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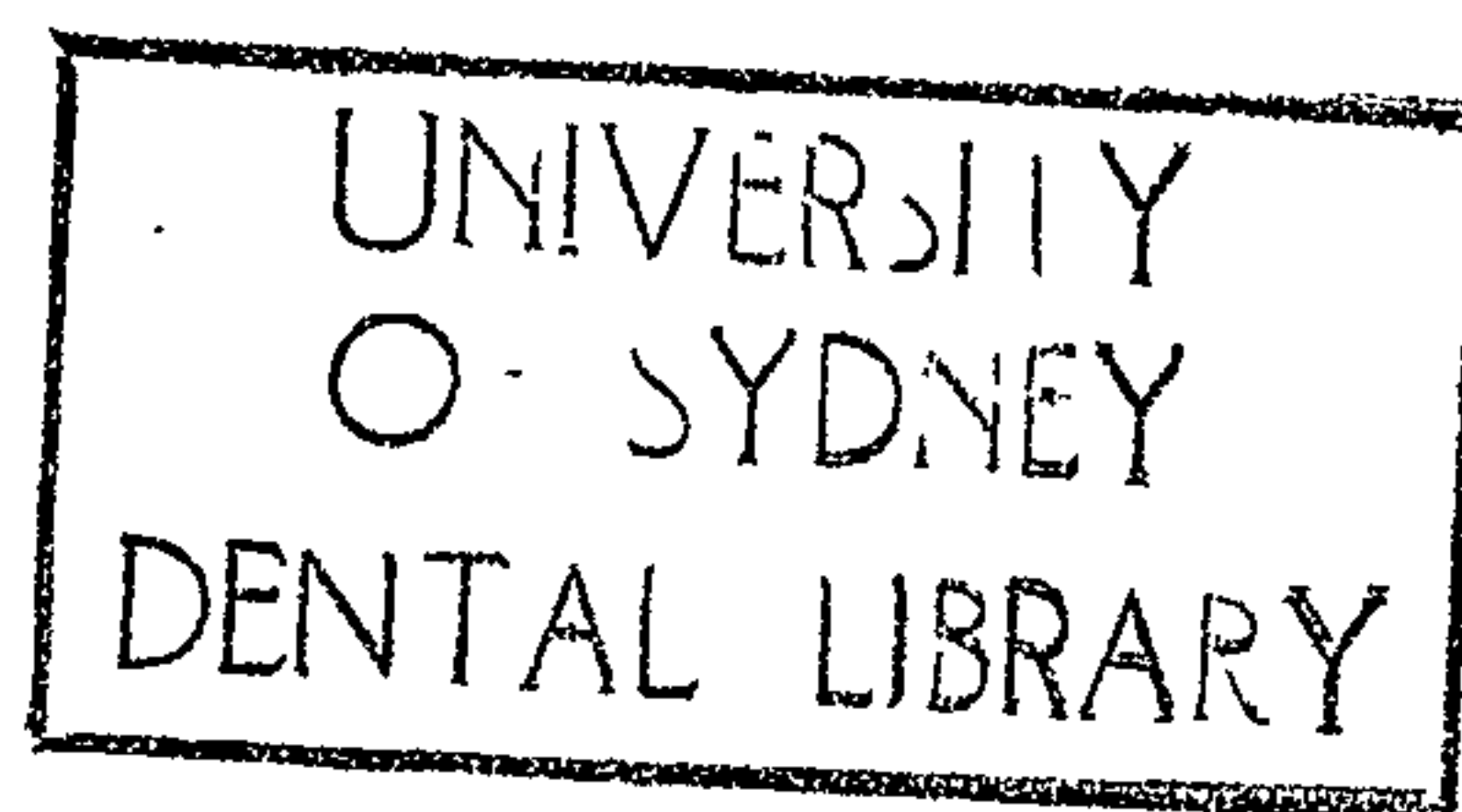
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DENTAL HEALTH EDUCATION IN THE PREVENTION
OF PERIODONTAL DISEASE.

