, such as skin rash, true allergy is unlikely. It is far more common for symptoms to be due to either inadvertent intravenous introduction of anaesthetic which produce a transient tachycardia, or patient anxiety which precipitates an episode of syncope. Whenever allergy to local anaesthetic is suspected, direct challenge should be performed rather than patch testing, since the reaction involved is a Type I hypersensitivity and not a delayed Type IV reaction. It is essential that such a challenge is undertaken in a hospital setting, where resuscitation facilities are immediately available, since if true allergy is present the patient may experience anaphylactic shock. In the future, a radioallergosorbent test for serum IgE levels towards the group of local anaesthetics may be available. (Lamey & Lewis 1991) This would be useful, since it only involves the taking of a blood sample and would, therefore, avoid the dangers associated with direct challenge.

3.4 CONNECTIVE TISSUE DISEASES

References that have been used as background reading for the summary of connective tissue diseases in this section have been Bates et al 1984; Besdine 1990; Byyny & Speroff 1990; Exon-Smith & Evans 1977; Lamey & Lewis 1991; and Mitchell & Mitchell 1992.

Rheumatoid Arthritis

Rheumatoid arthritis is the commonest connective tissue disorder, and is *common in elderly women*. Pain and swelling of the small joints of the hands and feet are a prominent early feature. Rheumatoid arthritis may be associated with weakness of the ligaments in the neck and therefore careful neck support is required, especially during extractions, to prevent the serious risk of cervical dislocation. Severe involvement of joints in the legs will obviously restrict the patient's ability to attend the dental surgery, whilst hand lesions will limit the ability to maintain adequate oral hygiene. Iron deficiency frequently occurs in rheumatoid arthritis and this may also predispose the patient to recurrent aphthous stomatitis or candidal infection.

When dry eyes or dry mouth occur along with a connective tissue disorder, then by definition the patient has secondary *Sjogren's syndrome*. Apart from an increased likelihood of dental caries, periodontal disease and salivary gland infections, patient with secondary Sjogren's syndrome may also develop mucosal changes as a side-effect of their anti-inflammatory drugs. In addition to mucosal lesions, taste abnormalities may also occur in patients receiving penicillamine therapy. Approximately 50% of rheumatoid arthritis patients with Sjogren's syndrome are allergic to antibiotics of the penicillin group and although the reasons for this are unknown it should be borne in mind when prescribing for bacterial infection or providing antibiotic prophylaxis for infective endocarditis (Mitchell & Mitchell 1992).

Although the cause of *systemic lupus erythematosus* is unknown, it is regarded as an autoimmune disease and is the second most common connective tissue component of secondary Sjogren's syndrome. The clinical presentation of lupus erythematosus is variable, but classically the disease affects women and involves fever, malaise, joint pains and a cutaneous rash. Approximately 20% of patients (Lamey & Lewis 1991) with systemic lupus erythematosus will some time develop erosive white patches on the oral mucosa which resemble lichen planus.

Scleroderma

Scleroderma (Systemic sclerosis) is an uncommon connective tissue disease which predominantly affects women. Unfortunately, the prognosis is poor and approximately 80% of sufferers have orofacial symptoms (Mitchell & Mitchell 1992). Progressive changes in the tissues limit mouth opening and produce a '*pinched*' or '*drawn*' appearance to the face. Apart from the obvious problems maintaining oral hygiene, patient with systemic sclerosis may also develop Sjogren's syndrome.

Discoid Lupus Erythematosus (DLE)

The aetiology of this condition is unclear. Connective tissue disease ('*autoimmune*'), drugs, hormones and viruses may contribute in genetically predisposed persons. Incidence is uncommon and it occurs mainly in women.. It can affect the mouth, and oral lesions can precede other manifestations in a minority of patients. The buccal mucosa, gingiva and lip are mainly affected and lesions on vermillion border are scaly and crusting. Intraoral lesions have central atrophic and often indurated red area with border of radiating white striae, and peripheral telangiectasia. Biopsy and serology is often informative investigations. Differentiation from systemic lupus erythematosus, lichen planus and carcinoma is often required. Topical corticosteroid or cryosurgery or excision of localised lesions may be the required treatment.

Sarcoidosis

Aetiology is unknown but may be a chronic granulomatous reaction. It is uncommon, with prevalence highest in black females. Clinical features include: cervical lymphadenopathy, enlarged salivary glands and xerostomia, mucosal nodules, gingival hyperplasia, labial swelling and rarely Heerfordt's syndrome (salivary and lacrimal swelling, facial palsy and uveitis).

Biopsy, chest radiograph, gallium scan Kveim tests are ideal investigations. Differentiation from Crohn's disease, tuberculosis and foreign body reactions is necessary. Intralesional corticosteroids, systemic steroids if lungs or eye involved is ideal treatment.

3.5 FUNGAL INFECTIONS COMMON IN THE ELDERLY

References that have been used as background reading for the summary of fungal infections in this section have been Bates et al 1984; Exon-Smith & Evans 1977; Lamey & Lewis 1991; Mitchell & Mitchell 1992; Thomas 1994; and Widdop 1991.

Denture Stomatitis (Candida and denture)

Candida is a common oral commensal. It becomes pathogenic if the environment favours its proliferation (dentures, antibiotic alteration of the bacterial flora) or the host's defences are compromised. (Lamey & Lewis 1991; Mitchell & Mitchell 1992; and Widdop 1991).

Denture stomatitis is also known as denture sore mouth, which is a misnomer because the condition is usually symptomless. Classically, seen as redness of the palate under a F/- denture, with petechial and whitish areas. It can be differentiated from acrylic allergy, which gives rise to erythema of all the soft tissues adjacent to denture. Denture stomatitis is caused by candida albicans in 90% cases, 9% due to other candida and less than 1% due to other organisms eg. klebsiella. Denture stomatitis is a common condition, having been reported in 30-60% of patients wearing F/F. It affects females more commonly than male, in a ratio of 4:1, and usually affects the upper denture bearing areas only.

The Aetiology of denture stomatitis is not still completely understood. Among many reasons following are the most common ones:

- * Infection with candida.
- * Poor denture hygiene.
- * Night-time wearing of dentures.

Trauma is often cited as a contributing factor to denture stomatitis, BUT:

1. occurs more commonly under Full denture/ -rather than -/Full lower denture
2. it can affect patients wearing Full upper denture/- only
3. also found under well-fitting orthodontic appliances.

- * Systemic factors can predispose to candida infection, eg. iron and vitamin deficiency, steroids, drugs which cause xerostomia, and endocrine abnormalities.
- * A high intake of sugar provides substrate for candida to multiply. It has been postulated that the reason that the upper denture-bearing area is more commonly affected is related to the more serous nature of saliva from the submandibular glands and the poorer fit of -/F which allows saliva to reach the underlying mucosa more easily.

Management of the infection is to:

- * leave denture out. This is not a realistic solution for most patients, but they should be encouraged to remove their denture at night.
- * improve denture hygiene, eg. brushing fitting surface and soaking in hypochlorite cleanser or chlorhexidine solution.
- * reduce sugar intake.
- * Antifungals. Nystatin suspension 100 000 units/ ml, 1ml qds (NB pastilles contain sugar) or Amphotericin suspension 100mg/ml, 1 ml qds are the first choice. 2% Miconazol gel is more expensive and should therefore be reserved for patients with candida which is unresponsive to other agents, or associated with angular cheilitis.
- * If suspect systemic factors exacerbating condition refer the patient to general medical practitioner.
- * Co- existing papillary hyperplasia of palate may need surgical reduction.

Angular cheilitis

Angular cheilitis is a condition *encountered frequently in clinical practice*. Is a combined staphylococcal, streptococcal and candidal infection, involving the tissues at the angle of the mouth, often with an underlying precipitating factor, eg. iron deficiency anaemia. *Detailed assessment and careful management are essential* since the presence of a chronic reservoir of infection at other orofacial sites has important therapeutic implications for angular cheilitis. Empirical treatment without adequate investigation will almost certainly result in recurrence of symptoms and failure to detect any underlying systemic disease.

Patients with angular cheilitis frequently present at their general dental practice. Clinical examination combined with an adequate case history will not only permit correct diagnosis, but will also point the practitioner towards appropriate investigation and treatment without the need to seek specialist advice. Close liaison with the patient's general medical practitioner can ensure that thorough haematological and biochemical investigation is achieved. Such approach to this problem is good practice and advances the *link between dentist and doctor* as practice partners in the provision of health care.

A patient who wears a prosthesis is likely to have Candida species, and this is often implicated in the aetiology of the angular cheilitis. *Clinically*, angular cheilitis may affect one or both angles of the mouth. It used to be considered that the clinical appearance of the

lesions gave an indication of the likely infective agent, for instance yellow crusting signifying staphylococcal infection; however, this is not correct, since the phage types of *Staph. aureus* isolated from angular cheilitis are rarely those encountered in impetigo, which is typified by yellow crusted skin lesions. Other organisms, in particular haemolytic streptococci, may also be isolated from cases of angular cheilitis, but their significance is unclear.

Although there is no true definition of angular cheilitis, most clinicians regard it as being characterised by inflammatory changes involving redness, soreness and ulceration occurring at one or both angles of the mouth. A classification of the type of clinical changes that occur in angular cheilitis has been proposed, but is not in widespread use. Occasionally, diagnostic difficulty is encountered when recurrent herpes labialis or erosive lichen planus affect the angles of the mouth. It is important to take detailed history of the complaint, its duration, previous treatment and the wearing of any prostheses.

A full medical and drug history should also be recorded. Clinical examination should be thorough and clearly must include investigation of the angles themselves, as well as a complete intra-oral examination. The lips need careful inspection and it may be necessary to ask the patient about the presence of lip swelling. Approximately 20% of patients with orofacial granulomatosis suffer from angular cheilitis for reasons which are not clear but could be that it is the physical enlargement of the lips owing to lymphoedema which predisposes to infection (Mitchell & Mitchell 1992).

It is crucial to the treatment of angular cheilitis to appreciate that it involves endogenous micro-organisms and that these originate from a chronic reservoir of infection. In the case of *Staph. aureus*, the reservoir is usually the anterior nares, when *Candida* species are involved (usually *Candida albicans*), the reservoir is always the oral cavity. Oral carriage of *Candida* vary from 7% to 40% of the general population. Therefore, when examining the oral cavity, potential reservoirs of candidal infection should be sought. Denture stomatitis is associated with patients wearing dentures, especially Full upper/- (Mitchell & Mitchell 1992).

Chronic atrophic candidiasis is frequently present; acute pseudomembranous candidiasis in some cases associated with steroid inhaler therapy, may be noted, as many chronic hyperplastic candidiasis or median rhomboid glossitis. It should be noted, however, that

even if the oral cavity appears entirely normal, this does not exclude the fact that candidal species may still be present in significant numbers.

Investigations and management requires a range of microbiological investigations that need to be performed for any patient who has angular cheilitis. Swabs (moistened), should be taken from both anterior nares, followed by swabs and smears from both angles and palate. If a denture is worn, this should be removed prior to the performance of an oral rinse. In this procedure, 9ml of phosphate-buffered saline is held in the mouth for one minute, then expectorated back into the bottle. Whilst the patient is doing this, the clinician can take a swab of the fitting surface of the upper denture or appliance, since this site commonly harbours *Candida* species. The samples should be promptly delivered to the laboratory for culture (swabs and rinse) and staining of smears.

If immediate transportation is not possible, then overnight storage in a refrigerator is necessary. Haematological screening, including measurement of haemoglobin, corrected whole blood folate, vitamin B12, Ferritin (or iron/total iron binding capacity) and a fasting blood glucose, should be undertaken. In some studies, up to 50% of patients with angular cheilitis have been found to have haematological abnormalities (Lamey & Lewis 1991). Clearly such patients require appropriate referral and treatment, to ensure that the patient's ability to fight any infection, including angular cheilitis, is not compromised.

The relationship between angular cheilitis and aspects of complete dentures has been the subject of much controversy. Several studies have shown no association between the vertical component of dentures and angular cheilitis. Failure to appreciate that patients may have moderate to high salivary counts of candida without signs of clinical infection has unfortunately clouded this issue.

Treatment will depend primarily on whether the micro-organisms involved are either staphylococci or candida, or a mixture of both. If *Staph. aureus* is present, then topical treatment with either *fucidic acid* or *mupirocin cream* is appropriate and applications should be continued 1-2 weeks after clinical resolution. It is important that the patient is given two tubes of drugs of choice, one for exclusive use of the angles and other for use in the anterior nares.

It has been shown by bacteriophage typing of *Staph. aureus*, that the strain present at the angles is the same strain as that found in the nares. The route by which staphylococci gain access to the angles is unclear, but it could be suggested that chronic nose-mouth-finger habits, the prolonged wearing of face masks, jogging, or upper respiratory tract infection are likely to be involved.

If infection is associated with *Candida*, the patient should use an antifungal ointment or cream four times a day for approximately four weeks. In mixed infections, miconazole is appropriate since it has some activity against both *Candida* species and *Staph. aureus*. It is crucial to treat the reservoir of infection within the oral cavity. A *nystatin* pastille or *amphotericin* lozenge four times a day for four weeks are the treatment of choice, whether or not intra-oral infection is clinically apparent. If chronic atrophic candidiasis is present, then the patient should also apply an antifungal cream to the fitting surface of the denture four times a day. It is also essential that the patient takes their dentures out at night and soaks them in a dilute hypochlorite solution. A chlorhexidine solution should be used if the denture has a chrome-cobalt component, since hypochlorite will blacken the metal. In the future, systemic triazole therapy, which has already been proven to be effective in the treatment of oropharyngeal candidiasis in HIV patients, may have a potential role in other infections, including angular cheilitis. Investigations of angular cheilitis have reported high recurrence rates, but this is inevitable if blood screening is not undertaken, and if reservoirs of infection are not eliminated (Lamey & Lewis 1991). Other factors which may need to be considered include orofacial granulomatosis, xerostomia, or allergy. Patients with a dry mouth should be given a saliva substitute (*Saliva Orthana*, *Glandosane* or *Luborant*), since this will achieve symptomatic relief and aid mechanical cleansing of the mouth.

Failure of treatment - If the steps outlined above have been closely followed, then treatment should be successful. In candidal infections, resistance to either the polyene group (*nystatin* and *amphotericin B*), or the imidazole (*miconazole*) is not clinically important and any failure of therapy is likely to be due to poor patient compliance and lack of denture hygiene. Many patients think that commercial denture cleansers will sterilise dentures, but this is not the case and appropriately diluted hypochlorite solutions (or chlorhexidine) should be used, although some patients dislike the aftertaste.

If the lesions persist in patients who report full compliance with therapy, then obviously systemic disease, particularly an immunocompromised state, should be considered. More commonly, however, the presence of a high carbohydrate intake prolongs infection. Many older patients suck hard sweets and this undoubtedly promotes intra-oral candidal growth and, subsequently, angular cheilitis. If patients are unable to reduce their sweet intake, they should use confectionery formulated for diabetics, which has a minimal sugar content. It is also worthwhile asking the patient how much sugar they add to tea or coffee. This can sometimes reveal a surprisingly high intake of carbohydrate.

Drug therapy, including broad spectrum antibiotics, can complicate the management of angular cheilitis. As mentioned, xerostomia needs treatment whether it is due to salivary gland disease (primary or secondary Sjogren's syndrome) or as a result of drug therapy. *Through liaison with the patient's medical practitioner*, it may be possible to alter drug treatment and achieve some return of salivary function.

Finally, persistent oral candidiasis is a frequent problem in patients who are receiving steroid inhaler therapy. This oropharyngeal candidiasis acts as a reservoir of infection, since steroids promote the growth of candida. Reassessment of the patient's respiratory condition by their medical practitioner is helpful, since it may be possible to establish an alternative or reduced steroid drug regime. Alternatively, patients prescribed steroid inhalers should be advised to rinse/gargle with water after inhaler use to minimise the effect of steroid retained in the oropharynx.