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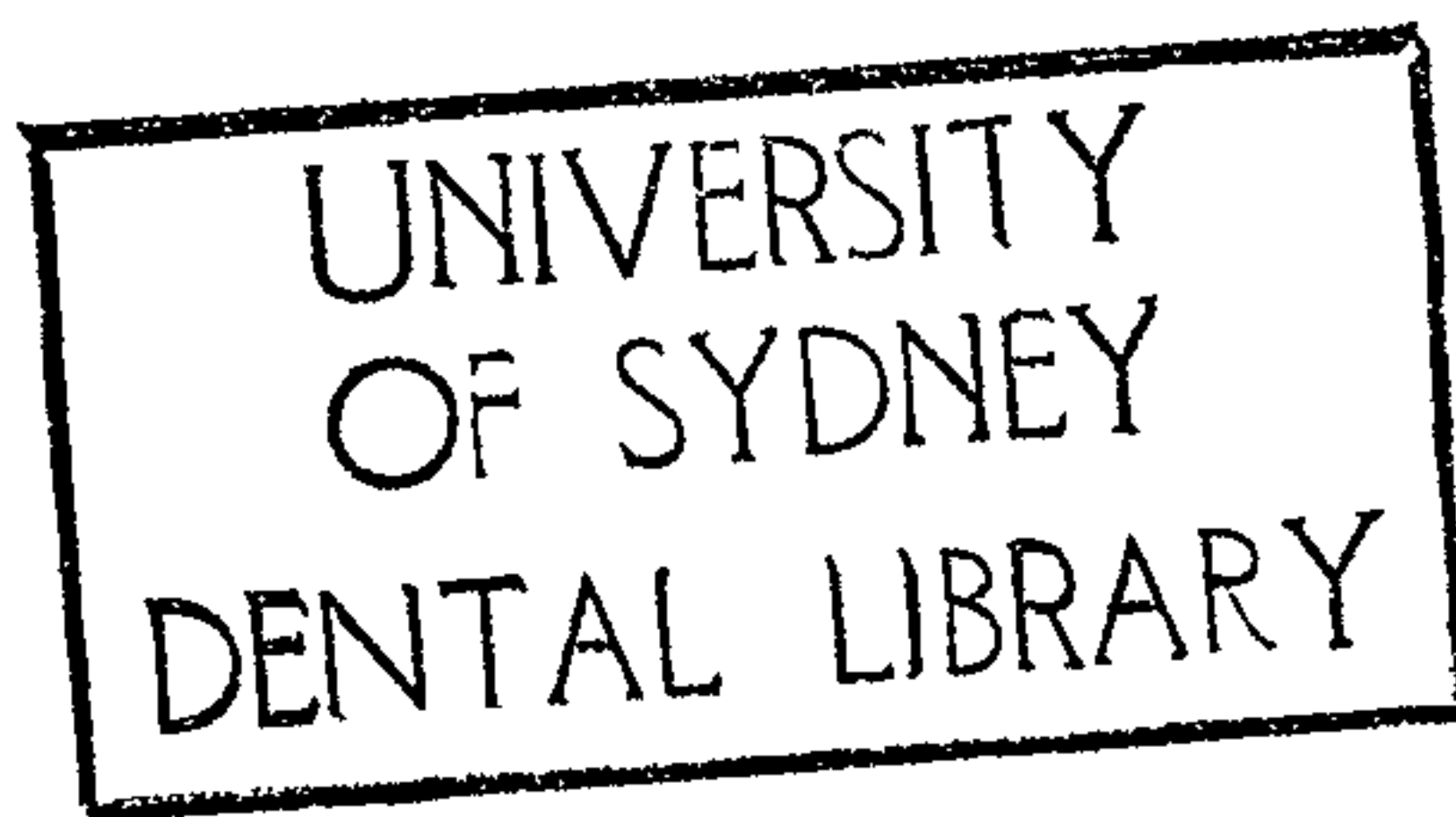
A thesis submitted in partial requirement for
the Diploma in Public Health Dentistry.

Department of Preventive Dentistry

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1983



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SUMMARY

Periodontal disease is one of the most widely prevalent diseases in mankind affecting approximately half the child population and almost the entire adult population.

The W.H.O. Expert Committee decided that the main principle in the control of the world-wide problem of periodontal disease was educating the public as to the benefits of prevention by intensive dental health education.

Hence the aim of this thesis is to:

- (1) discuss methods of bringing awareness of periodontal disease to a community;
- (2) discuss methods of motivating people to adopt dental health practices conducive to minimising periodontal disease;
- (3) review literature on methods and techniques of dental health education..

Microbial plaque constitutes the major and possibly the only extrinsic agent in the aetiology of inflammatory periodontal disease. Other factors influencing periodontal disease were reviewed.

The educational process should be continually applied at the primary preventive level. This involves the promotion of periodontal health through dental health education to improve oral hygiene, periodic dental examination with proper advice on prevention and onset of gingivitis, and

education to raise the standard of nutrition and diet.

Many internal and external factors and forces affect the outcome of the educational process, and must be recognized in planning dental health programmes. Any barriers to dental health education must be reduced, removed or penetrated by the educator before the learner can make any movement towards the desired goal.

Most people are unaware of periodontal disease and even if they are aware, it does not seem a serious problem. It is, therefore, the responsibility of the dental profession and the dental health educators to increase public awareness of the value of periodontal health.

The next step would be to inform the community of scientific facts concerning periodontal disease. Information must be authenticated from reliable sources; messages must be simple, understandable and meaningful to the receiver. Effective communication means tailor-made programmes especially designed for the situation, time, place and audience.

However, the mere provision of information as to what is good for health may not move people into action. There are various factors and sources of motivation that drive an individual to adopt dental habits which must be sought. If there is no motivation of the individual, the purpose of dental health education is lost.

The concept of the "dental team" is well established and the "team approach" to preventive dentistry has many

advantages. The crucial person is the dentist, who with other dental health educators should be trained in educational concepts and behavioural principles related to ways of motivating people to take effective dental health action.

In any dental health education activity, certain priority groups have to be identified. Of these groups, school children top the list because habit patterns are in the process of being formed. The entire school population as a captive audience is an ideal setting and should be fully exploited. Also, expectant and nursing mothers are easily motivated to receive advice on care of their babies and themselves, and they can be reached through pre-natal and post-natal clinics. The handicapped should be considered an important priority group and should not be forgotten.

Preventive periodontics consists of many inter-related procedures, but it revolves to a very large degree around education and motivation of the patient to accept and perform oral hygiene procedures required to remove plaque on a continuing daily basis. Dental health education should also include nutritional counselling and encourage people to go for routine dental check-ups. While teaching oral hygiene procedures, besides teaching correct methods of tooth brushing, the use of other cleansing aids such as dental floss and interdental cleansers should be encouraged.

In the propagation of dental health education, the use of the media are equally essential. Audio-visual aids can help to build concepts and can be a valuable aid in teaching dental health education for small groups or for individual instruction, making a good visual impact. Television, radio, newspapers and pamphlets have a wide coverage and can reach almost all ethnic groups in a country. Dental health education campaigns can also be held for school children as well as for the general public.

Periodic evaluation of dental health education programmes are equally important to determine whether the programmes are progressing satisfactorily towards the set objectives and goals.

Prevention of periodontal disease is within the means of all individuals. It is a disease none of us need have. There is a convincing amount of data to show that good oral home care alone or combined with professional cleaning and/or the use of antimicrobial compounds are able to control dental plaque. These will reduce the prevalence of periodontal disease in a community. Various dental health education activities, methods and techniques have been broadly discussed in this thesis. The knowledge gained through dental health education, that periodontal disease is preventable, time-consuming, difficult and costly to treat in its late stages, and that simple treatment

can only be effective when it is instituted early, hopefully, will motivate the individual to practise good oral hygiene daily and seek regular dental care.