Candidal Infections Common in the Elderly Population

Denture stomatitis, pseudomembranous candidiasis (thrush), chronic hyperplastic candidiasis (candidal leukoplakia or Candida-associated leukoplakia). References that have been used as background reading for candidal infections have been Bates et al 1984; Besdine 1988; Byyny & Speroff 1990; Exon-Smith & Evans 1977; Lamey & Lewis 1991; and Mitchell & Mitchell 1992.

Pseudomembranous candidiasis is characterised, as its name suggests, by extensive white pseudomembranes consisting of desquamated epithelial cells, fungal hyphae and fibrin. This membrane can be scraped off with a spatula or swab to expose an underlying erythematous mucosa. Diagnosis is usually straightforward, although it should be confirmed

microbiologically, either by staining of a smear from the affected area or by culture of a swab or an oral rinse. Whenever pseudomembranous candidiasis, or indeed any form of oral candidiasis is diagnosed, it is necessary to consider why candidal infection has arisen. In some patients, broad spectrum antibiotic therapy or steroid therapy, in particular the use of inhalers, can precipitate candidal proliferation, whilst in others it is a result of an immunological abnormality (ranging from neutropenia to HIV infection). In addition, haematological deficiencies, blood dyscrasias or undiagnosed diabetes mellitus have been implicated in predisposing to oral candidiasis. Therefore, full investigation is warranted in all patients and referral for appropriate counselling is essential if HIV infection is suspected.

Treatment of pseudomembranous candidiasis involves eliminating any predisposing factors and the institution of antifungal therapy, such as *nystatin* pastilles or *amphotericin* lozenges (dissolved in the mouth four times a day) for a period of up to 2 weeks after clinical resolution.

Chronic hyperplastic candidiasis characteristically occurs bilaterally in the commissure region as homogeneous or speckled lesions. As previously mentioned, the presence of any underlying systemic disease should be excluded when candidiasis is suspected, but in chronic hyperplastic lesions smoking also appears to be an important local factor. Traditionally, the condition has been treated by antifungal therapy given topically for a periods of up to 3 months. Unfortunately, compliance with this prolonged drug regime is likely to be poor and eradication of *Candida* is therefore unlikely to occur. It would also appear that clinical resolution depends on whether the patient stops smoking. Poor compliance may well partly explain the known incidence of malignant change associated with hyperplastic candidiasis. In view of this, it may be more appropriate to prescribe systemic *fluconazole*, since it has been shown that this approach is effective in the treatment of chronic hyperplastic candidiasis. It is important, however, to maintain any patient treated in this way on a long-term follow-up to determine whether the risk of malignant is reduced.

Denture stomatitis

The causes of denture stomatitis include: denture trauma, denture plaque, allergic and primary irritant reactions to denture base materials, dietary factors (including resultant blood deficiencies), candidal infection, systemic factor and miscellaneous. Among these causes denture plaque is the most common and important one. Denture plaque can be seen and

understood, but it is difficult to remove all denture plaque effectively, particularly by the elderly and handicapped.

When all teeth are lost from the mouth, lactobacilli, yeasts, streptococci and staphylococci disappear. After placing dentures streptococci increase markedly. Anaerobes increase also but not the spirochaetes. Denture plaque is the '*quiet destroyer*'. Acrylic is like a sponge and organisms can crawl into it and live there. If a denture is polished much less plaque accumulates and there is less penetration by microbes. However, plaque will always adhere and it must be removed otherwise it can and does become pathogenic. Candida species have commonly been the sole target of investigation and treatment. Candida is only opportunistic and present in 64% of normal mouths and in 92% of mouths with denture stomatitis (Mitchell & Mitchell 1992). Haemophyllus, Neisseria and streptococcus pneumoniae are not commensals and if found in denture stomatitis may be considered as invasive pathogens.

Frequently there are no *symptoms of denture stomatitis*, but 28 - 70% are reported to complain of bleeding, swelling, pain, halitosis, bad taste and dryness. (Thomas 1994)

Classifications of denture stomatitis (Thomas 1994)

Newton's classification

Cl 1 Pinpoint hyperaemia.

Cl 2 Diffuse hyperaemia

Cl 3 Papillary hyperplasia.

Butz-Jorgensen and Bertram's classification

Cl 1 Simple localised inflammation

Cl 2 Simple diffuse (generalised) inflammation.

Cl 3 Granular inflammation.

Bergendal's classification

Atrophic denture stomatitis

Hyperplastic denture stomatitis.

Treatment of denture stomatitis

Denture stomatitis can be prevented by effective removal of denture plaque. Denture stomatitis can be treated by the use of combination of antibiotics and anti-fungals. Dentures should be soaked in *Hypochlorite* solution or *Chlorhexidine* solution overnight. (Thomas 1994)

Suggested methods of cleansing denture have been *mechanical and chemical*:

Mechanical

- i. Toothbrush and paste.
- ii. Sound.
- iii. Ultrasound.

Chemical

- i. O₂ liberating/ effervescent.
- ii. Hypochlorite.
- iii. Acid and Enzymes.
- iv. Chlorhexidine.
- v. Dehydration?

The commonest but least effective and harmful of the above are toothbrushing and O₂ liberating cleansers. Scrubbing from tooth- brushing can cause wear at the fitting surface particularly if abrasive toothpaste is used. We should therefore be looking for a completely non-mechanical method of plaque removal which sterilises at the same time. Furthermore, home-care of dentures should be quick, practical, safe, pleasant and cheap (ie obtainable from supermarkets, not from pharmacies). We can therefore rule out: sound, ultrasound, enzymes, chlorhexidine and acids (Steradent make Deepclean which has a low pH and which is reasonably effective). And that leaves us with, Hypochlorites (Milton is easily available and cheap) and a possible new development- microwaves. (Thomas 1994)

Denture Hyperplasia (Epulis fissuratum, Granuloma fissuratum or Denture induced fissured granuloma) can be caused by chronic trauma from a denture edge - usually peripheral. It may start as an acute ulcer which if ignored may become chronic. Then it may have acute episodes. denture hyperplasia is a typical chronic, dense fibrous tissue.

Treatment of denture hyperplasia may be conservative by massage but it is long and tedious. Surgical removal is the usual treatment. Lesion often is in the sulcus and insensitivity in the treatment can lead to obliteration of sulcus.

Acute Ulceration From Denture

All denture press, so there may be reduced blood supply and interruption of blood supply may lead to necrosis and ulcer.

Treatment of acute ulceration from denture is to relieve the pressure.

3.6 OROFACIAL PAIN

References that have been used as background reading for the summary of orofacial pain in this section have been Besdine 1988; Besdine 1990; Byyny & Speroff; Lamey & Lewis 1991; and Mitchell & Mitchell 1992. The diagnosis of orofacial pain, particularly of non-dental origin, may present the clinician with a considerable diagnostic problem. Accurate assessment of the history and nature of the pain, combined with good clinical examination, will achieve a correct diagnosis relatively easily. Table 7 (Lamey & Lewis 1991) shows the timing and nature of the more common causes of orofacial pain.

Orofacial pain is a common reason for patient attendance at the dental surgery but diagnosis of the cause may initially present the dentist with a problem. However, it is hoped that the approach to pain outlined below will assist the diagnosis of the more common pain syndromes. The nomenclature of certain pain syndromes varies from centre to centre, and the term temporomandibular joint dysfunction syndrome is used for the condition others may call facial arthromyalgia and the term periodic migrainous neuralgia for the condition which some may describe as cluster headache. (Lamey & Lewis 1991, Mitchell & Mitchell 1992)

For practical purposes it is useful to divide orofacial pain into two categories, *either dental or non-dental*, depending on its origin. Dental pain may be associated with acute dento-alveolar abscess, pericoronitis or dry socket. Fortunately, such conditions are usually well localised and accompanied by obvious characteristic clinical features which readily permit diagnosis. However, clinical examination in the case of *orofacial pain of non-dental origin* often reveals no abnormality and therefore *diagnosis has to be based on a detailed assessment of the history and nature of the complaint*. (Lamey & Lewis 1991, Mitchell & Mitchell 1992)

Two key questions '*Is the pain present every day?*' and '*does the pain interfere with sleep?*' are helpful at the outset. (Lamey & Lewis 1991) Following these questions, the patient should be asked to describe the timing and character of the pain during a normal day, from '*the minute they wake up in the morning until they go to bed at night*'. Such questioning should reveal how long the pain lasts, whether it is sharp or dull, constant or episodic, or aggravated by certain activities, such as eating or the wearing of dentures. Finally, the patient should be asked to rate the pain on a scale 0-10, where 0 corresponds to '*no pain*' and 10 indicates '*the worst pain experienced*'. Such a score will give the clinician a good indication of pain severity and is helpful in monitoring the effect of any subsequent treatment.

Table 7

Characteristic timing and nature of common causes of orofacial pain
Source: Lamey & Lewis 1991

Timing of pain	Nature of Pain	Condition	Comments
Present on Walking	Variables Severe and throbbing Severe and burning	TMJ dysfunction Migraine Burning mouth syndrome(type-2)	Associated with nocturnal bruxism or clenching Clenching may be trigger Needs full BMS investigation
Worse in evening	variable Sever and Burning	TMJ dysfunction Burning mouth syndrome (type-1)	Associated with daytime bruxism or clenchings Needs full BMS investigations
Coincidence in eating	Diffuse Pain and tightness Variable Sharp or boring Severe, shooting, lacination or Piercing.	Salivary gland obstruction TMJ disease Giant cell arteries Trigeminal neuralgia Glossopharyngial neuralgia	Requires sialography Structural changes Raised ESR Trigger factors May mimic pulpitis Pricipitated by swallowing
Disturbs sleep	Severe and episodic	Periodic migrainous neurlgia Paroxyximal facial hemicrania	Precipitated by alcohol No facial flushing running of eye/nose
Constant	Constant, throbbing or nagging Constant and dull Burning, gripping, boring or band-like Severe and throbbing	Atypical facial pain Neoplasms Psychological disorder Acute sinusitis	Exclude organic disease Requires full investigation Requires expert assessment Increase severity on bending head forwards
Variable	Sever and burning Burning, gripping, boring or band-like Variable Intense burning Variable burning or dull	Burning Mouth syndrome (Type-3) Psychological disorders Paget's disease Post-herpetic neuralgia Ramsey-Hunt syndrome	Needs full BMS investigation Require expert assessment Needs blood and radiographic assessment Hyperaesthesia or paraesthesia Vesicles in outer ear

Pain of Salivary Gland Origin

Obstruction of a salivary duct is characteristically associated with a complaint of swelling of the affected gland at meal times. When the parotid is involved, patients may complain of unilateral pain in the pre-auricular region on eating. However, since swelling is not always clinically obvious, confusion between salivary obstruction and temporomandibular joint dysfunction syndrome can occur. A complaint of a '*fullness*' or '*tightness*' in the area of the parotid would support the presence of obstruction rather than temporomandibular joint dysfunction. (Lamey & Lewis 1991, Mitchell & Mitchell 1992)

Submandibular duct obstruction can also present a diagnostic problem for the dentist, although in this situation bimanual palpation should demonstrate an enlarged or tender gland. Confusion with temporomandibular joint dysfunction can occur if the source of any tenderness detected is the medial pterygoid muscle, rather than the submandibular gland.

Sialography is more helpful than radiography in the diagnosis of salivary gland obstruction, since 20% of calculi are radiolucent and undetectable on routine radiographs (Lamey & Lewis 1991). Acute salivary gland infection can also be the cause of facial pain, but diagnosis is usually straightforward due to accompanying clinical signs which are typical of this condition. *Whenever pain is thought to be of salivary gland origin it must be fully investigated*, as symptoms at these sites may indicate the presence of neoplasms, sometimes small lesions.

Pain of Vascular Origin

Giant cell arteritis

Although rare, the vascular condition of most relevance to dental practitioners is giant cell arteritis, which is also known as temporal arteritis. The term '*temporal arteritis*', however, is a poor one, since the condition can affect any head or neck artery and its occurrence is not restricted to temporal vessels. Patients with giant cell arteritis are usually elderly, have a degree of systemic upset and complain of jaw claudication. Jaw claudication is characterised by cramp-like pain around the masseter, which occurs when the patient starts to eat. This pain prevents further jaw movement, which in turn leads to resolution of symptoms, allowing the patient to chew once again, for a limited period of time. Clinically, one or more extracranial vessels may be tender to palpation. The erythrocyte sedimentation rate is usually greatly elevated and this finding, in combination with other clinical features, is sufficient for diagnosis. There is little merit in temporal artery biopsy, since the characteristic histological

features are only present sporadically and therefore multiple biopsies would be required to confirm diagnosis. (Lamey & Lewis 1991, Mitchell & Mitchell 1992)

Giant cell arteritis should be regarded as an emergency, particularly when visual loss has occurred, since blindness of one eye can be followed by blindness of the other eye within 48 hours if high dose steroid therapy is not instituted. The usual contraindications to the use of high dose steroid therapy should be observed and the patient should be given a steroid warning card, giving details of treatment prescribed. Giant cell arteritis is not necessarily a lifelong problem and therapy can gradually be reduced with time.

Periodic migranous neuralgia (cluster headache)

Whilst it has not been established that periodic migranous neuralgia is truly vascular in origin, it is useful to consider it under this heading. In this condition, patients usually complain of a severe pain around the eye, temple or malar region, which lasts from 30 to 120 minutes. The pain is episodic and the patient can go for days or weeks without attacks. During an attack the face on the affected side is flushed and there may be lacrimation or rhinorrhoea. periodic migranous neuralgia is one of the few non-dental pains which will wake a patient from their sleep. A useful indicator of the likely presence of this condition is the fact that patients report that alcohol, even in small amounts, can precipitate an attack.

Treatment of choice is prophylactic *indomethacin*, although the use of ergotamine derivatives may also be successful. (Lamey & Lewis 1991, Mitchell & Mitchell 1992)

Paroxysmal facial hemicrania

Paroxysmal facial hemicrania can present with symptoms identical to those of periodic migranous neuralgia, although facial flushing and running of the eye or nose is absent. This condition also responds well to indomethacin or ergotamine derivatives.

Pain of Bony Origin

Apart from trauma, there are limited number of possible causes of pain of bony origin. Osteomata, including mandibular or palatal tori, can be traumatised and produce a complaint of localised, dull pain. The pain itself is self-limiting and is usually precipitated by hard foodstuffs or toothbrushing trauma.

Infection of bone is uncommon, except for the localised osteitis associated with a dry socket. Suppurative infections are also uncommon, but can be a complication of osteoradionecrosis. Although osteoradionecrosis is rarely seen nowadays, occasional cases do still occur, sometimes many years after irradiation.

Pain may be a feature of either *primary or secondary tumours within bone*. The nature of pain varies, but has often been described as a constant dull ache, with no precipitating or relieving factors. The occurrence of a tumour is an important differential diagnosis of atypical facial pain, which may present with similar symptoms. Dental radiographs will usually detect the presence of a tumour within the maxilla or mandible. However, computerised tomography or magnetic resonance imaging can also be invaluable in detecting tumour deposits, although the use of such high technology should not suppress information gained from clinical observation. (Lamey & Lewis 1991, Mitchell & Mitchell 1992)

Patients suffering from *Paget's disease* may experience orofacial pain, owing to compression of branches of the trigeminal nerves as a result of bone formation on foramina of the base of the skull. Bone activity will also produce clinically obvious features such as enlargement of the skull or widening or flattening of the hard palate. The presence of Paget's disease can be confirmed by haematological detection of a raised alkaline phosphatase level of bony origin. Radiographs may reveal the presence of a '*cotton wool*' appearance to the calvarium and hypercementosis around the roots of teeth.

Pain from Maxillary Sinus

The intimate relationship between the maxillary air sinus and the upper posterior dentition can cause problems when trying to differentiate between pain of sinus origin and that of dental origin. Radiographs or computerised tomographs of the sinuses and teeth can be of assistance, but, as always, a good history is essential. Symptoms which would support the presence of sinusitis include toothache-like pain affecting several upper posterior teeth, absence of tenderness to percussion of the teeth, and increased severity of symptoms during movements of the head, particularly on bending forward. In the short term, antibiotic therapy, such as *amoxicillin* or *tetracycline*, will resolve the infection and consequently relieve the symptoms of maxillary sinusitis. If the patient suffers from recurrent episodes, then referral for a surgical opinion should be considered.

The frontal, ethmoidal or sphenoidal air sinuses can all also have pathology associated with them. Branches of the trigeminal nerve innervate the lining of these sinuses, in addition to supplying sensation of the skin of the face. There is, therefore, considerable potential for referred pain to cause orofacial symptoms.

Pain from the Temporomandibular Joint

There has probably been more written about temporomandibular joint dysfunction syndrome than almost any other painful condition which may present to the dental practitioner. A variety of terms including Costen's syndrome, myofascial pain dysfunction syndrome and facial arthromyalgia, have been used to describe the situation where pain arises from the temporomandibular joint apparatus.

It is useful to differentiate TMJ disease from TMJ dysfunction at the outset. In cases of *TMJ disease*, there is an anatomical abnormality of the joint which should be detectable on radiographs, tomography or arthrography. An example of such an abnormality is the presence of osteophytes arising from the condylar head, which give rise to pain on mandibular movement. Although conservative treatment with analgesics can help in this situation, surgical intervention is usually required in the long term.

In contrast to TMJ disease, radiographs fail to reveal any abnormality in *TMJ dysfunction*, since it is a functional disorder. It could be argued that radiographic investigation is not required when clinical signs and symptoms are sufficiently supportive of TMJ dysfunction. Characteristic features of the condition are trismus, pain over the condylar region and tenderness of the muscles of mastication. Parafunctional habits such as clenching or grinding appear to be important in TMJ dysfunction and, therefore, patients often wake with the pain in the morning or report that symptoms develop as the day goes on. It has been claimed (Lamey & Lewis 1991) that stress or anxiety trigger parafunctional habits and, interestingly, TMJ dysfunction appears to be more frequent in younger people, especially at times of examination or other stressful life events.

When *active treatment* is required, the preferred management of TMJ dysfunction is the provision of a hard acrylic splint which opens the bite approximately 2mm. Adam's crib should be incorporated to provide retention, and the appliance should cover all the occlusal surfaces of the standing teeth. When fitted, the splint should achieve even occlusal contact in

centric relation and during lateral excursion. Clearly, TMJ dysfunction is not a lifelong condition, although patients usually need to wear the splint at night only for several months. Some clinicians prefer the use of soft vacuum formed splints, but these are bulky and cannot easily be modified to achieve even occlusal contact. (Lamey & Lewis 1991)

Selective occlusal grinding of the teeth for the treatment of TMJ dysfunction has its advocates, although this approach is by no means universally accepted. However, the presence of obvious occlusal interference, particularly in recently placed restorations, should be eliminated.

Finally, acrylic splint therapy can also be of benefit in the treatment of migraine, although it is important to establish that patients truly have migraine and therefore suffer from severe prolonged headaches (6-36 hours) with associated nausea, vomiting or photophobia. The patients with migraine who appear to benefit most from splint therapy are those who suffer from attacks on, or within 1-2 hours of, waking.

Pain of Central Nervous System Origin

Trigeminal neuralgia

Trigeminal neuralgia is more common in women than in men and can affect any division of the trigeminal nerve. Interestingly, the maxillary or mandibular division, particularly on the right side, appears to be most frequently involved. Classically, trigger factors such as smiling, eating or touching the skin, have been described in this condition, although in practice these are present in the minority of patients. The pain is described as '*lancinating*' or '*electric-shock like*', and is of such severity that even the most stoical of patient will describe attacks as '*10 out of 10*', '*the worst pain I have ever experienced*,' which '*stops them in their tracks*'. Prior to the onset of the characteristic symptoms of trigeminal neuralgia, approximately 20% of patients have an entirely different pain, known as pretrigeminal neuralgia, which affects the teeth and can be confused with pulpitis, cracked tooth syndrome or dentine hypersensitivity. (Mitchell & Mitchell 1992)

Both trigeminal and pretrigeminal neuralgia *respond well to carbamazepine therapy* if used properly. Since carbamazepine is not an analgesic but a membrane stabilising drug, it is crucial that patients recognise the importance of adhering to the prescribed regime. An initial dose of 100mg tid should be prescribed and this may be increased in 100 mg increments

every 3-4 days until the pain is controlled. Patients usually become asymptomatic on a total daily dose of 400-800mg. It is prudent to take a blood sample prior to placing any patient on carbamazepine therapy, in order to assess liver enzymes, since hepatotoxicity, although rare, can occur. (Lamey & Lewis 1991)

The main reason for failure of carbamazepine therapy is poor patient compliance with the prescribed dose schedules. *Phenytoin* may also be used in the management of trigeminal neuralgia and should be considered for those patients in whom carbamazepine is ineffective. Cryotherapy and a variety of surgical options, including intracranial procedures, are also available, but these should be reserved for occasions when drug therapy has not been successful. Rare causes of orofacial pain of central nervous system origin include acoustic neuromas, intracranial neoplasms and multiple sclerosis, all of which can, on occasion, present as trigeminal neuralgia.

Glossopharyngeal neuralgia

The nature and symptoms of glossopharyngeal neuralgia are very similar to those of trigeminal neuralgia. However, in this condition the distribution of the ninth cranial nerve is affected and, therefore, patients complain of a unilateral pain involving the posterior third of the tongue, and the tonsillar region or the ear. Management of glossopharyngeal neuralgia should be based on the use of carbamazepine.

Pain of Infective Origin

Post-herpetic neuralgia

Reactivation of *Varicella zoster virus* is responsible for the condition known as shingles (herpes zoster). Following an episode of shingles, a patient may suffer from either residual pigmentation or post-herpetic neuralgia. The post-inflammatory pigmented lesions are limited to the skin supplied by affected branches of the trigeminal nerve and may produce an aesthetic problem for sometime. The pain due to post-herpetic neuralgia is intense and may be associated with symptoms of hyperaesthesia and paraesthesia. The condition tends to affect older patients and can be particularly distressing, since it may be totally resistant to a range of drug treatments, including tricyclic antidepressants. It would be a considerable advance if *acyclovir*, an antiviral agent used to treat herpes zoster, could also be proven to minimise the development of post-herpetic neuralgia.

Ramsay-Hunt syndrome

Ramsay-Hunt syndrome is characterised by a combination of clinical signs and symptoms which are due to Varicella zoster infection of geniculate ganglion. Patients generally complain of pain, vesicular cutaneous eruptions in the outer ear and facial nerve palsy. There are differing opinions on the best treatment of Ramsay-Hunt syndrome. Although some authorities believe no successful treatment is available, it would seem appropriate to provide antiviral therapy, in the form of acyclovir, to limit viral activity. In addition, it has been suggested that the use of corticosteroid therapy will reduce the inflammatory oedema which is probably responsible for the facial nerve palsy. Active and rapid treatment of facial nerve palsy is important, since, if untreated, the defect may be permanent and can present a very distressing cosmetic problem for the patient. (Lamey & Lewis 1991)

Pain of Psychogenic Origin

Orofacial pain is a component of a variety of psychiatric disorders, ranging from hypochondriacal individuals who use orofacial pain as gain, to anxious individuals who somatise their complaints in terms of organic disease.

Atypical facial pain

The term atypical facial pain is often misused and is applied to painful conditions which either do not fit into any other disease category or cross anatomical boundaries. (Lamey & Lewis 1991, Mitchell & Mitchell 1992) This is unfortunate since the original descriptions of atypical facial pain were quite specific, consisting of a constant pain (nothing makes it better, nothing makes it worse) which is usually localised over the maxilla and frequently affects middle-aged women. In addition, the patients will usually complain of headache, backache, dysfunctional uterine bleeding, irritable bowel syndrome and itchy skin. Depression and anxiety are likely to be major factors in atypical facial pain, but without experience in these areas it is difficult to detect the presence of these components by clinical interview alone. *The Hospital Anxiety and Depression scale* is a useful tool in confirming the presence of either anxiety or depression and may reveal surprisingly high scores for these factors in apparently normal individuals (Lamey & Lewis 1991). A major advantage of the Hospital Anxiety and Depression scale is that its use does not require any specialist training. *Tricyclic antidepressants* are very effective in controlling atypical facial pain, and *dothiepin* (75 mg) is the drug of choice. It is a matter of some controversy as to whether it is the antidepressant action

of the tricyclic drug which controls the pain or whether relief is achieved due to some other mechanism.

Clearly, organic disease, particularly the presence of an antral tumour, should be excluded when the patient complains of constant pain over the maxillary sinus.

Miscellaneous Conditions

It is not possible, in a brief description of orofacial pain, to be comprehensive and include rare conditions such as Eagle's syndrome and neck-tongue syndrome. Fortunately however, owing to their rarity, it is extremely unlikely that these syndromes will be encountered in general dental practice. (Lamey & Lewis 1991)

4 DENTAL WORKFORCE FOR THE ELDERLY

Many authors have considered dental workforce requirements for the elderly including the following who are not referred to directly in the text (House 1987; Improving dental health in Australia 1992; Kovar et al 1988; Manning et al 1985; NHMRC 1993; Odrich 1985; Ogawa 1995; Roberts et al 1995).

4.1 NEED, DEMAND AND UTILISATION

- **Need** for dental care can be defined as that quantity of dental treatment which expert opinion judges ought to be consumed over a certain time period for people to achieve the status of being dentally healthy (Spencer 1980).
 - **Demand** for dental care is the expression by a patient or the public of a desire to receive dental care to attend to their perceived needs (Jeffers et al 1971). A model was developed many years ago by Dollar & Kulstad (1949) to show the *relationship between need, potential demand and effective demand*. and Figure 5 is still widely used
 - **Utilisation** is the actual attendance by members of the public at dental treatment facilities to receive dental care. It is expressed as the proportion of a population who attended a dentist within a given time, usually a year, or as the average number of visit per person made over a year (Burt & Eklund 1992). Studies that considered all age groups have typically reported utilisation pattern falling in an inverted-U-shaped curve with the very young and the very old seldom using dental services, adolescents and the young adults having the highest use of services, and a moderate decline in use observed in middle age. Some of the age-related association may be direct result of oral disease levels, the presence of teeth and previous experience with dentists. Both dental awareness and the presence of teeth have been associated with a high utilisation of dental services.
- Striffler (1983) has presented a very comprehensive discussion on **need, demand and utilisation** and his main points are presented in Figure 6 and the next half dozen paragraphs. The *concept of absolute need* was previously defined as the need actually existing in a person's mouth. *Detectable need* was defined as that which the dentist could detect. No examination procedure could be expected to uncover all pathological conditions present and there will be some difference between detectable and absolute need.

Figure 5 Oral health treatment needs and demands for dental care
Source: Dollar & Kulstad 1949

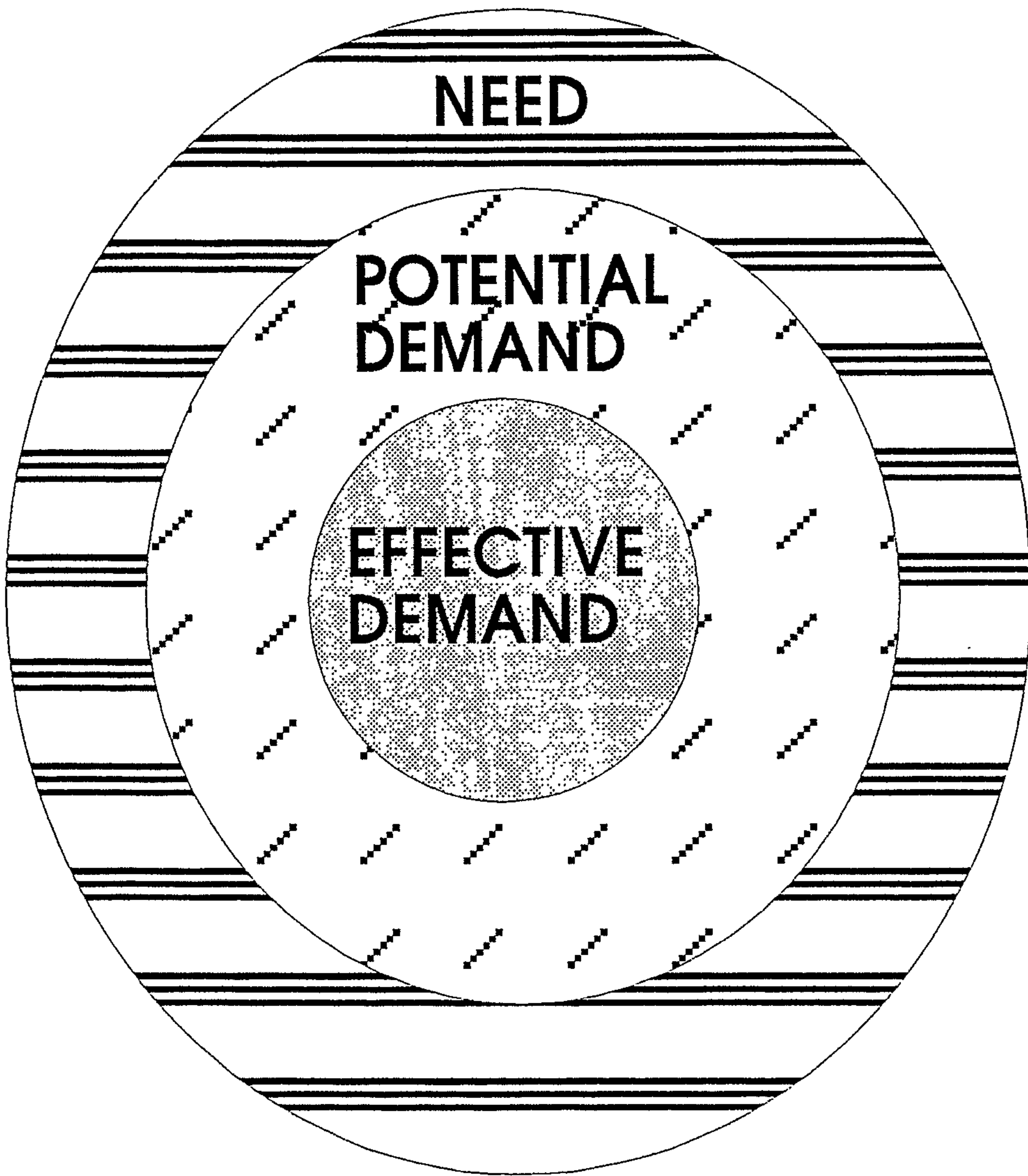
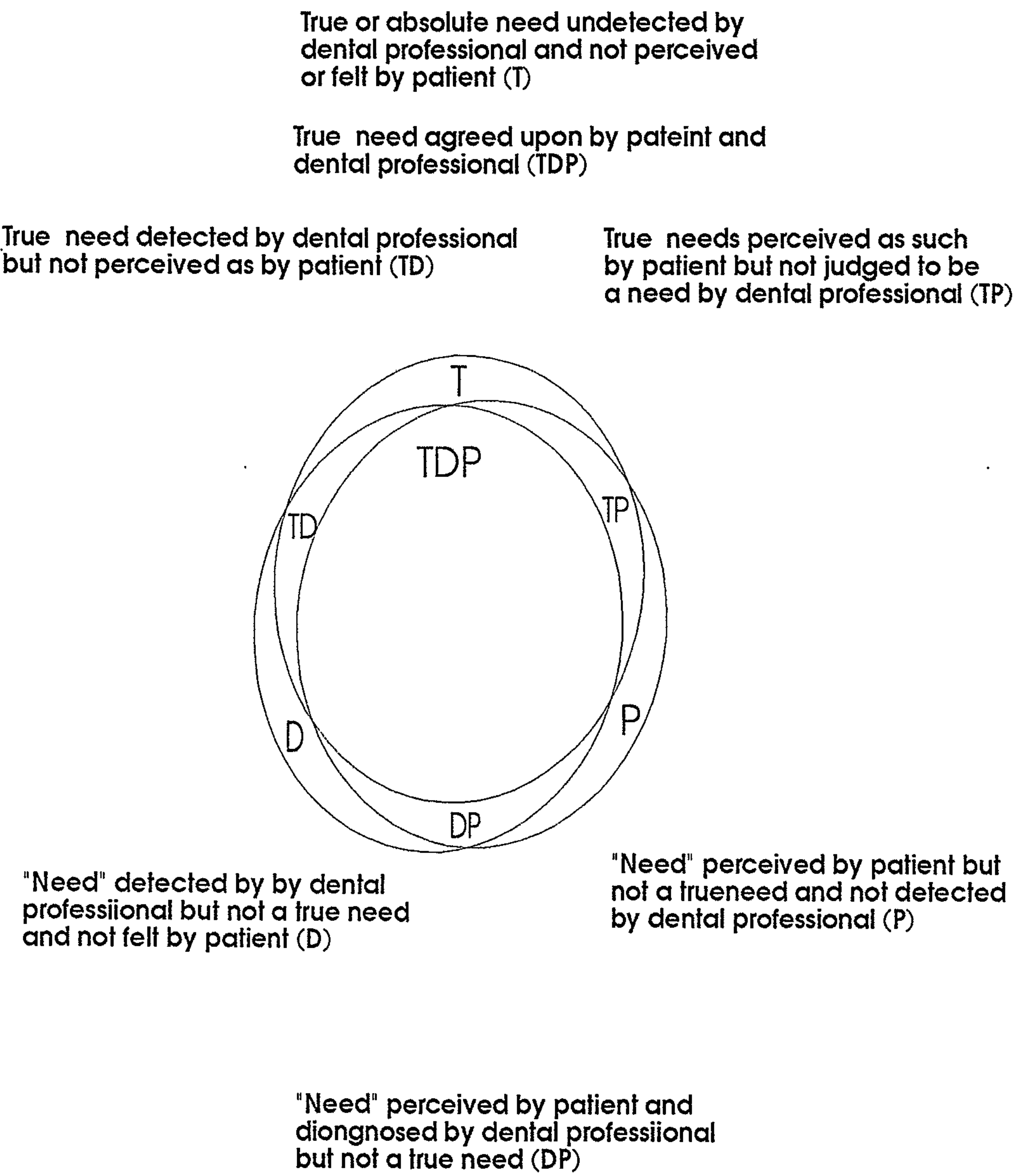