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1. INTRODUCTION

"If deviation from perfect health is used as a yardstick, practically all human beings have periodontal disease" (Waerhaug 1970).

Periodontal disease is one of the most widespread diseases of mankind. No nation and no area of the world is free from it, and in most it has a high prevalence, affecting in some degree approximately half the child population and almost the entire adult population (W.H.O. 1961).

Age-related surveys reveal that far from being a disease solely of later life, periodontal disease is common in childhood. (Powell 1965). Gingivitis is commonly seen in children and most adults have experienced gingivitis, periodontitis or both. Survey data gathered by the American Dental Association indicate that, in men over the age of 35 and in women over the age of 40 years, periodontal disease is responsible for between two and three times as many extractions as dental decay (W.H.O. 1961).

Surveys carried out in the British adults revealed that periodontal disease of great severity was prevalent and is a major dental health problem (Sheiham 1969).

Epidemiological studies in countries of Asian and South Pacific regions indicate that periodontal disease is pandemic in these countries and occurs early in the lives of most individuals. Periodontal disease is also widely prevalent in developing and under-developed countries such as India and Africa (Wong 1975).

The human resources of trained personnel necessary for the administration of dental therapeutic procedures throughout the world is overwhelmed by the need, therefore it is necessary to look increasingly to the primary prevention of oral diseases as the ultimate answer to this costly area in national health. In spite of the sophisticated dental care available in highly developed countries such as the United States, still more than 2 billion dollars per year is spent in correcting secondary defects rather than primary prevention of periodontal diseases. (Zaki et al 1969). Taking into consideration the gravity of this problem, it becomes evident that early preventive measures both for the welfare of the individual and his community are difficult to ignore (Leavell and Clark 1965).

With increased retention of natural teeth into older age anticipated as the dental caries problem comes under control, the magnitude of periodontal problems is likely to increase. The increased awareness of the widespread prevalence of periodontal disease and the tooth loss it causes, plus the existence of a backlog of untreated

disease which increases more rapidly than the ability to treat it, make it imperative that the emphasis in periodontics shift from treatment to prevention (Glick - man 1967).

Unlike fluoridation of water which is the single most effective means of caries prevention on a large scale with minimal community participation, there is no such simple answer to periodontal disease. However, knowledge accumulated during recent years largely explains the initiation and progression of inflammatory periodontal disease. Research into the aetiology, prevention and treatment of periodontal disease has provided knowledge which is adequate for control of the disease at individual and community levels.

Yet, periodontal disease presents a universal public health problem and this is due to the inadequate application of the available information on preventive measures dealing with oral hygiene (W.H.O. 1961). As periodontal disease is difficult, time-consuming and costly to treat in its late stages, and as simple treatment can only be effective when it is instituted early, every endeavour should be made to educate the public and draw attention to the need for prevention and early care. The key to prevention is education towards oral health. The W.H.O. Expert Committee on Health Education decided that the main principle in the control of the world wide problem

of periodontal disease was educating the public as to the benefits of prevention by intensive dental health education.

Recent studies have also proved that periodontal disease can be controlled and prevented through an effective dental health education program for the public. Education should be the prime importance, for the dental profession, onto which a sound preventive program can be built. Dental health education should be the tool used to prompt people to seek advice and help, and it is at this stage that each dental practitioner should use his influence to create a more lasting effect. Ancillary personnel must be used to their fullest advantage in order to bring the available professional manpower to the highest efficiency.

The world-wide prevalence of periodontal disease should be a constant reminder of the almost universal need for effective dental health education programs. Hence the aim of this thesis is to:

1. Discuss methods and techniques of bringing awareness of periodontal disease to the community through dental health education;
2. Discuss methods of persuading people to adopt and sustain dental health practices conducive to minimising periodontal disease;

3. Review literature on methods and techniques of dental health education.

"Prevention, not therapy, is today's challenge and hopefully tomorrow's achievement" (Zaki et al 1969).

2. PERIODONTAL DISEASE

Study of periodontal manifestations reveals that these disease processes can be classified into two main groups with subdivisions (Goldman & Cohen 1977).

Inflammation

Gingivitis

Periodontitis (marginal)

Dystrophy

Disuse atrophy

Occlusal traumatism

Gingivosis

Periodontosis

Combination

Periodontitis and occlusal traumatism

Periodontosis and periodontitis

2.1 NATURE OF THE DISEASE

Periodontal disease maybe inflammatory, dystrophic or traumatic. Moreover, combinations of these conditions exist in the same mouth. Much research evidence is emerging to suggest that the term "periodontal disease" encompasses several diseases, each with its own aetiology and pathogenesis (Van Palenstein ~~de~~ Helderman 1981).

Inflammatory or dystrophic disease of the periodontium involves a series of tissue changes, which if untreated may eventually result in complete destruction of the supporting apparatus of the dentition. These changes are initiated and perpetuated by a wide variety of microbiologic, genetic, local and systemic factors acting individually or collectively. In addition they may be modified by the "resistance and repair" potential of the individual, including physical, physiologic, psychologic and socio-economic factors (Ruben et al 1977).

As pathology of the investing and supporting structures of the teeth, comprising gingiva, periodontal ligaments, cementum and alveolar process is so common in adult populations, and the nature of its progress so insidious, and so lacking in painful symptoms, it seems to have become accepted as a fact of life by a large proportion of the public (Altman & Wendon 1974).

2.1.1 Inflammation

2.1.1.1 Gingivitis

The inflammatory disease process involving only the soft gingival tissue is termed gingivitis. This condition, which is often first seen in childhood or at puberty, may continue into adulthood. Gingival inflammation may be either acute or chronic with remissions and exacerbation. Chronic gingivitis is the most common form of periodontal disease.