Figure 6 **Overtreatment, appropriate treatment and undertreatment**
Source: Striffler 1983



In Figure 6 (Striffler 1983) the three intersecting circles represent, first, *absolute or true need* as the slightly elevated center circle (*T*), second, the *dental professional's diagnosed or declared need* as the circle to the left (*D*), and third, the *patient's perception of their own needs* as the circle to the right (*P*). The largest area in the center, contained by the intersection of all three circles (*TDP*), is the absolute need or *true need* that has been detected by the *dental* professional and that also is felt by the *patient*. In this largest area, overtreatment or undertreatment is not a problem. The crescent area farthest to the left (*D*) represents *overtreatment*, that is, dental needs declared to exist by the dental professional but not true needs and not perceived by the patient. Overtreatment could be an honest error in diagnosis, or it could be the result of a deliberate recommendation for a dental service that really was not required. The inner crescent area on the left (*TD*) also represents need that is a *professionally determined true need*, but that is not felt by the patient and one that could result in undertreatment if the patient refused the recommended treatment. The crescent or partial circle to the far right (*P*) is need felt by the *patient* but is not a true need. The patient might persist and the treatment might be performed. In this instance it would be *patient-induced overtreatment*. (Striffler 1983)

The crescent to the right (*TP*) just inside the outer crescent would be *true need felt and perceived by the patient* but not recognised as such by the dental professional. This type of need could be an honest disagreement between patient and dental professional because the patient, for example, felt some sensitivity that the dental professional tended to discount but that later proved to be valid. Undertreatment could also occur if a prepayment plan was so constituted that dental professionals were encouraged to provide services fully covered by the plan and to ignore or put off services not fully covered or not covered at all in the plan. In this instance that type of 'service' is a form of 'skimming' and not being concerned about the total patient, comprehensive care, or whether or not the patient is seen again. (Striffler 1983)

Striffler (1983) also notes that the unqualified desire for dental care may be defined as '*potential demand*' whereas the desire plus the ability to obtain dental service may be defined as '*effective demand*'. There are other terms that economists and others use such as '*felt need*' (which perhaps could be equated with '*potential demand*'). From an economist's view-point, '*utilisation*' probably should be used instead of '*effective demand*'. Obviously if people are effectively demanding care, that means they are getting it and thus are utilising dental services.

Some economists maintain that utilisation should refer to the number of individuals that utilise (make use of) dental services. (Striffler 1983) Thus, an increase in utilisation literally means that a larger number of individuals utilise dental services as measured in numbers of individuals-not quantities of services. The related concept of '*utilisation rate*' simply refers to the proportion of a population that utilises dental services over a specific period of time.

Striffler (1983) states that the contrasting concept of '*demand*' is referred to as an economic term most commonly expressed as a quantity of goods or services that will be purchased for a given price. The quantity of demand normally increases when prices fall and decreases when prices rise. The demand concept of economic theory does not include any reference to the number of people who are buying the quantities that are demanded at the given price. The literature seldom makes a distinction between utilisation and demand and often uses the concept interchangeably. The number of visits per person per year is the most commonly reported measure of '*utilisation*', yet it gives neither the number of people using the services nor the quantities and prices of services purchased. (Striffler 1983)

The population is ageing and the use of the dental services by the elderly is changing. The elderly of today are more educated, more mobile, have a higher income and many in developed countries like Australia have been exposed to dental health education, fluoridation and extended dental care. In all countries, *planning for the oral sector* needs to involve at least four responsible groups (WHO/FDI 1989): (i) education; (ii) existing professional groups both from the private sector; (iii) public sector; and (iv) those involved in primary health care. Ideally, a National Planning and Monitoring Group for oral health, including representatives from each of the four groups is needed, to develop appropriate goals, define strategies and to maintain ongoing monitoring of the situation. It is also clear that a coherent reliable set of basic information is needed for use by such a planning group. (WHO/FDI 1989)

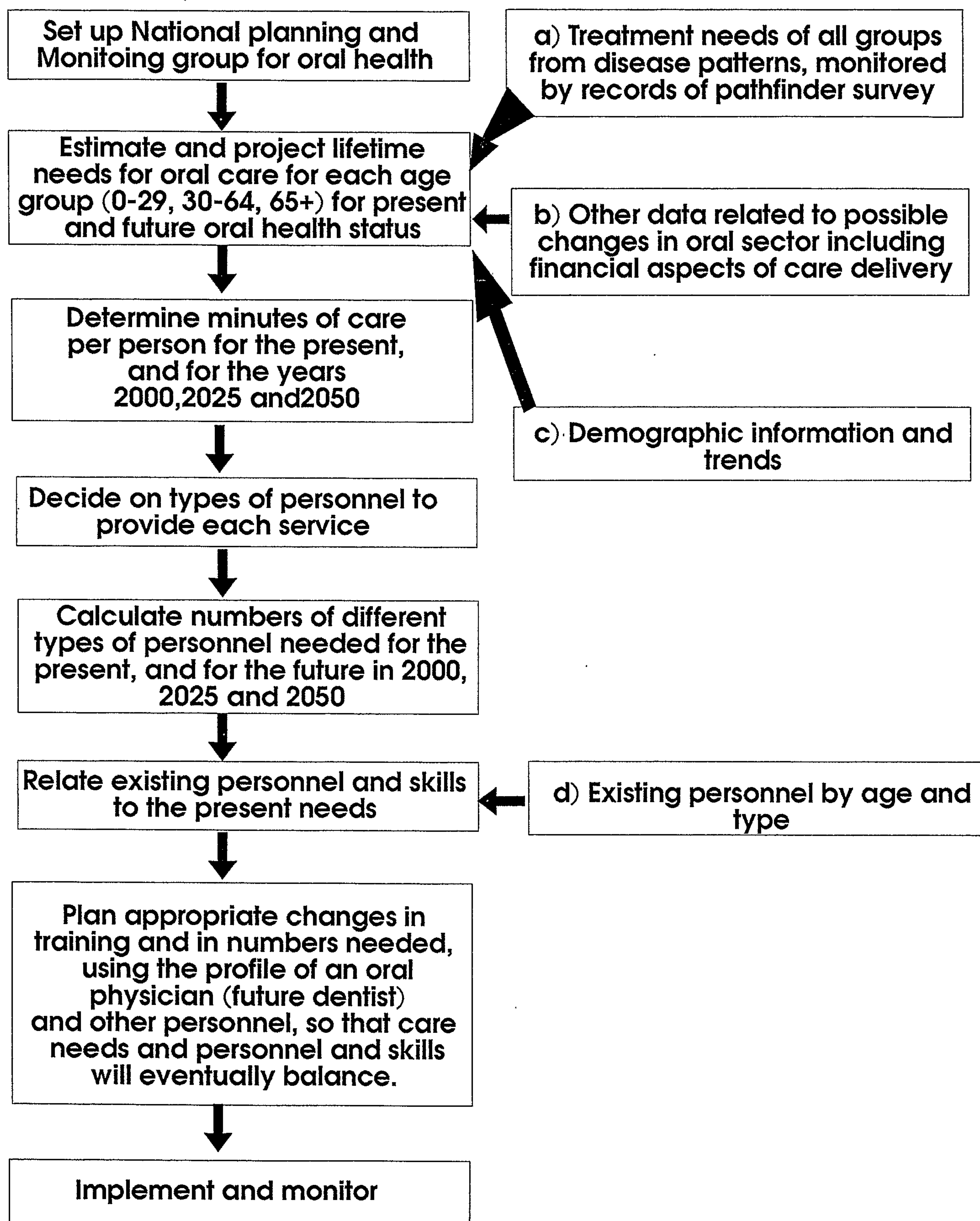
A joint WHO/FDI Working group (1989) has clearly defined a basic set of information needed for planning and monitoring in the oral health. This set of data includes information on: (a) treatment needs, disease patterns and trends, and factors likely to influence these trends and needs, (b) demographic trends, (c) existing and planned numbers and types of oral health personnel. Guidelines on methods of collecting and analysing this information for use in the calculation of appropriate numbers and types of personnel have also been developed. (WHO/FDI 1989)

Essentially, the methodology proposed by the group (WHO/FDI 1989) involves the projection of lifetime needs for oral health for different cohorts of a population using data from oral disease profiles established by the WHO Global Oral Data Bank. Calculation of annual treatment times for each cohort, as provided through the prevailing oral care delivery system, is then related to changing demographic patterns. Then calculations of numbers of health personnel needed at present and for various times in the future can be made and appropriate plans developed to ensure that personnel numbers and skills will match the oral health needs of the population as closely as possible. The flowchart shown on **Figure 7** indicates the general steps in this process (WHO/FDI 1989).

There are many inter-related factors involved in assessing manpower needs. As the expenditure of money and effort in developing a program is often heavy, these factors must be carefully considered. The objective of the dental profession should be the attainment by all peoples of the highest level of dental health. For such an objective to be approached requires thorough planning on a nationwide basis and the rational and efficient utilisation of resources. considering that both the major dental diseases, periodontal disease and dental caries, are preventable, dental services should be developed primarily on the basis of the preventive approach both for the community and the individual. (WHO/FDI 1989)

The question of what type of health service, how much to spend for which services, and for whom, remains a political question for the society concerned (Slack 1981). This problem is further complicated by the politics of the health professions themselves. For example, the vested economic interests of the dental profession could hinder progress by not allowing paradental personnel to carry out simple dental procedures (dentists have often been opposed to the introduction of dental hygienist and dental auxiliaries). Such an attitude tends to increase the cost and reduce the availability of dental care. The dental profession generally shows little interest in the administrative aspects of dental health services and the planning role falls to non-dental administrators more concerned with efficiency than efficacy. The interests of the profession are often not strong in the prevention of dental disease and there has been apathy and in some cases antagonism of the profession towards the subject of water fluoridation as evidence to support this statement (Slack 1981).

Figure 7 **Flowchart for calculation of health manpower supply**
Source: WHO / FDI 1989



4.2 DEVELOPMENT OF DENTAL WORKFORCE

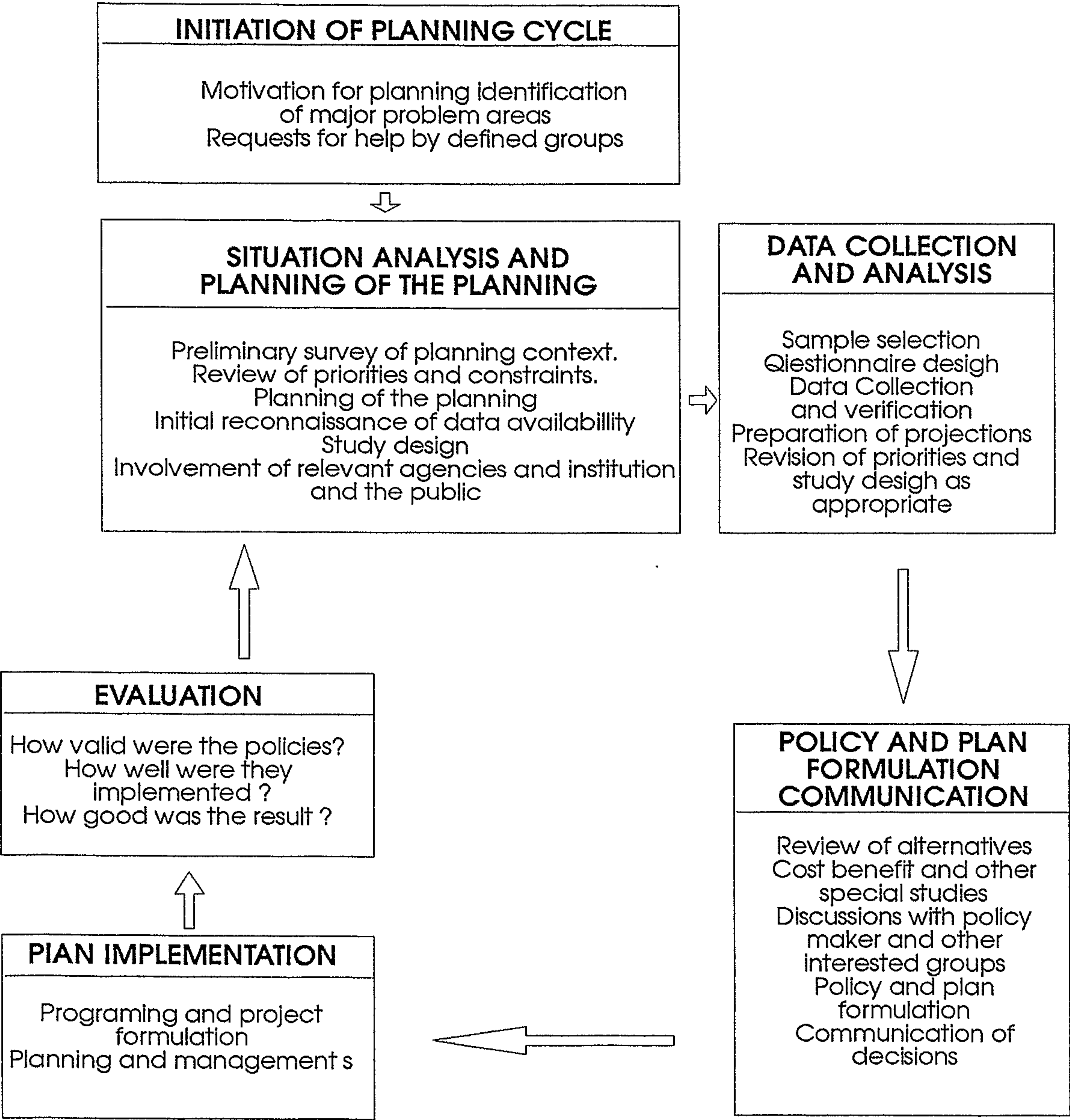
The form of the health services of a nation is determined by its prevailing social values, historical precedents, and its educational and fiscal resources. Although differences exist between nations, several features are common to health service systems (Slack 1981). Prior to making proposals for dental workforce changes knowledge is required of: the relative priority given to good health, and oral health in particular; the amount and source of financial support for health services; and the amount and type of legislative power exercised by politicians. (Slack 1981) Dental manpower planning is one case of health manpower planning (Born 1975).

Hall & Mejia (1978). emphasise that: *'(1) planning is likely to be effective if due account is not taken of the social, economic and, especially, political circumstances in which it takes place; (2) health manpower planning is an integral part of comprehensive health planning and should not become an independent activity; (3) the three components of the health manpower development process-planning, production and management-must be brought into closer and more functional relationship with each other and with health services development if manpower policy is to be implemented; (4) manpower studies or reports of commissions, however sophisticated, do not necessarily lead to the development, much less to the implementation, of a plan, or to social, economic and political conditions and a definite national political will are present'*.

Mejia & Fulop 1978 indicate that planning involves the identification and analysis of problems, the formulation of alternative options, the selection of the appropriate solution, the determination of the technical methods to be used and the definition of the program objectives and of the future action to be taken. A plan should be spelled out by detailing the tasks and resources and methods of implementing the objectives in the specified time.

- Health manpower planning is the process of estimating the number of persons and the kind of knowledge, skill and attitudes they need to achieve predetermined health targets and ultimately health status objectives (Mejia & Fulop 1978; Cole & Cohen 1971). Such planning also involves specifying who is going to do what, when, where, how, and with what resources for what population groups or individuals so that the knowledge and skills necessary for adequate performance can be made available according to predetermined policies and time schedules. This planning must be a continuing and not sporadic process, and requires continuous monitoring and evaluation (Mejia & Fulop 1978). Six stages of manpower planning have been set out by Hall and Mejia (1978) and are shown on Figure 8.

Figure 8 Manpower requirements
Source: Hall & Mejia 1978



Slack (1981) has provided an excellent overview of how the dental workforce is developed and stresses the importance of planning. *'Health personal planning (the gender-neutral term 'personnel' is preferred over the more common 'manpower') is the process whereby a determination is made regarding the appropriate number, types, and distribution of individuals capable of providing health services to achieve a desired goal or health outcome'*.

The determination of necessary personnel levels is based on the relation between the variables of consumer's need or demand and the availability or supply of dental care. Their interaction defines the ultimate utilisation of dental services and to some degree, the health status of the population. Personnel planning relates these variables in a manner that, ideally, permits accurate prediction of future personnel requirement. These predictions may then be used to initiate modification in the personnel pool so that appropriate number, types and distribution of dental service providers result.

The production of dental services is strongly influenced by the availability of personnel, because the provision of dental services is labor intensive. This dependence on personnel supply coupled with the long training time required for dentists, means that required changes in future personnel levels needs to be anticipated years in advance. Thus the reliability of any personnel planning model will be strongly influenced by its ability to estimate future need and demand levels. (Slack 1981)

The three most commonly used ways to develop models of dental personnel are: *dentist-to-population ratio, demand-based models, and need-based models*. The ultimate choice of a model is based on either the availability of data to support the model or on the political or philosophical basis of those doing the evaluation. (Slack 1981)

The *dentist-to-population ratio* simply counts the number of dentist present within a specific population and has served as a traditional measure of the need for dental personnel. From a public health standpoint, a *health needs approach* to estimate personnel may be preferable to other techniques because it identifies not only disease level, but also permits treatment to be prioritised and allows the evaluator to track movements towards health objectives. (Slack 1981)

It has been shown that the information necessary to predict personnel requirements with confidence is generally unavailable. (Slack 1981) Each of the above mentioned techniques suffers from lack of critical data and the inability to account for future

epidemiological, social, economic and political changes depending on who coordinates the planning activity these techniques also generally lack objectivity. Planning for dental personnel production will continue regardless of the quality of the data or planning model available. The consequence of any planning decision must be evaluated in terms of the cost in resource commitment and health outcomes that result from its implementation. (Slack 1981)

The World Health Organization (1969) has suggested that the following framework be considered important in planning:

1. Analysis of the existing situation
 - a. dental health needs and demands for services
 - b. dental health manpower supply
 - c. utilisation of dental health manpower
2. Policy formulation
 - a. dental health manpower planning
 - b. incentives and controls
 - c. levels of decision making.

This framework involves an assessment of the existing situation which includes the social, cultural, and political environment and the identification of factors which may positively or adversely influence the planning process. Information on levels of oral health, the effectiveness and efficiency of dental health services and the views of the consumers must be obtained. Subsequently an estimate of the oral health needs of the population must be assessed and costed. Attempts must also be made to do a census of all dental health workers, taking into account the type of work they do and the growth and organisation of the profession. (World Health Organization 1969)

The utilisation of dental health services by the public will vary according to *the availability, accessibility, and acceptability of the services*. In addition, attributes of the population such as its educational system and economic status will affect utilisation.

Dental manpower planning must be based upon rational foundations and there must be a commitment to make necessary changes in policy, even if the proposed changes meet opposition among sections of the profession. (Slack 1981)

The over-riding principle governing manpower development is that the service has a commitment to improve the dental well-being of the population it is serving (Slack 1981). If the services are not achieving that objective, alternative solution should be considered but the planner should avoid the common failing of viewing the alternative method only in terms of other ways of increasing the supply of a given type of dental health worker. Instead he should, for example, consider relating the services to dental health control, to increasing efficiency and productivity of dental health workers or to changing the dental health manpower profile by changing the proportions of different grades of worker. (Slack 1981)

The dental health planner must also consider incentives and controls to achieve the specified objectives of his program (Slack 1981). The types of incentives and controls will vary according to the local or national circumstances. Incentives may be based upon promotion, monetary bonuses, and other fringe benefits. Controls may be imposed by national, professional, or consumer groups. The effects of various forms of administering the controls should be closely scrutinised. Controls are more likely to be accepted by dental health workers if they have been closely involved in stage of the decision-making process of the dental health workers, civil servants, and senior politicians should be involved in making decisions. (Slack 1981)

The framework suggested by the World Health Organization in 1969 for manpower planning is still appropriate as it included an analysis of the existing situation regarding dental health needs and demands for services and estimates of needs and resources.

As the existence of disease is the reason for health services, manpower needs could be defined in terms of the physical and mental conditions of the population and the capabilities of the prevailing medical and dental methods to deal with them. Therefore, a population's need for dental services requires a knowledge of the state of their health, the existence of well-defined standards of good health and a knowledge of what contemporary dentistry can do to improve ill health.

Slack (1981) puts the need for health care into three categories: *met demand*, *identified but unmet need*, and *unidentified need*. Met demand is measured by utilisation data and identified but unmet need are those needs identified by the profession which are not met or met only after harmful delay. Bradshaw (1972) has enumerated four categories of need: *normative need*, *felt need*, *expressed need* and *comparative need*.

The need for dental services must be distinguished from the demand for care and from the use of services or utilisation. (Slack 1981) A need for preventive, curative or rehabilitative dental measures exists when an individual has dental disease or disability for which there is an effective and acceptable treatment. Preventive care may be needed when an individual is obviously at risk but has no overt signs of disease. Need can be defined both in terms of the type of dental condition considered to need treatment or of the treatment or resources required to provide it. *Thus the need for dental services in a population refers to the number of individuals needing treatment and the type and extent of that treatment, the number needing preventive procedures and education for oral health and the type and extent of these interventions and finally, the number and type of personnel needed for carrying out the necessary measures.* (Slack 1981) The treatment, prevention and education must have been shown to be effective and specific for the groups to which they are to be applied.

The need for dental care has been measured in terms of the prevalence and severity of dental disease. (Slack 1981) However, the established indices of dental disease such as the DMF and Periodontal Index are not adequate for assessing needs. Therefore, converting findings into needs must take into account not only the condition of the individual tooth but also the number and condition of all teeth in one mouth, their relationship to each other in each arch, and the relationship of the teeth in the upper and lower arch to each other. In addition, the attitudes and dental health behaviour must be taken into account. (Slack 1981)

Another difficulty in converting oral health findings into need is the wide variation in the methods and types of treatment for a given oral health condition. One further important reason why it is difficult to assess the true dental needs is that the strong traditional emphasis on dental caries leads many dental examiners to pay insufficient attention to the other oral and oral health conditions in the mouth, particularly periodontal disease. This failure to diagnose obvious dental disease leads to gross errors in the assessment of need. (Slack 1981)

The need of a population for dental services should be estimated by surveying a properly selected sample of the target population and collecting the information in a standardised way. A survey system used for planning the dental resources required should have the following properties (British Association for the Study of Community Dentistry 1977):

1. *The system should be comprehensive and include data collection, processing analysis and presentation.*

2. *The method of data collection should be based on established criteria of need which are known to be valid and reliable and which reflect stages in disease process which call for tested interventions.*
3. *An assessment of the status of the teeth and their supporting structures, the oral cleanliness status, the occlusion, the oral tissues and the subject's previous use of dental services and propensity for good dental health behaviour, should be made.*
4. *The findings should be expressed in terms of resources required as well as disease prevalence and severity.*
5. *The system should be easy to use and capable of application at local, regional and national levels.*

The Combined Oral Health and Treatment Assessment system of the World Health Organization (World Health Organization 1977) does fulfil some of these criteria. It includes measures of dental and oral diseases as well as assessment of treatment needs for caries, periodontal disease, orthodontics and dentures. By using the estimates of the time required to carry out the dental procedures and education (World Health Organization 1978), and the average number of hours that dental personnel work per year, an estimate of the manpower required can be estimated.

Two methods of conversion of dental disease findings into treatment needs have been used. (Slack 1981) The first is based on the assumption that carious teeth should be restored, the second and most elaborate method involves conversion of findings into entire time taken to carry out procedure or into units based upon fees for different treatment items; the fees in turn are usually related to timing of procedures. In a study conducted by Ast et al (1965) in fluoridated and non-fluoridated areas of New York State the amount of treatment required was assessed by survey and the treatment was carried out by the study team under standardised conditions, thereby converting the findings for disease into actual treatment time. The actual amount of chair time for each child was also recorded. This included non-operating time which was mainly taken up by child management. The individual services were priced according to the New York Department of Health scale fees prevailing at that time. This allowed the conversion of treatment needs into dollar costs. Different countries or communities can make their own fee conversions.

A Periodontal Treatment Need System-PTNS-was devised to classify and quantify the need for periodontal treatment (Johansen & Haugen 1975). The system is based on an assessment of

the need for motivation and oral hygiene instruction (Class A), scaling and elimination of overhangs (Class B), and lastly surgery (Class C) and on the time needed to perform the various types of treatment.

They found that persons in Class A require about 60 minutes and that it took 30 minutes per quadrant to treat person in Class B. .persons in Class C required 60 minutes per quadrant for periodontal surgery. The timings reported above and the criteria for surgery may not be generally applicable (Ekanayaka & Sheiham 1978) but the concept which has been modified by the **World Health Organization (1978)** is useful. The WHO (1978) grouped subjects into those with (1) gingivitis, (2) calculus or shallow pockets, (3) deep pockets. Services for each group were laid down and timings for each procedure suggested.

The *Dental Services Index* devised by Beck (1968) is an attempt to overcome the shortcomings of dental surveys which only record dental disease findings. It provides an indication of the amount of dental treatment required in a given individual or population. The magnitude of the index is directly proportional to the amount of dental treatment required to make the individual or population '*dentally fit*'. On the individual basis, it is directly related to the cost of dental services required. Hobdell et al (1975) developed and expanded Beck's concept. They enumerated nine sequential stages in planning a dental program to satisfy the needs of a population. *The nine stages were:*

1. The recognition of the need for dental treatment in the population group.
2. Estimation of the size of the problem.
3. The definition of feasible treatment aims for the service.
4. The formulation of treatment strategies designed to achieve those aims.
5. The effects of these treatment strategies on the amount of the individual items of treatment to be carried out. The statement of the total treatment needs of the whole population then follows.
6. The conversion of the individual items of treatment to Relative Value Units of dental treatment required.
7. The calculation of the time required to provide the necessary treatment.
8. The calculation of the relative costs of using dental teams of different composition to provide the treatment.
9. Finally, deciding which dental team will provide the required service most effectively within the constraints prevailing.

Surveys conducted primarily to assess treatment need are much more informative because they present data on the time and personnel required to treat the needs.

Dental Needs and Personnel Required to Treat Them

The numbers of dental personnel required to meet the needs of a given population will depend upon whether the dentist works with or without ancillary help, how the dentist is remunerated, the preventive measures used, and the interval between recall of people for maintenance of dental care. Fewer dentists will be required if ancillaries are used to carry out preventive procedures. (Slack 1981)

To formulate dental manpower, information is needed on: the dental health needs and demands of the population; and the supply and utilisation of dental health manpower.

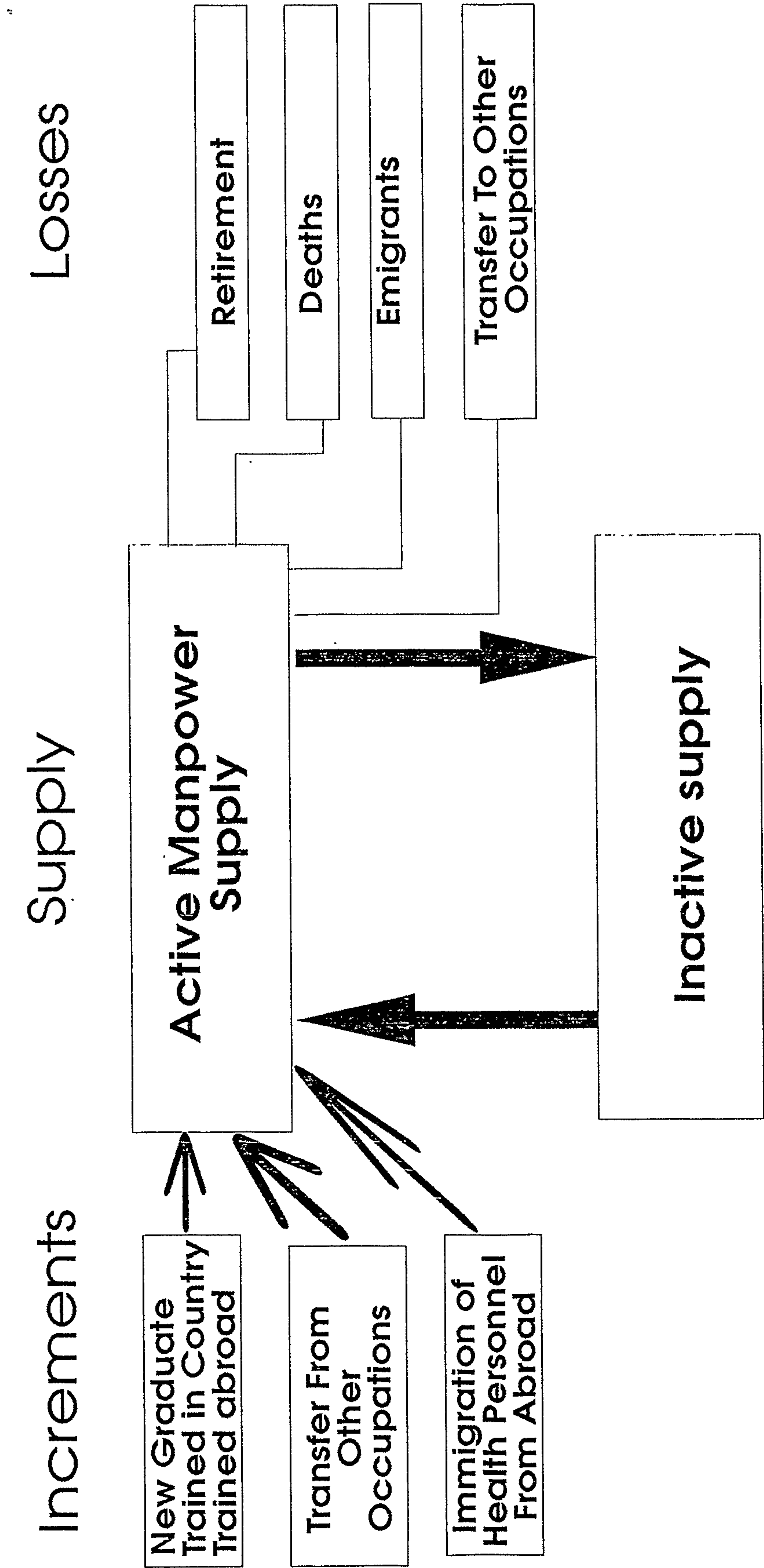
Dental Health Manpower Planning

The formulation of a manpower policy for a service such as dentistry cannot be developed without considering the national priorities for manpower. The supply of dental manpower must be seen in the whole scheme of health services. (Figure 9 from Hall & Meija 1978)

It appears that dental health workforce planning is the process of estimating the quantity of manpower, plus the different types of knowledge and skills needed to bring about planned alterations in the dental health service system, so that improvements in the dental health of the population are optimal. Planning must specify who is going to do what, with whom, where, and how - both now and in the future. *Dental health manpower planning involves:*

1. *The analysis and projections of dental health needs and demands for services by the population. Such data are obtained by epidemiological surveys and from treatment records.*
2. *The assessment of present dental health manpower availability and the analysis of its pattern of utilisation.*
3. *The formulation of policy.*
4. *The estimation of future manpower requirements and of relevant education and training needs in the light of the overall dental health plans.*

Figure 9
Components of health manpower supply
Source: Hall & Mejia 1978



5 DENTAL SERVICES FOR THE ELDERLY

5.1 AUSTRALIAN DENTAL ASSOCIATION REPORT

The Australian Dental Association in 1986 reported on dental services for the elderly. The report indicated that review of the facilities available for the provision of dental care to the elderly had become a matter of urgency due to the increasing number of aged persons in the community and the changing nature of the dental diseases now experienced by them. It was considered that the current situation had many shortcomings and that existing treatment facilities, though not entirely inappropriate, required considerable expansion and modification to be able to cope humanely with the enormity of the need. A number of questions were posed (ADA DHSC 1986).