The gingiva is attached to each tooth in such a way as to form a V-shaped sulcus, approximately 1.5 mm deep, between it and the tooth surface. In periodontal disease, the gingival wall of the sulcus becomes inflamed, and the sulcus deepens and develops into a periodontal pocket. As the pocket deepens, the underlying tissues are destroyed, and the gingiva is progressively detached from the tooth. Gingivitis is characterized by swelling, loss of stippling, redness, change of physiologic contours, and a tendency to bleed easily. Chronic gingivitis is painless.

2.1.1.2 Periodontitis

This disease is characterized by the progressive loss of periodontal attachment through destruction of connective

tissue fibres and the alveolar bone, the commonest clinical finding being deepening periodontal pockets. With the destruction of the periodontium, mobility of the affected teeth develops; the changes of colour and form of the gingiva depend on the chronicity of the lesion as well as the aetiological factors.

It is not yet proven whether periodontitis is a direct progression of untreated gingivitis in a susceptible patient, or whether it is a separate disease. The conversion of gingivitis to periodontitis has been demonstrated experimentally only in dogs (Lindhe et al 1975). In humans, it appears that gingivitis may or may not progress to periodontitis which has prompted Page and Schroeder(1976) to propose that there is either a modification or activation of the host response which exacerbates the disease, or changes in plaque composition with the introduction of more highly pathogenic micro-organisms. Further explanation for the possible conversion of gingivitis to a periodontitis based on immunological grounds has been offered by Seymour et al (1979).

Periodontitis is a chronic progressive, but not necessarily a continuous disease. The rate of progress is not entirely predictable. Recent reports indicate that the progression of inflammatory periodontal disease is not continuous but occurs in cycles. Some severe periodontal

defects appear able to remain inactive for years with no further destruction occurring. It is also apparent that treated patients who subsequently maintained good plaque control do not experience any further progression of the disease (Holborow et al 1983).

2.1.2 Dystrophy

Though different in origin and nature, dystrophic lesions such as periodontosis and occlusal traumatism affect the attachment apparatus of the periodontium. Periodontosis is a rare disease which represents an idiopathic destruction of the periodontium, originating in one or more of the periodontal structures, characterized clinically by migration and loosening of one tooth, groups of teeth, with possible proliferation of the epithelial attachment apically, and irregular bone resorption in a vertical direction. Pocket formation and concomitant inflammatory sequelae are later findings. This entity is seen in young people (Goldman & Cohen 1977).

2.1.3 Combination of Dystrophic and Inflammatory Lesions.

2.1.3.1 Periodontitis and occlusal traumatism

In this combination of processes, a diseased gingival attachment is present along with the degenerative

changes in the periodontium. The same aetiologic factors are responsible for their respective type of destructive process.

2.1.3.3 Periodontosis and periodontitis

When the inflammatory condition develops in periodontosis, one usually observes deep infrabony pockets, advanced mobility patterns, gingival inflammation and the drifting of teeth. It is in this stage that the condition is usually first recognized.

2.2 PREVALENCE OF PERIODONTAL DISEASE

In the evaluation of the importance of periodontal disease in public health, severity as well as prevalence must be considered. The prevalence of periodontal disease varies widely from continent to continent, from country to country and from community to community; furthermore, within the same community, there may be variations in severity associated with age, sex, race, education, socio-economic status and a multitude of other factors.

2.2.1 Correlation of Periodontal Disease with Age.

All epidemiological reports agree that the number of persons with gross and destructive disease increases systematically as the population ages, and that this increase in the number of persons affected is accompanied by an increase in the average severity of the disease as well. There is similar agreement that the onset of the disease may be as early as puberty and that many adolescents show extensive destruction of tissues before the age of twenty (W.H.O. Report 1961).

Sheiham (1979) stated that periodontitis with loss of periodontal attachment of the permanent teeth was reported in 11 year olds and by 15 years, 20 percent

were affected, 88 percent of 25-29 year olds and 98.7 percent of 45-49 year olds had loss of periodontal attachment. The Periodontal Index in that group increased from 2.6 in 25-29 year olds to 5.9 in 60-65 year olds. The disease was so severe that 42 percent of the British adults examined were in the terminal stages of the disease and about to lose their teeth because of the disease. Similar trends for increasing severity of periodontal disease in adults have been reported for Scandinavian populations. In Finland, Modified Periodontal Index increased from 0.90 at 20 to 29 years to 6.00 at 60 to 79 years in females (Ainamo & Alvesaler 1968). Tooth mortality studies are equally revealing. Pelton et al (1954) reported on investigation of tooth loss from all causes in a series of age groups ranging from 15 years to over 60. Dental caries is the predominant reason for extraction in the 15 to 24 years age group, but thereafter declines in importance, until in the 35-44 age group, periodontal disease is responsible for over 60 percent of extractions.

2.2.2 Correlation with Oral Hygiene

Studies have shown that there is a strong correlation between severity of gingivitis and periodontitis and oral hygiene. For an institutionalized population, Suomi (1969)

found that subjects who reported brushing twice or more times daily had lower gingivitis, debris and calculus scores than those who brushed once or not at all. Along with other workers Suomi et al (1969) have also shown that persons receiving frequent prophylaxis have cleaner teeth and less gingival inflammation.

2.2.3 Association with Socio-Economic Status

Waerhaug (1970) summarised data from a number of surveys which demonstrated that periodontal conditions improve as the years of formal education increase, and as income goes up. People with high income and standard of education clean their teeth on average better than those with low income and a poor education. People living in rural districts have, generally, a lower income and less education than those living in urban areas.

The appreciation of these simple facts may be of value to the public health worker when he plans how to improve the periodontal conditions on a community basis.

2.2.4 Correlation with General Disease

The most clearly documented associated between debilitating disease and periodontal destruction are found in acute leukemias, agranulocytosis and neutropenia.

An increased prevalence of inflammatory gingival and periodontal disease during periods of sex-hormone imbalance such as puberty, pregnancy and menopause, have been described (Lindhe & Altstrom 1967).

2.2.5 Correlation with Nutritional Factors

The relationship between malnutrition and pre-disposition to inflammatory gingival and periodontal disease is not understood despite extensive investigations. However, the composition and consistency of diet may have a bearing on the development of plaque and inflammatory disease.

2.3 FACTORS CONTRIBUTING TO PERIODONTAL DISEASE

2.3.1 Bacteria Factors

2.3.1.1 Bacterial Plaque

The localized concentration of micro-organisms on the tooth surface is referred to as bacterial or dental plaque (Allen et al 1968). Bacterial plaques are most likely to form on tooth surfaces which are not readily accessible to the cleansing action of the tooth-brush, the wiping action of the tongue or cheeks, or the detergent action of the coarse food as it passes over the teeth. Plaque is seen most frequently in the interproximal embrassures and around the cervical areas of the teeth. The principal significance of dental plaque in the aetiology of gingival and periodontal disease lies in its concentration of bacteria and their products (Dornan 1968).

Microbial plaque in the region of the gingival crevice and pocket constitutes the major and possibly the only extrinsic agent in the aetiology of inflammatory periodontal disease. However, other factors facilitate bacterial accumulation and growth, and their host tissues appear to vary in their response to the bacterial environment.

Role of Micro-organisms

There is now over-whelming evidence for the primary role of supragingival or subgingival bacteria in the aetiology of inflammatory periodontal disease. Usually the classical experiments of L  e (1965) and his co-workers are described to demonstrate the cause-effect relationship between bacterial plaque and gingivitis in man.

Socransky (1970) has documented the following facts which strongly support a significant bacterial role in the aetiology of gingival and periodontal disease.

1. Topical or systemic antibiotics alleviate the severity of acute necrotising ulcerative gingivitis and reduce gingival exudations in humans.
2. Dietary antibiotics reduce periodontal inflammation and bone destruction in animals. The severity of gingivitis is correlated with the amount of gingival debris which consists almost entirely of bacteria.
3. Cessation of toothbrushing and the resultant accumulation of bacterial plaque leads to gingivitis, which disappears when plaque is removed.
4. Mechanical irritants such as overhanging fillings and rough surfaces in contact with the gingiva produce little or no inflammation until bacterial plaque accumulates around them.

Overall there is now clear evidence to show that, in most instances, inflammatory periodontal disease will be eliminated by any techniques aimed at the elimination of supra and subgingival micro-organisms (Lindhe & Nyman 1975). Although the role of micro-organisms in the initiation and progression of periodontal disease has been well established, the actual mechanisms whereby the micro-organisms exert their effect is unclear. It has been demonstrated that micro-organism isolated from disease sites in humans will cause destructive disease in gnotobiotic rats and hamsters, suggesting a possible specificity and transmission of micro-organisms involved. Also, endotoxins have been isolated from a number of oral bacteria, but no direct evidence is available concerning their role in the initiation and progression of gingival inflammation. Living, metabolising plaque organisms produce a wide range of enzymes and toxic metabolites that may be toxic to viable tissues (Socransky 1970). The actual role of these metabolites in destructive disease is unclear.

Cultural studies indicate that in healthy periodontal tissues, this microflora is dominated by streptococci. *Actinomyces israeli* and *actinomyces naeslundii* are often present in high numbers. Electron microscope studies of in situ plaque located near the gingival margin

and in the gingival crevice area show a thin layer of mainly gram-positive cells (Listgarten 1976). However in gingivitis there is an increase in the complexity of microbial composition, which often occurs before the onset of clinically detectable gingivitis. Supra-gingival and subgingival plaque at inflamed sites is more abundant than that associated with healthy sites. It can attain a thickness of approximately 0.4 mm (Listgarten 1976).

The microflora associated with periodontitis is yet again different from gingivitis, with a predominance of gram-negative rods which are mainly asaccharolytic (Tanner et al 1979). The relative proportion of these organisms may vary considerably.

In the less common form of periodontal disease, juvenile periodontitis (periodontosis) the sparse microflora is loosely attached to the root surface and contains predominantly gram-negative rods. (Listgarten 1976).

2.3.1.2 Calculus

It was considered axiomatic by the earliest dental "researchers" that calculus was associated with periodontal disease (Weinberger 1948). Recent studies have attempted

to quantify this relationship and evaluate the significance of the correlation by statistical, clinical and experimental laboratory methods.

Løe et al (1965) conducted studies in humans and have found that oral deposits play a major role in the development and maintenance of periodontal disease. He noted that calculus is always covered by an unmineralized bacterial deposit. Waerhaug (1967) also reported a strong correlation between the prevalence and severity of periodontal disease and the accumulation of calculus and plaque.

Fischman et al (1975) in his review of the literature, concluded that calculus played a significant role in the aetiology and progression of periodontal disease. He stated that calculus is important both as an entity in itself and as a locus for plaque accumulation. Plaque, adherent to calculus, is in close proximity to the gingival tissues. An effective calculus inhibiting agent might be expected to result in improved oral health by eliminating calculus as a local irritant and as a locus for additional plaque formation.

Calculus forms more readily in areas of the mouth which are sheltered from mechanical cleansing than in areas frequently used for chewing or areas which are accessible

to the toothbrush. Patients who practise inadequate or ineffective oral physiotherapy form more calculus than those who employ meticulous oral hygiene techniques. Rough tooth surfaces or unpolished surfaces of dental restoration or prosthesis enable deposits to form more readily than do smooth surfaces.