How can the demonstrated needs for better oral health of the older generation be met in the future?

It may be anticipated that the improvement of dental health status of younger generations as reported from many parts of the world in recent years will gradually be reflected also in the elderly section of the population. In the coming years an increasing proportion of the aged will preserve most of their teeth. As a result both the demand and the need for oral care will grow. Dental treatment of the elderly is often complex and is related with medical, sociological and economic problems as well. (ADA DHSC 1986)

Is the dental profession, inclusive of dental schools and faculties prepared to meet this challenge?

A better appreciation of the complex issues involved can be gained by classifying aged persons into 4 Groups according to whether they are mobile and healthy or not, and whether they are financially independent or not. The plight of elderly persons worsens significantly (and hence their need for assisted dental care increases) if they are functionally and/or financially impaired. (ADA DHSC 1986)

Planning strategies could be devised which would lead to improvements for each of these groups. This would imply concerted initiatives emanating from government, the Australian Dental Association, dental faculties, individual dentists, allied professionals, health funds,

and the community. Of all the disadvantaged sections of the community, priority ranking for dental care of the *financially disadvantaged aged*, which the ADA has distinguished as groups 1A and 2A should be high. (ADA DHSC 1986)

A series of applicable Recommendations for such action is given in this section.

The 'aged' group within the Australian population is generally regarded as consisting of individuals aged 65 years and over. This group comprises about 10% of the total population (ADA DHSC 1986). It is reliably predicted, however, that both the proportion and the actual number of aged persons within the community will increase, as will average life expectancy. Hence, an increasing component of appropriate health care will be required by older patients.

Dental care is an important part of the total health and well being of any individual. Existing health services provide subsidised medical and hospital care to the population, but *only limited subsidised dental care*.

The provision of necessary dental services to the aged will be influenced by (ADA DHSC 1986):

- a. changing patterns of dental treatment needs due to the changing nature of dental disease. More natural teeth and supporting structures will require clinical maintenance;
- b. increasing number of aged persons with a greater life expectancy;
- c. alteration in life style as a result of changed socio-economic and cultural factors, and progressively deteriorating physical, mental and emotional faculties;
- d. likely complex, perhaps compromised, medical status; and
- e. a tendency in aged persons not to seek dental services despite genuine and often increasing need.

Attitudes to ageing and illness, by the aged themselves and many of those who care for them, *including the dental profession*, may be one of the main reasons for the reduced demand for necessary dental services by aged persons, and lack of facilities to provide such services.

Access by the elderly to dental care depends upon (ADA DHSC 1986):

- a. organisation (including finance) and management; and
- b. acceptance by the individuals concerned. by the community and its representatives, and by dentists and allied professionals of a responsibility to maintain oral health and screen for developing oral pathology.

For planning purposes, the effects of ageing and illness can be considered in terms of their impact on the status of elderly persons with respect to *Function* (physical) and *Finance*.

Based on these two principal factors of independence (lack of it) four situations can be defined for the aged: (ADA DHSC 1986)

ie. Group 1A	(-) Finance	(-) Function	Group 2A	(-) Finance	(+) Function
Group 1B	(+) Finance	(-) Function	Group 2B	(+) Finance	(+) Function

Tables 8 and 9 summarise features of the dental services currently available (often in very limited form) to each of these groups. (ADA DHSC 1986)

Commentary on current facilities (ADA DHSC 1986):

- * The treatment for Groups 1A and 2A needs to be wholly financed through government resources.
- * The capital costs of establishing dental facilities away from large population centres have largely been met already through private practice and could be used of these two groups.
- * Since there is increased incidence of serious oral pathology with age, aged persons need regular assessment by a dentist to consider both their oral and medical status (including medication) and they should not become totally dependent on auxiliaries for treatment.
- * Dentists and auxiliaries need training and knowledge to meet their special requirements.
- * Regular attendance for maintenance and supervision of dental health only occurs when patients have been educated to seek this services.
- * The full potential for dental services is not often realised by the aged or their families, nor by other health care and support groups.
- * Many practice locations and environs are unsuitable for the elderly, and practitioners should be urged to provide facilities which will assist aged persons to gain access.
- * Family initiative is often needed to direct aged patients to appropriate dental facilities.
- * Allied professional groups eg. medical practitioners, district nurses, hospital nursing staff, and social workers should be able to recognise dental needs in these patients and direct them to dental facilities.
- * There is a need for on-site treatment facilities for the aged in nursing homes and retirement complexes.
- * Mobile dental facilities can only provide a limited service.
- * Assistance with transport may be needed .

Table 8

Dental facilities currently available to aged groups 1A & 1B
Source: ADA DHSC 1986

Function (Mobility)	Treatment Site	Providers of Treatment, Maintenance & Supervision	Finance
Degree of immobility dependent on physical, mental and/or emotional impairment, and influenced by confined living in	Home, by use of portable equipment - only limited treatment can be provided Vehicle equipped to take a limited service to the home, nursing home or hospital Hospital	1. Salaried dentist 2. Sessional, hourly rate or fee for service assisted by appropriate auxiliaries	Government funded
<u>Group 1A</u>			
<u>(-) Finance</u>	1. Own home		
	2. Nursing home		
<u>(-) Function</u>	3. Hospital		
<u>Group 1B</u>			
<u>(-) Finance</u>			
<u>(-) Function</u>			
As above	As above	General dentist with interest and aptitude in gerodontics, and awareness of economic implications of extra time and equipment necessary for this Group Hygienist (acting under the instructions of a dentist for the purpose of providing periodontal maintenance - available only in some states)	Personal funding (perhaps with a health insurance component). carrying the burden of additional fees occasioned by greater duration and difficulty of treatment

Table 9

Dental facilities currently available to aged groups 2A & 2B
Source: ADA DHSC 1986

Function (Mobility)	Treatment Site	Providers of Treatment, Maintenance & Supervision	Finance
<u>Group 2A</u>			
Physically independent but may require:	1. Dental hospital	1. Salaried dentist	Government Funded
1. Help from relatives or friends	2. General hospital with dental clinic	2. Sessional or hourly rate dentist	
2. As few steps as possible, or a lift to provide ease of surgery access	3. Community health clinic	-assisted by appropriate auxiliaries	
<u>(-) Finance</u>		Private practice*	Fee-for-service* (government funded with small patient contribution) - eligibility established by Pensioner Health Benefit Card
<u>(+) Function</u>			
		1. General dentist	
		2. Denturist (for dentures only, subject to State limitations, and with no capability for main- tenance & supervision)	
		*Most existing schemes are limited to the provision of dentures. However, the Rural Dental Scheme in NSW and the Country Practitioners Scheme in WA are examples of schemes providing full basic service through private practice.	
<u>Group 2B</u>			
As above	Private practice	General dentist with interest and aptitude in gerodentics	Personal funds (perhaps with a health insurance component)
<u>(-) Finance</u>		Hygienist (acting under the instructions of a dentist for the purpose of providing periodontal maintenance available only in some States)	
<u>(+) Function</u>			

Although *Groups 1B and 2B* are largely independent financially, cost may be regarded by them as a barrier to seeking dental care, and financial support may still be needed for them to gain access to special facilities. (ADA DHSC 1986)

The recommendations of the report were as follows (ADA DHSC 1986):

- * The essential requirements of facilities offering treatment to functionally and/ or financially disadvantaged elderly persons be determined, and a protocol for the use of existing private and public facilities be established.
- * Encouragement be given to private dentists and public authorities for the development of suitably-sited and easily-accessed dental facilities.
- * A protocol be developed for the establishment of treatment facilities in proximity to concentrations of elderly persons.
- * The use be encouraged of transportation taking aged patients to properly equipped treatment centres which have emergency and resuscitation facilities and professional back-up, and less reliance be placed on the use of mobile facilities
- * Arrangement be negotiated whereby dentists will be able to initiate the use of ambulances and other community transport where needed to assist their aged patients.

Finance

- * Liaison between government and the private sector of dentistry be mediated by the ADA (Australian Dental Association Inc.) to adapt to the specific needs of disadvantaged elderly persons the fee-for-service plan (a fixed scale of rebates based on usual, customary, and reasonable fees) set out in the ADA document '*Proposal for Provision of Dental Treatment to the Disadvantaged*' or other appropriate mechanisms.
- * Discussions with health funds be undertaken to delineate the specific needs of aged dental patients, and to ensure that private health insurance meets these needs.

(ADA DHSC 1986)

Oral Health Surveillance

- * Regular screening of aged patients by dentists to detect early signs of oral pathology and to assess medical status with respect to dental treatment needs be recommended at a minimum frequency of each two years.

(ADA DHSC 1986)

Professional Training

- * A gerodontic training protocol be established for inclusion in undergraduate and continuing education programs.
- * Consideration be given to the auxiliary personnel most appropriate to assist in gerodontic practice, and to the training they will need.
- * Allied professional groups should be made aware that it is desirable for their members to be able to recognise basic dental needs in the aged, and to assist, where appropriate, in helping meeting such needs by directing patients to suitable facilities.

(ADA DHSC 1986)

Public Education

- * There should be included in public health education programs, information regarding the special needs for dental care of the aged.
- * A component of oral health education be devoted to informing elderly persons and their families about existing dental facilities.

(ADA DHSC 1986)

5.2 INTERNATIONAL STUDY BY FDI

The World Health Organization has set targets for improvement in oral health for all people of the world by the year 2000. To achieve that goal, special consideration must be given to certain age groups in the population. The oral health of the elderly is far from satisfactory even in countries with comprehensive welfare services and available resources for oral health care. Research in the area of geriatric dentistry will provide the dentist with a better basis for clinical decision-making in the treatment of the elderly. There are, however, problems related to the delivery of oral health care to the elderly patient which will require different solutions in different countries. They will have to be solved to increase the quality of life for the aged.

In 1986 the **Commission on Dental Education and Practice of the FDI** appointed a working group to study problems related to the delivery of oral health care to the elderly patient. The final report is summarised in FDI Technical Report No 43 published in 1990 (FDI 1990).

The first term of reference for the working group was to identify problems related to delivery of oral care to the elderly patient. An initial survey was directed to dentists and other health care workers asking them to *specify problems related to the delivery of oral health care to:*

- 1) the healthy elderly,
- 2) the partially incapacitated
- 3) the institutionalised elderly

Problems referring to (FDI 1990):

- * The elderly individuals do not value oral health.
- * Lack of perceived need of oral care.
- * Problems with health or activity in daily life eg. mobility.

The dentist (FDI 1990):

- * Insufficient training for geriatric dentistry.
- * Lack of experience in treating the elderly.
- * Insufficient continuity of dental care.
- * Lack of recall systems and efficient referral at dentist's retirement
- * Difficult access to the dental office and to the treatment area.
- * Lack of domiciliary care.

Society (FDI 1990):

- * Lack of public support for programs promoting oral health for the aged.
- * Insufficient financial support for research on oral health needs of the elderly.

Three problems were more frequently indicated by non-dental personnel (FDI 1990):

- 1) the need to organise regular screening for oral disease among the frail and dependent elderly;
- 2) the need to establish continuity of dental care for the elderly patient eg at the retirement of the dentist; and
- 3) the need of denture labelling for the institutionalised elderly.

The most frequent area of concern quoted by all categories responders in all countries were (FDI 1990):

- 1) both dentists and non-dental personnel assumed that the elderly do not value their oral health as much as their general health;
- 2) dentists reported having insufficient training for the treatment of the elderly; and
- 3) both dentists and non-dental personnel believed there are difficulties with accessibility to the dental office for the elderly.

The working group decided to study more closely these three areas of concern expressed by many categories in different countries. Three task groups were set up and *three questionnaires were designed to collect information internationally (FDI 1990).*

Value of oral health among the elderly

The aim of this questionnaire was to collect information about how the elderly value their oral health. Secondly the opinion of experts was sought as how to promote interest in oral health care among the elderly. (FDI 1990)

In the first survey among the experts (FDI 1990):

- * 87% disagreed with the statement that the general dental/oral health of the elderly is at an acceptable level.
- * 60% disagreed with the statement that elderly people value their oral health as much as their general body health.
- * 82% agreed that the current elderly group is more aware of the value of oral health than previous generations.

In a subsequent survey the same experts were asked to rank, for their country or region, agencies which would have the greatest impact on most elderly in increasing their awareness of oral health. Clearly the *respondents believed that media like TV, radio, newspapers and pamphlets have the greatest impact*. Individual education by health workers ranked second. (FDI 1990)

The teaching of gerodontology in dental schools (FDI 1990):

In this survey many dentists reported having insufficient training for the treatment of the elderly and specified difficulties of clinical treatment and treatment planning.

Has this perceived need of training been recognised by the dental schools and faculties?

Is geriatric dentistry taught in the dental schools at present?

A survey containing 18 questions on the subject was designed and sent to dental schools worldwide.

About two thirds of the responding schools declared that the curriculum included geriatric dentistry. Most frequently the course was included in the final year. The number and per cent of schools teaching geriatric dentistry in different geographic areas is shown in Table 10 (FDI 1990).

Organisation of theoretical course

Occasional lectures as part of some of the clinical specialities was the most common way of teaching. A specific course in geriatric dentistry was uncommon outside North American and European schools. (Table 11 - FDI 1990)

Duration and contents of theoretical courses (FDI 1990):

The majority of the responding dental schools had a course with a duration of less than 25 hours of theoretical teaching. The schools with more extensive courses were, with few exceptions, situated in North America or Europe. The schools that offer more than 10 lectures and seminars were found in these areas with 92% of the schools including less than 10 seminars and 61% less than 10 lectures in geriatric dentistry in the curriculum.