2.3.2 The Host Response

Until approximately a decade ago, dental plaque was considered to be a complex but relatively constant entity of bacteria and their products. However, this concept was not able to explain differences in susceptibility to a severity of periodontal disease in patients. Although individual variation in host resistance and the immune mechanisms could explain observed variations in severity, these conditions could not account for the frequently observed localization of disease within an individual.

Recent microbial technical development, together with electron microscopy of plaque sections from in situ specimens, now provide evidence for the role of specific pathogens in sites of periodontal destruction. For example, recent reports give evidence of high antibody titres

to suspected periodontal pathogens in the serums of individuals with inflammatory periodontal disease (Mouton et al 1980). The various components of the host immune system have the potential to act either beneficially or detrimentally with regard to the host (Page & Schroeder 1981).

Cells

Mast cells - eosinophils and basophils - contain potent vasoactive and cell-regulatory substances. Polymorphonuclear neutrophilic granulocytes (PMNs) contain tissue destructive substances which also have a defensive role. Reductions in their numbers or function is associated with some forms of rapidly progressive periodontitis. Mononuclear phagocytes have the ability to be both protective and destructive to periodontal tissues. Lymphoid cells can differentiate into T cells which are responsible for immunoglobulin production and lymphokines and into T cells, responsible for lymphokine production. In vivo activity and the degree of specificity of these mechanisms await clarification. The complement system acts as an amplifier and effector of the immune system. The extent to which activation of the system is beneficial rather than harmful has not been established.

2.3.3 Non-Bacterial Factors

With a few exceptions (Drum 1975), investigators regard micro-organisms and their metabolic products as the primary cause of inflammatory periodontal disease (Pennel & Keagle 1977). However, there are other adjunctive environmental factors which favour the accumulation of bacterial plaque and calculus and other factors which may alter the host's response to local irritants.

2.3.3.1 Anatomical Irregularities

Anatomical irregularities such as badly aligned teeth with deepened interdental cols, a poor relationship between the dental arches (which reduces self-cleansing action), palatal grooves in maxillary incisors, enamel projections into furcations, enamel pearls on root surfaces, abnormal coronal contours, accentuated approximal concavities and absence of adequate zones of attached gingiva may lead to an increased accumulation of plaque. (W.H.O. 1978).

2.3.3.2 Iatrogenic Factors

There are a number of features of restorations which may lead to stagnation and resulting build-up of

plaque. These include improperly shaped restorations, defective margins, overhanging restorations, open contacts, and poorly designed partial dentures (Waerhaug 1960).

2.3.3.3 Mouth-breathing or Lack of Lip Seal

Mouth breathing or lack of lip seal has been shown to be an aggravating factor in some cases of gingivitis, which may be due to reduced salivary flushing away of bacterial products and a lessened exposure of tissues to the inhibitory factors of saliva (W.H.O. 1978).

2.3.3.4 Saliva

Saliva contains specific glycoproteins that assist bacterial adherence and aggregation, and specific IgA antibody which has been found incorporated into samples of pooled human plaque (Gibbons & Van Houte 1973).

2.3.3.5 Occlusal Trauma

Damage to the periodontal tissues caused by excessive or abnormal stress on the tooth from occlusal forces has been implicated in the progress of periodontitis. Excessive occlusal forces aggravate periodontal bone loss,

especially in individuals with parafunctional occlusal habits such as bruxism (W.H.O. 1978).

2.3.3.6 Diet

The composition and consistency of diet may have a bearing on the development of plaque and inflammatory disease (Holborrow et al 1983).

2.3.3.7 Systemic Disorders

There is considerable clinical and experimental evidence that susceptibility to periodontal tissue destruction can be modified by general systemic alterations such as those that occur in blood and metabolic disorders and changes in hormonal balance (W.H.O. 1978).

2.3.3.8 Genetic Factors

Several studies relating genetic factors to periodontal disease in otherwise healthy individuals suggest that they play a role.

2.3.3.9 Time

Time is also an important factor in terms of the length of time tissues are exposed to plaque and its complex microbial activity.

3. DENTAL HEALTH EDUCATION

As discussed in the previous chapter, knowledge accumulated explains the initiation and progression of inflammatory periodontal disease. Research into the aetiology, prevention and treatment of periodontal disease has provided knowledge which is adequate for the control of the disease at individual and community level. However, large scale prevention has rarely been implemented, and it is evident that traditional treatment and counselling practices alone will not greatly alter the high prevalence of periodontal destruction. The dentist-patient approach to managing periodontal diseases is largely ineffective at a community level. Education and prevention within the community must be undertaken to achieve the goal of reducing the prevalence of periodontal disease.

Unlike fluoridation of water, procedures and techniques that can be followed to prevent periodontal disease demand a large measure of effort on the part of the individual. This personal effort consists of a thorough removal of plaque daily, both interproximally and on the facial and lingual surface. The individual must be taught effective methods of removing plaque and he must be motivated to apply these methods conscientiously and regularly. This is the most realistic approach to

the problem of preventing periodontal disease at the present time (Heifetz & Suomi 1973). The key to prevention or control of periodontal disease is thus the preaching of preventive periodontics through dental health education.

3.1 DEFINITION

Health is defined in the Constitution of W.H.O. (1961) as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity". This definition applies to the whole individual, and therefore encompasses such specific parts of the organism as the oral cavity.

Dental health cannot be separated from general health, since oral diseases may be a manifestation of or an aggravating factor in some more widespread systemic disorder. This is especially true of periodontal disease. Oral evidence of systemic diseases occurs in periodontal disease. Several systemic conditions have become identified as being associated with increased incidence or severity of gingivitis or periodontitis. Leukemia can be accompanied by enlargement, ulceration and haemorrhage, and varying degrees of inflammation of the gingiva (W.H.O. 1961).

Health education programs should aim to rouse public consciousness to the fact that periodontal disease affects general health, that it is similar to other problems which require early recognition and treatment, and prevention is much more to be desired than treatment, which is time consuming and costly.

There are many academic definitions of health education, but Young and Striffler (1969) simply define health education as the provision of health information to people in such a way that they apply it in everyday living.. Turner (1964) said health education is the use of health knowledge, educational skills and behavioural sciences to promote sound health attitudes, appreciations understandings and behaviours.

The W.H.O. (1970) definition of health education is aimed at persuading people:

1. To adopt and sustain healthful life practices;
2. To use judiciously and wisely the health services available to them;
3. and to take their own decisions, both individually and collectively, to improve their health status and environment.

Health education is one of the most essential activities within the field of public health. Through its processes, individuals are not only motivated for desirable health practices but are also influenced to participate in a support health program. Prevention of disease on a community basis is one of the most important direct activities of public health services.

In the light of present knowledge, prevention of periodontal disease requires education in two main areas:

- (1) Adoption and continuing regular application of prescribed oral hygiene and nutritional practices.
- (2) Periodic dental care for early treatment of disease or specific preventive measures such as professional cleaning of the teeth.

Although these measures may appear relatively simple to understand and carry out, in practice they may present many difficulties. Having noted the encouraging prospects for caries reduction, Davies (1980) warned that the future outlook, so far as control of periodontal disease is concerned, is much less optimistic. He noted that while gingivitis can be prevented by regular and efficient plaque control, the probability of converting the general population to the cult of brushing and flossing is very low indeed.

Health tends to be appreciated only when it is impaired. Since periodontal diseases do not commonly pose an immediate threat to the dentition, most people do not take appropriate action to decrease the future risks to teeth survival. Besides early symptoms of periodontal disease go unnoticed or are regarded as of little significance.

The development of a concept of positive dental health is made difficult by the chronic, recurrent, cumulative and prevalent nature of periodontal disease. These characteristics contribute to the belief that dental problems are inevitable and non-preventable. Individuals are in general willing to undergo some temporary inconvenience for the sake of health, provided such inconvenience is rewarded with tangible and substantial benefits.

Moreover, the teeth have different degrees of importance to different individuals. Some protect their teeth because of their functional and aesthetic value; others look after them because of their contribution to social and mental well-being; to many individuals, the teeth are seemingly of such low value that few attempts are made to preserve or protect them. In some ways, personal health measures are like life insurance: some people are willing to scrimp and save, and continuously deny personal pleasures in order to benefit decades ahead, but others see this as an undesirable restriction on living (Jackson 1970).

The difficulties are further increased by the relative efficiency, comfort and social acceptability of artificial replacements for the natural dentition. Those who regard loss of teeth through disease as inevitable may consider dentures to be the best possible solution to

to their dental problems.

Other major obstacles to the development of a concept of positive dental health are the undramatic nature of most dental diseases, the association of dental treatment with pain, discomfort and anxiety, and the reluctance of many individuals to accept and carry out on a regular, continuing basis of the oral and general health practices related to the prevention and control of dental disease (W.H.O. 1970).

3.2 THE CONCEPT OF DENTAL HEALTH EDUCATION

3.2.1 Nature of the Concept

Dental health education, like all other educational activities, is based upon existing knowledge, beliefs, cultural patterns and habits of the population or group towards whom the educational program is directed, and also upon their misinformation and taboos. Cultural patterns vary widely in different parts of the world. So also does the availability of professional dental care. Some countries have a highly developed dental profession, while some areas of the world lack professional dental services completely.

Ideally the main objective for dental health education is to impart knowledge and information so as to equip the people and enable them to attain dental health by their own efforts and actions. Because this is possible only when people appreciate dental health, another objective becomes self evident, i.e. to stimulate interest in people to value dental health and as a result seek and subsequently acquire it. This is an important point, as mere bombardment (with information) of uninterested people with what the health educator thinks people should know, is a wasted effort. This may result in a negative response or even an active obstruction to the attainment of dental health goals (Sundram 1970).

Young and Striffler's (1969) definition of health education is the "provision of health information to people in such a way that they apply it in everyday living". The important word stressed in the definition is "apply". The measure of effective health education, he says, is in the application, the translation of knowledge into action. Knowledge is not enough, knowledge must be translated into desirable practices.

The same is true about dentists' knowledge of health educational practices and methods. Knowing what he wants his patients to understand does not mean that he knows how, when or where he should provide information to them. Therefore, it would seem that the primary objective of any dental health educational program is to stimulate and motivate practicing dentists, dental hygienists and school dental nurses to provide information about dental health to their patients and community in such a way that it will be translated into desirable patterns of action (Young & Striffler 1969).

To accomplish this goal, the dental health educator should have a first hand knowledge and appreciation of the people with whom he plans to develop a health education program. He should be familiar with the nature of the culture; the way of life of the people; their goals in life; and their values, beliefs, traditions,

customs and taboos with respect to health and illness. He should understand the objectives for which people are willing to strive, and conversely, the aspects of life that mean very little to them or that they are as yet unable to understand. Such understanding of the way of life of the people is important in setting the limits of any educational effort (W.H.O. 1970).

The working concept of dental health education must be centred within a framework which is behaviour centred, since the ultimate goal of planned dental health education programs is behavioural in nature, viz. the reinforcement and maintenance of health behaviour where this is satisfactory, or a change to new behaviour that will promote and improve individual, group or community health. Planning for dental health education should therefore take into account not only the forces within the individual that affect behaviour (eg. beliefs, attitudes, interests, values, needs, motives, expectations, perceptions and biological factors) but also external forces that interact with these internal ones and have an impact on a person's behaviour (eg. family, kinship, and friendship groups; health and medical facilities and services). Since all these forces are in a constant state of dynamic interaction, the processes of dental health education should be flexible and should be continually tailored to take account of changing personal and situational factors (W.H.O. 1970).