The most frequently taught subjects were oral manifestations of systemic disease and stomatological changes associated with ageing. In contrast the least popular topics were care for the homebound elderly and the use of portable equipment. It is surprising that dental management of the elderly is not included in all courses and that barriers to dental care for the elderly had such low priority. (FDI 1990)

Table 10 **Dental schools including geriatric dentistry in pre-graduate curriculum**
Source: FDI Technical Report Series No. 43 1990

Area	Potential responders	Number resp.	G.D. in curricula	Percentage
1. Europe	179	135	102	76
2. N.America	78	71	63	90
3. S.America	88	51	23	45
4. Asia	87	57	22	39
5. M.East, Africa	29	15	7	47
6. Australia NZ	6	6	5	83
Total	467	335	222	67

Table 11 **Organisation of courses in geriatric dentistry**
Source: FDI Technical Report Series No. 43 1990

Area	Specific course		Organized series		Occasional lectures		Other	
	No.	%	No.	%	No.	%	No.	%
1. Europe	16	15	15	15	66	64	6	6
2. N.America	42	67	10	16	8	13	3	5
3. S.America	2	9	3	13	15	65	3	13
4. Asia	2	9	2	9	16	73	2	9
5. M. East Africa	2	29	0	0	5	71	0	0
6. Australia N.Zealand	1	20	3	60	0	0	1	20
Total	65	29	33	15	110	49	15	7

Table 12 Clinical content of courses in geriatric dentistry
Source: FDI Technical Report Series No. 43 1990

Number and percentage of institutions including clinical course
of gerodontology in curriculum. n= 220

Area	Including clinical course		Compulsory course	Elective course
	No	%		
Europe	82	80%	93%	7%
N.America	48	76%	73%	27%
S.America	15	65%	100%	0
Asia	7	32%	71%	29%
Middle East Africa	5	71%	100%	0
Australia N.Zealand	3	60%	100%	0
Total	160	72%	87%	13%

Clinical content of courses in geriatric dentistry (FDI 1990):

The clinical courses were most frequently found in European schools (80%), followed by schools in North America. Most schools in Europe and North America also had extramural programs to allow the dental students to treat the elderly outside the school premises.

(Table 12 - FDI 1990)

Postgraduate education (FDI 1990):

Only some schools offer postgraduate courses in geriatric dentistry. Most of these institutions were North American or European. The opportunity for the dental practitioner to achieve postgraduate education in geriatric dentistry must be considered as inadequate in light of the growing numbers of elderly patients and their treatment needs.

Physical access to dental care for the elderly (FDI 1990):

Lack of access to the dental office and the treatment area was one of the most frequent problems mentioned by both dentists and non-dental staff in the survey.

This survey by FDI has demonstrated lack of sufficient training in geriatric dentistry in most countries of the world. It was considered very important that the findings be made known to the National Associations of the FDI and to dental educators so that teaching of gerodontology can be included in, or increased in, the dental curricula. Postgraduate education in geriatric dentistry should also be encouraged worldwide.

The need for information to the public on existing centres providing domiciliary care and allowing access by wheel chair has also been clearly demonstrated in the study. National Dental Associations should encourage local initiatives with the aim to improve information on existing facilities.

5.3 DENTAL SERVICES FOR THE AUSTRALIAN ELDERLY

The report of the 1987-88 National Oral Health Survey (Barnard 1993) noted that: the Australian population 65 years and over was expected to increase from 1.6 million in 1986 to 2.9 million in the year 2011; the elderly would have increased retention of teeth at risk for dental caries and periodontal disease; the elderly have less private dental insurance, less utilisation of dental services, and were much more dependent on government than other adult groups. One Australian Goal for the Year 2000 is to reduce the proportion of the elderly who are edentulous to 40% (Barnard 1993). The dental services required for these Australian elderly have been presented in a very comprehensive report from the National Health and Medical Research Council (1994).

Dental services available for the aged group in Australia can be described under the following broad headings (NHMRC 1994):

1. Private practising dentists.
2. Institutions caring for handicapped persons.
3. Dental and general hospitals.
4. Government mobile dental services for rural population and Aboriginals.
5. Public fixed dental clinics.
6. Hospital based community dental programs.

These programs are usually based in a hospital or teaching institution which serves long term care facilities within a nominated radius of the institution. For example, a Community Dental Health Unit (CDH) was established in 1986 by the Western Sydney Area Health Services as part of its community health care program. The aim of the unit is to provide dental treatment to special groups of people who cannot get access to normal dental care easily, such as the aged, physically handicapped as well as the intellectually handicapped. Treatment provided for out-reach visits consists of routine dental check-ups, construction of partial or full dentures, repair and relining of existing dentures and also simple GIC restorations. More complex treatments are provided back in Westmead Hospital. (NHMRC 1994)

Specific Services And Facilities For Older Adults:

There are a number of programs which exist primarily to provide dental care for a specific group or which are confined to specific services. Some of these programs are

relatively informal, and therefore it is difficult to quantify the nature or extent of care provided through them. (NHMRC 1994) Within the private sector, the State branches of the ADA (Australian Dental Association) support schemes in which dental practitioners are nominated to provide care for residents of nursing homes, hostels and similar institutions. Within South Australia, for example, each of the 167 institutions has a designated dentist who is available to provide care. The costs of prosthodontic care may be met by the state Pensioner Denture Scheme (for persons with health card entitlement), while individuals themselves are responsible for other treatment costs which dentists may charge. (NHMRC 1994)

Within the Commonwealth government, the Department of Veterans Affairs has played the most significant role in direct provision of dental care. Much of the care provided through the Department's program is received by older adults, and the main form of service delivery is through private dental practices. A uniform schedule of fees exists covering the costs of most forms of general dental care, and subject to prior approval, some items of more advanced treatment. In the 1987-88 financial year there were approximately 376,000 beneficiaries. A total of 340,000 services were provided at a total cost of \$22.52 million, of which \$950,000 was for dentures. (NHMRC 1994)

The following description of services is summarised from the NHMRC Expert Panel examining dental services for disadvantaged groups *State and Territory Government Dental Services and Facilities with a Primary Focus on Older Adults* (NHMRC 1994).

New South Wales domiciliary services are staffed by 6.5 FTE (Full-time equivalent) dentists treated 11,191 persons in 1991-92 dominated by general dental care operating from the United Dental Hospital (Sydney). Institutional services staffed by 2.2 dentists treated approximately 1000 persons in 1991-92 dominated by services in the New England Region and from the United Dental Hospital.

In **Victoria** the domiciliary services are staffed by 1.0 FTE dentists treated 307 persons in 1991-92 providing general dental care. No institutional services are reported.

Queensland reported no domiciliary services. Institutional services, operated within two regions (out of nine), provided general dental care for 1729 persons in 1991-92.

South Australia domiciliary services staffed by 1.4 FTE dentists treated 1,2000 persons in 1991-92 providing denture and emergency care. No institutional services were reported.

Western Australia domiciliary services staffed by 0.8 FTE dentists treated 1,615 persons in 1991-92 providing general dental care. Institutional services staffed by 1.4 FTE dentists treated 2,842 persons in 1991-92.

Tasmania reported no domiciliary or institutional services.

Northern Territory domiciliary services reported for Northern (0.1 FTE dentist) with institutional services staffed by 0.2 FTE dentists in Catherine and Southern regions.

ACT had no domiciliary or institutional services reported.

Some of the problems relating to dental services for the elderly noted in the report

(NHMRC 1994)

1. Attitudes of the elderly individuals:

These attitudes are not adequately researched, but it is suggested that older persons believe that poor oral health is a concomitant of ageing and that nothing can be done. Chronic dental disease is accepted as a consequence of the ageing process by the older person. Therefore, restorative and preventive dental care, even care for acute conditions, is not sought as much by the elderly as by younger persons. Even when free care is offered, many older person do not take advantage of it.

2. Attitudes of the public and carer of the elderly:

Most of the dentists feel, or are trained to believe, that older persons are poor candidates for dental rehabilitation and preventive care. The major cause of these attitudes is a lack of understanding about the nature and process of human ageing and their relationship to oral health. These attitudes are further exacerbated by the failure of dentists and economic situations.

3. Education of allied professionals:

A need exists for a joint dental-medical orientation course to disseminate dental information to members of the medical profession.

4. Education of dentist:

A need for a joint dental-medical orientation course on the program for the chronically ill and aged person.

5. Accessibility to dental care:

For rural and remote areas, many are unable to obtain dental care because of the hospital location, difficulties associated with travel and accommodation, and the length of the waiting lists.

For lower socio-economic groups, the main obstacle is the financial burden to private dental services and long waiting lists for public services.

For handicapped groups, obstacles include: communication problems for mentally handicapped; physical barriers like design of dental clinics for the physically handicapped; and special skills and techniques for the medically compromised persons.

6. Finance:

Existing public programs have limited coverage of approximately 20% of eligible health card holders who face unsatisfactory waiting periods for basic dental care and a lack of access of timely preventive and restorative dental treatment. This has resulted in unnecessary loss of teeth. (NHMRC 1994)

To improve the backlog needs and decrease the waiting periods, the following plans may be beneficial (NHMRC 1994):

- A. Subsidised fee for service scheme.
- B. Establishment of regional dental clinics.
- C. Utilisation of school dental clinics to treat adults.
- D. Payment of private dentists to provide care on a sessional basis in their own surgeries.

The treatment needs of the elderly may be summarised as follows (NHMRC 1994):

- 1. The maintenance of health of existing hard and soft oral tissues.
- 2. The provision and maintenance of prostheses.
- 3. The regular examination of patients to check for oral pathology.
- 4. Education in, or provision of, preventive oral hygiene care.

The first of these objectives can only be carried out by a dental surgeon and the next two may also require advice from a hospital consultant dental surgeon. The fourth objective may be carried out by dental hygienists or health educationalists.

5.4 ATTITUDES OF AUSTRALIAN DENTAL STUDENTS

The attitudes of Sydney dental students towards elderly persons was studied (Ettinger et al 1984) using a semantic differential questionnaire developed by Rosencranz and McNevin in 1969. USA dental students from two Universities were used for comparison. Knowledge about ageing was also obtained from the study populations through the use of *Palmore's (1977) Facts on Ageing Quiz (Palmore 1977)*. Analysis of this data indicated that Sydney dental students viewed persons aged 65 over as more ineffective, less autonomous and less personally effective than did the USA students. The Sydney students were significantly less well informed about ageing than the USA dental students as measured by the number of correct answers on Facts on Ageing Quiz. (Ettinger et al 1984)

How will these Australian dental students treat the elderly when they are in practice? It would appear that more emphasis is required on the problems of the elderly in this Australian dental school. Courses in geriatric dentistry should provide relevant clinical information based on *'information on normal aging as differentiated from aging changes related to pathology as well as the social, behavioral and medical implications for the dental treatment of geriatric patients'* (Ettinger et al 1984)

Dentists are not the only ones to have problems with the treatment of the aged. *There is general reluctance among health workers to care for their elderly patients or clients.*

The aetiology of this reluctance seems to be multifactorial and the factors most commonly listed are (Ettinger et al 1984):

1. Negative attitudes towards the elderly generated by a cultural bias against old age.
2. A financial disincentive generated by additional time needed to treat elderly patients.
3. A lack of experience in treating patients away from the private office setting.
4. A general lack of knowledge and experience in treating elderly patients.

USA dental students share the same negative bias towards the elderly, many entering dental school with this bias. All dental students appear to have a low knowledge in Geriatrics and Gerontology. Further more, short term clinical experiences with the elderly and handicapped groups produced no significant change in this attitude. (Ettinger et al 1984)

Since it is a professional obligation for dentists to care for the elderly, dental curricula should attack the misconceptions and stereotypes held by dental students.

6 SURVEY OF ELDERLY WOMEN IN SYDNEY

In previous chapters the characteristics of the aged population, particularly women in Australia, their dental problems and their needs and demands for dental services have been discussed. Many factors could improve the oral health of the elderly (NHMRC 1994) including the approach taken by the dentist provider.

The writer believes that *dentists do not take an holistic approach while dealing with patients*. It was in order to test this belief that the research project was conducted.

6.1 HYPOTHESIS

The hypothesis taken for the research is '*Dental practitioners do not take an holistic approach while treating elderly women.*' The null hypothesis is thus '*The dental practitioners do take an holistic approach while treating elderly women.*'

The objective of this research is to prove the hypothesis or disprove the null-hypothesis.

A number of different approaches were considered for this research and were rejected if they were too expensive to implement, impractical, or subject to too much potential bias. In government services, such as Westmead Hospital Dental Clinical School, there are guidelines for the approach to be taken for patient assessment by the dental officers and mechanisms for referral of patients and consultation with GPs or specialists, and complete medical histories are taken for all patients. Any research in this area could be tied in with quality control for that organisation, such as a check on whether the guidelines are indeed being followed. However, more than 80% of dental services in Australia are provide through private practitioners, who do not have the same sort of quality controls that operate in some government services. Direct observation of individual dentist / patient relationships is very difficult, especially in private practice situations. Interviews of dentists concerning their actions would give some relevant information, but self answered questionnaires are unlikely to give good responses to any perceived challenge to the way in which the dentists practise their dentistry.

Patients are those for whom we have most concern, and it was decided to interview a sample of the elderly as they are concerned with their own health, and are in a position to report directly on actions that they have observed, or perceived, with their dentist.

6.2 METHOD

In order to prove the hypothesis or disprove the null-hypothesis a suitable sample was interviewed by the writer. The sample selected for interview were women over the age of 65 years, whom one would expect to be at high risk of having other medical conditions present when they make a visit to the dentist. It was considered likely that they would have an interest in their own health and the health care management that they receive.

Questionnaire

A simple structured interview questionnaire was developed to determine if the dentists appeared, to the women in the sample, to be interested in and take note of the other health problems of their patients. There were no surveys noted in the literature that had looked at the dentist approach from the viewpoint of the patient so the questions were developed through trial interviews with elderly women, and discussions with colleagues with an interest in comprehensive patient care. A draft questionnaire was pre-tested on a convenience sample of 10 women aged over 65 years and amendments made.

The final questionnaire used is shown in Figure 10. The questionnaire is concerned with:

- The frequency of visits to the dentist (Questions 1, 2, and 4)
- What other health problems the patient had during visits to the dentist, in addition to their dental problem (Questions 3a)
- Whether the dentist viewed the problem holistically or specifically (Questions 2b, 3c, 5, 6 and 7)
- Was the problem of the patient solved to her satisfaction (Question 8)
- Estimated age of the dentist (Question 1b)

Interviews

Face to face interviews were conducted by the writer using the structured questionnaire.

Permission to conduct interviews in 11 Supermarkets; 11 Railway stations; 2 Nursing homes; and 7 Medical centers was received in different Sydney suburbs and elderly persons approached at random. With very few exceptions these women agreed to participate in the survey after it was explained that the writer was from Sydney University and needed information from them concerning their use of dental services.

Interviews generally took 15 to 30 minutes to complete. The respondents were seated in a convenient location and allowed plenty of time to respond to the questions in a relaxed interview situation.

Figure 10 Questionnaire used for survey of elderly women in Sydney

INTERVIEW .QUESTIONNAIRE

Name Age Residence

1) How often do you visit your dentist?

... Once in 6 months ... Once in a year Other

b) Approximately how old is your dentist?

2) When did you last see a dentist?

.....

b) Did he take your medical history

3) Did you also have other health problems while seeing the dentist?

... Yes ... No

If yes

a) What were those problems?

.....

.....

b) Did you tell the dentist about your (those) problems?(Yes or No)

(comments).....

c) Did the dentist ask about it?

if yes did the Dentist

a) Did the dentist contact your GP or contact with your specialist

... Yes ... No

b) Did the dentist contact your care taker ?

... Yes ... No

4) How many times did you go to the dentist with same problems?

.....

5) Did your dentist give you enough time to explain your problems?

... Yes ... No

6) Did the dentist ask you about your other health problems?

... Yes ... No

7) Did the dentist ask you any question regarding your psychological/emotional state?

... Yes ... No

8) Was your problem solved satisfactorily?

... Yes ... No

6.3 RESULTS

Sample size

A sample of 100 Elderly women (aged 65 and above) were interviewed.

The distribution of the sampled population was spread throughout the Sydney Metropolitan Area in the following suburbs:

Penrith: 9	Kingswood 10	St Marys: 8	Blacktown: 6
Parramatta: 8	Redfern: 9	Fairfield: 8	Lane Cove: 7
Liverpool: 12	North Ryde: 10	Mona Vale: 10	

Age of those interviewed

The distribution of the sample by age was over-represented by those under 70 years when compared to the normal population (ABS 1997).

Age [years]	65-69	70-79	80 +	Total
Number	83	13	4	100
Per cent	83%	13%	4%	100%
Expected	35%	48%	17%	100%

Age of the dentists [as estimated by their patients]

With 40% of the dentists estimated to be under 40 years their age distribution was slightly below that which could be expected (AIHW DS&RU 1994)

Age [years]	25-39	40-59	60 +	Total
Number	40	50	10	100
Per cent	40%	50%	10%	100%
Expected	42%	42%	16%	100%

Frequency of dental visits

The frequency of visits was high with 35% indicating that they usually visited the dentist every 6 months and 45% said that they visited once in a year.

Last visit to dentist

Many of the sample interviewed reported that they had visited the dentist more recently than would be expected for this age group. In the National Oral Health Survey (Barnard 1993) only 39% of those 65 and over had visited the dentist in the previous year.

Last visit	Fairly recent	6 mos ago	1 year ago	> 1 year	Total
Number	30	50	12	8	100
Per cent	30%	50%	12%	8%	100%

Visited dentist with same problems

The sample indicated that they had the same problem(s) when they went to the dentist again and again. This is shown clearly on the table.

Number Visits	2-3 Times	3-4 Times	4+ Times	Total
Number	40	42	10	92
Per cent	43%	46%	11%	100%

Dentist takes medical history

Medical history had been taken at some stage by the dentist (or chairside assistant) for 20% of the sample. This appeared low to the writer.

Patients having other health problem(s)

The number of cases where the patient had other health problem(s) in addition to their dental problem was high at 92 [92%].

The problems were mostly those as detailed in chapter 3 of this thesis.

Dentist asked patient about other health problem(s)

The number of cases where the dentist asked the patient about other health problem(s) was very low at 8%. In 3% of cases the dentist made some suggestions about the other health problems.

Patient told dentist of problem(s)

Only 5 [6%] of the 92 with problems took the initiative to tell the dentist of their other health problem(s).

Dentist made contact(s)

In no (0%) cases did the patients indicate that the dentist made any contact with their GP, specialist or caregiver.

Dentist does not give enough time

Very few of the women, only 12%, in the interview sample felt that their dentist gave them enough (or indeed any) time to explain their problems.

Dentist enquires about psychological / emotional problems

Not one of the 100 elderly females in this sample reported that their dentist had ever asked any question regarding their psychological or emotional state.

Resolution of patient problem(s)

In only 5% of the sample did these patients think that their problem(s) had been solved satisfactorily after repeated visits to the dentist

Comparison of actions of dentists, by age

The responses were analysed from information provided by the sample for dentists aged less than 40 years (n=40) compared to those over 40 years (n=60). It was thought that the older dentists (age group 40 and above) would be more inclined towards asking the patients about other health related problems. However, no statistically significant differences were found between these two dentist age groups.

Summary

The sample approached were most co-operative in agreeing to be interviewed. They were relatively frequent attenders at the dentist, and a higher proportion had visited the dentist in the previous year than one would expect in a community sample. There was a higher proportion of the younger elderly in the sample and they appeared to the interviewer to be very interested in, and aware of, their own health and dental problems.

A very high proportion (92%) of the sample had other health problems. The writer, during the course of her survey also interviewed 30 dentists, 12 general medical practitioners, and 26 dental assistants who confirmed that most of their elderly women patients suffer from the problems described in chapter 3 of this thesis

From the survey responses it would appear that the dental practitioners in most of the cases did not practise with an holistic approach and treat their patients based on their local symptoms, with little apparent reference being made to their other health problems.

7 DISCUSSION

From the discussion of the many diseases from which the elderly women suffer, it is very clear that to properly diagnose and treat those conditions an holistic approach must be taken.

If the dentist only looks at the pathology, or tries to cure the specific pathology instead of looking beyond the patient's mouth and without considering the psychological condition of the patient, or considering all the other physical conditions of the patient he will probably miss the cause of the disease or give a temporary solution to the problem. The views of a number of authors, not cited directly in the text, reinforce the information presented in this thesis and the conclusions that have been drawn. (Baum 1980, 1981, 1986, 1988; Beck JD 1984, 1988, Ghadirian 1991; Gift 1984; Gilbert 1989; Goldstein 1988; Gremowski et al 1987; Heyman & Jeffers 1963; Tryon 1986)

If the dentist takes a linear approach in dealing with the conditions it is more probable that he will misdiagnose and hence giving wrong treatment or a treatment which may treat the condition superficially (temporarily) instead of permanently removing the root cause. In such a situation the patient will be going to the dentist repeatedly with the same problem.

To give a satisfactory solution to these oral health problems, in other words to give a good service to the patient, the dentist must take a holistic approach in dealing with each case. He will have to give enough time to the patient, he must listen to the patient, must look for the physical and psychological cause of the disease, and must consult with the patient's general physician or care taker. The dentist must consider the fact that the cause of a severe dental pain might not be anything to do with the teeth or the mouth and the origin of this pain may be something totally different.

The *medical aspects of oral care for the older person* are very important. The dentist must consider the fact that the condition of the mouth can affect self esteem, aesthetics, nutrition, social interaction and personal comfort. General health can deteriorate because of problems with mastication, mucosa or the periodontium. The resulting emotional and psychological impact can be devastating to the older patient, who already may be depressed, or in pain, or have other chronic medical conditions. While dealing with elderly persons suffering from chronic diseases like arthritis, hypertension and heart disease, the dental team have to play an

increasing role in the total medical management of the older patient. Medical history-taking will be more important, more complex and more time-consuming than ever before. Dentist knowledge of the *systemic effects of chronic disease on oral health* will be critical to successful practice and will require an integrated approach to diagnosis and treatment involving consultations with physicians, pharmacists, physical therapists, nurses and nutritionists.

Along with *medical history*, it is essential that the oral health team record a *medication profile* for each patient. A medication profile can indicate the severity of a patient's medical condition. More than 400 medications are known to cause oral side effects. Tables 4-6 listed many commonly prescribed medications as well as their indications, drug-induced conditions, adverse reactions, etc. Research shows that the per cent of the population taking at least one prescription medicine increases with age. The mean number of prescriptions, for those taking at least one, also increases with age from five in 19 to 24 year-olds to a staggering 14 for the 65 and older age group. (Table 5)

Chronic diseases limit cooperation and compliance with oral health care. Arthritis, stroke and other movement limiting conditions significantly hinder oral hygiene at home and treatment in the dental office. For example, simple movement of the arms above the shoulders is a problem for 16% of senior women, and sitting in one position for an hour is a problem for a similar number of older men and women.

Of adults aged 65 and over, about one third *have heart conditions that may present problems during dental treatment* including choice of local anaesthetic, duration of the appointment or chair position. With the older adult, the dental team is frequently called upon to diagnose and manage emergencies, such as the life-threatening '*silent*' myocardial infarction. Stroke and cerebrovascular accidents, the third most common cause of death for men and women over age 65, can lead to major disabilities. Oral ramifications associated with sensory and motor loss are often devastating. Maintaining oral health in these individuals can be particularly challenging, but also extremely rewarding.

Approximately 10% of the population over age 65 is affected by *conditions compromising intellectual capacity*. Specifically, dementia is a problem, as treating patients with dementia raises questions of ethics and patient autonomy. Problems arising from orientation and perception can occur during treatment. Senile dementia of the *Alzheimer's* type, the most

common dementia, will approach epidemic proportions as the older population grows in number and longevity. Dental professionals and their entire staff should be adequately prepared to care for the patient with dementia.

Each year, about one million Americans are diagnosed with some form of *non-dermatological cancer*. Of these, about 400,000 will develop oral complications from cancer treatment. Complications can take the form of mucosal inflammation and ulceration, bacterial, viral and fungal infections, mucosal bleeding, salivary gland dysfunction and xerostomia, coronal and root caries, osteoradionecrosis, and taste loss. (American Association for Retired Persons 1988)

Head and neck radiation treatment and anti-neoplastic chemotherapeutic agents need the combined efforts of medical and dental teams. Ensuring that the mouth is clean is the simplest pretreatment strategy. After cancer treatment has begun, oral infections can trigger systemic and potentially life-threatening conditions. Home fluoride gel applications are indicated throughout radiation treatment, since caries associated with decreased salivation is an expected complication.

While dealing with the elderly, the dentist must consider the fact that, particularly among older patients, a disease with a classic array of symptoms will show up occasionally with *few or none of the characteristic signs*. Symptoms in older adults may be vague and non-specific and could include refusal to eat or drink, loss of coordination, incontinence, acute confusion, worsening dementia, weight loss and/or failure to thrive. Any of these symptoms may suggest disease and should never be dismissed as attributable solely to ageing.

Atypical presentation of oral disease in older adults may include gingival overgrowth, and various oral lesions, the frequency of chronic infection is more common. Older adults tend to minimise their symptoms and often fail to report them to their physicians (or dentists). One possible explanation for such behaviour is denial. The inevitable consequence of this behaviour is that patient does not receive timely treatment for their dental problem.

The dentists should set goals for *assessment and treatment planning* of his older patients. Although seniors face special health care problems, the dental team's goals in caring for older adults are essentially the same as those for younger patients. Achieving the goals specific to

the older population is often more complicated and time consuming than those of the younger one. Making decisions for the patient instead of with the older patient may comprise the person's self-determination as well as the quality of the treatment plan.

Age itself is not a key factor in treatment planning. However, age-related oral changes, the prevalence of various oral diseases, multiple chronic diseases and their concomitant drug use and functional impairment complicate treatment planning for older patients.

Assessment is the key to developing a comprehensive, appropriate treatment plan. The elderly should be first interviewed. For the cognitively impaired elder, the presence of a care giver may facilitate the interview process. The social history should assess living arrangements, mental status, transportation to and from the office and financial considerations. Separate, well-organised forms for recording medical history, medications, physical exam findings and vital signs are helpful, since the medical status may change. Frequent updating of information on these forms is equally important. The interview setting should be quiet and private, particularly if the patient being interviewed has a hearing impairment. Asking the patient to bring all current medications to the dental visit is helpful in obtaining an accurate medication history. Skilful questioning can reveal whether the patient is taking the medications correctly.

For the older patient, an assessment of the *need for antibiotic prophylaxis* before a dental treatment is a must. Cardiac valvular disease, with its attendant risk of bacterial endocarditis, is an important consideration. Specific questions should address any history of endocarditis or rheumatic fever, shunts, prosthetic valves, mitral valves prolapse and heart murmurs. About one third of the population aged over 75 has heart murmurs, but not all heart murmurs require antibiotic prophylaxis. (Oral health and aging 1992) Consultation with the patient's physician is important. Patients with prosthetic joints are at risk for bacteraemia induced joint infection and consultation with the patient's orthopaedic surgeon is indicated.

From the discussion in chapter four it is clear that the dental manpower available today is not well equipped to meet the ever increasing need and demand of the elderly population, especially females, in Australia. There is a lack in their knowledge while dealing with an elderly patient because in most of the dental courses that are conducted in Australia very little is taught about dealing with elderly people.

The majority of dental schools teach mostly how to cure oral pathology. Students do not learn to look holistically while dealing with a patient. Most of the dentists today are so overburdened with treating the pathology that they are reluctant to give enough time to the patient; which is an absolute necessity while curing any disease in elderly people.

From the research study data of the writer it is seen that while 92% of the patient had other health problems while visiting the dentists only 3 of them were asked about it and none of them were referred to a GP or care taker. Only in 8 cases did the dentist take a medical history of the patient. This sort of approach is contradictory to the holistic approach. For an holistic approach it is required that the dentist give enough time to the patient but in this survey it was seen that only 12% of the patients thought that the dentist gave them enough time to listen to them.

When solving the problem holistically, it is required that the dentist take due consideration of the psychological or emotional state of the patient. However the survey revealed that none of the dentists, whom the sample had visited, appeared to have investigated the psychological or emotional state of these patients.

The survey also indicated that only 5% patient think that their problems had been solved satisfactorily and most of the patients (97%) were coming (more than once) to the dentists again and again with the same problem. The reason behind such failure is that the dentist solved the problem partially, he did not take other health and related things into consideration which would have solved the problem more successfully.

The results of the survey clearly supports the hypothesis of the writer ie. *'Dental practitioners do not take holistic approach while treating elderly women.'*

The survey of the literature in this thesis has clearly shown the elderly in Australia are increasing and that the *population is an ageing one*. By 2021 it is expected that 16% of the population will be 65 years or older (ABS 1984). The *oral health of the elderly is changing* with more teeth at risk for periodontal involvement and root dental caries, and fewer being edentulous. Although the elderly are the lowest users of dental *services their utilisation increased* from 22% (visiting a dentist in the previous year) in 1983 to 36% in 1988 and will definitely increase in the future (Barnard 1993). There are many barriers to

the utilisation of dental services by the elderly and *cost is also an important factor* as those over 65 years have the lowest proportion of persons with dental insurance and the group is much more dependent upon government services than other adult groups.

The National Health and Medical Research Council of Australia has presented the most appropriate recommendations for the future. (NHMRC 1994)

1. Geriatric service should become a prominent part of university, hospital, and dental profession functions.
2. Political pressure on government at all levels are likely to increase, it involves the health providing professions to determine reasonable solutions before they are forced to.
3. The dental therapist model in Australia seems appropriate for expansion into the area of geriatrics.
4. Dental students, dental hygiene students, and residents could have mandatory rotations among geriatric populations.
5. Hygienists and dental assistants especially trained as plaque control therapists could be licensed to go to the homes of the aged and work directly with the public.
6. The profession should stimulate programs that educate those dealing directly with the elderly. Nurses aides, nursing-home personnel, patient's family and friends could be involved with complete care.
7. Professional clinicians should visit old peoples homes and give regular, through professional prophylaxis to all at-risk people.
8. Future research into the adjunctive roles of antiplaque mouth rinses would seem appropriate. Chlorhexidine, tetracycline, and metronidazole are the three promising agents that may have a significant role in plaque control and periodontal health maintenance of the elderly.
9. The full spectrum of periodontal therapies should be offered and be available to the aged.

In summary we can say that the population is ageing all over the world. The number of elderly population is on the increase and expected to continue so in both industrialised and developing countries. The ageing of Australia and the increase in the life span and

life expectancy of the population in Australia is evident. The elderly have many social barriers in obtaining adequate and routine oral health care. These barrier include cost, mobility, transport and availability of oral health services. More extensive surveys and studies may need to be carried out to give more accurate and realistic numbers of the elderly who live at home on their own and may be homebound, and the numbers in residential home care and hospitals. The existing studies carried out on the dental needs of the elderly have made it quite clear that dental treatment should be provided and made more accessible and available to the elderly population. For the edentulous elderly, services to provide routine examination and evaluation of their existing denture should be easily available. Such services could be provided by a domiciliary dental unit. The dentate elderly should also have regular dental examinations like the rest of the population. Services to provide periodontal care is especially needed. The provision of a free dental health service to the elderly will certainly enhance and improve the quality of the life of the elderly population.

8 CONCLUSIONS

From the discussion and material presented in this thesis it has been concluded that:

- The elderly population in Australia is ever increasing and the need for dental treatment will increase in the future.
- Common diseases with which elderly women suffer can only be managed if an holistic approach is adopted.
- The present day structures of the dental health care and dental education systems of Australia are not well equipped to tackle the problem of providing dental health to the elderly women.
- Research indicates that dental practitioners do not take an holistic approach while treating elderly women.

Considering these facts the *writer is recommending* the following which she believes will dramatically improve the present situation:

1. Dental education should be modified such that:
 - It teaches with an holistic to dentistry
 - It teaches geriatric dentistry
 - It teaches human psychology to some extent
2. Dental practitioners should take a detailed medical history before treatment
3. When needed, the dentist should refer the patient to the GP or specialist.
4. While treating, the dentist should give proper attention to the psychological and emotional condition of the patient.

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