Some concepts offered for dental health educational activities in the prevention of periodontal disease are:

1. Creating awareness of periodontal disease in a community;
2. Informing the community of scientific facts concerning periodontal disease and the means for prevention by the people's own efforts and actions;
3. Motivating the public to seek adequate treatment at regular and frequent intervals and to carry out oral hygiene procedures.

3.2.2 Creating Awareness

Major factors contributing to high prevalence of periodontal disease in most countries are due to ignorance and misconceptions amongst the people. This can be attributed to the fact that in the past no major effort had been made to educate the community on periodontal care. It is apparent now that there is a deficiency in public awareness of the disease and means by which current mechanisms for reaching the public and influencing opinion and behaviour should be utilized more effectively. The first step, therefore, in the prevention and control of periodontal disease through dental health education, is to create awareness of the disease in the community.

Basic information on the cause and prevention of periodontal disease should be widely disseminated by utilizing the various mass media for educating the public. Television and radio spots, created for maximum impact, should be produced. The frequency of broadcasting these spots and their turnover rate should be adjusted to keep the message effective and in front of the public. Appropriate business should be encouraged to design advertisements with dental health messages. Suitable posters should be displayed in public places, dental clinics, schools, etc. to reach individuals of all ages (Listgarten 1976).

Very early in its life, the Dental Health Foundation in Sydney realised their main role was to find ways to awaken the people's interest in dental health. The Foundation regularly carries out community dental health displays and preventive dentistry promotions. In an endeavour to educate members of the public on the importance of plaque in the aetiology of periodontal disease, the Foundation decided to offer a dental plaque disclosing service to members of the public attending dental health displays (Woolley 1977). Thus the Plaque Disclosing Tunnel came into existence. It has created great interest wherever it has been used, and provides an ideal talking point from which to reinforce the dental health message. Many tens of thousands of people have had their plaque demonstrated. Plaque Disclosing Tunnel was proved effective in arousing the community to become tooth

conscious because dentists practising within the area covered by the display often noticed a significant increase in casual or non-scheduled attendances for treatment by people who had had their plaque revealed by the system. A series of dental health education presentations has been taken to health clinics throughout N.S.W. The Dental Health Foundation employs baby health clinic sisters, school medical and dental service doctors and nurses, health education officers and other health personnel in spreading the dental health message to even greater numbers of people throughout the community. (Woolley 1982).

In Singapore, Dental Health Contests are based on the contestants' oral health status. This not only provides some motivation to all intending participants, but also serves well to stimulate greater interest in dental health amongst individual participants and many others, when the contests and particularly the basis of judging are widely published (Wong 1972).

Movies have been used extensively in adult education for many years. Their effectiveness in holding interest, in presenting certain types of informational content, and in arousing an emotional response, has been well established.

In America, state health departments offer a variety of services which may be applied to dental problems. Periodical bulletins, film library units, photographers, artists, printers, exhibits, and television and radio units, are available to provide materials and inform people through state, district and local programs. Public inquiries regarding community and personal health problems are answered (Pelton & Wisan 1955).

It is necessary to increase public awareness of periodontal disease, if the incidence of the disease is to be reduced.

3.2.3 Informing a Community

Before one can inform others, one must be informed first. Such self-study would envelop the most authentic and recent findings regarding dental disease control procedures and in fact anything that is to be disseminated as information to the people.

Since ~~major~~ a major objective of dental health education is to effect improvements, the term authenticity should reflect current scientific opinions. Dentists and other health personnel are constantly confronted with the questions, "What is authentic?". "What information should be given to the public?" Examples of authoritative

information are informations received from reputable outside sources such as the American or British Dental Association, or informations supported by competent investigators under the auspices of the United States Public Health Services and the World Health Organization. Local departments of health, administrators of community clinics, and resourceful practitioners who desire to apply newly reported preventive measures would do well to investigate carefully before adopting them (Pelton & Wisan 1955).

The dental health educator has to disseminate this knowledge to the public in a form that is best suited to the characteristics of the individual, community or nation.

The message must be meaningful and understandable to the receiver and must have relevance to him. In general, people select those items of information which promise them greatest rewards. The contents determine the audiences. Meaningfulness is the key variable in learning. Meaningful material is less easily forgotten than any other.

Messages should be expressed in short statements. Long garbled messages may cause the intent of the message to be overloaded^{ok}. Messages should have the power to

arrest attention of the casual reader.

Messages must be in simple terms. Professional terminology and general terms confuse people. On the other hand, simplified explanations help to induce desired results. For this reason, written materials should be pretested before printing. Persons who are to be the beneficiaries should be asked to express their opinions of the proposed wordings.

Complex issues must be compressed into themes, slogans or stereotypes of simplicity and clarity. The greater the barriers, the simpler the message must be. Wall posters, pamphlets, films that reinforce health messages, must be accurate and not confusing.

Repetitions with variations contribute to both factual and attitude learning, but the story must be consistent. Frequently it is the one message that is emphasized and repeated by using the various media of communication, with the hope that people's minds become saturated with one thought or idea, that will in time become permanently fixed.

Messages are most effective when they require the least effort on the part of the recipient. When delivering dental health messages, it should be done

slowly a step at a time. When the recipient starts to talk, it is important to listen to find out whether the message has been understood. Audience capability varies from nil upwards.

Specificity is indispensable. Attempts to change dental habits by presenting dental information among a number of other health items are usually ineffective. It seems most persons, when given diversified and multiple instructions are perplexed. On the other hand, a message spear-pointed with emphatic and detailed guidance will have a better chance of hitting the target - improved dental concepts and practices.

Communication starts with the climate of belief. The receiver must have confidence in the sender. He must have a high regard for the source's competence on the subject. The dentist will be regarded as a source of authentic information (Wong 1972).

Effective co-munication means tailor-made programming, especially designed for the situation, time, place and audience. It means careful selection (Wong 1972).

3.2.4 Motivating the Public

In order to provide health information in a way that will motivate individuals to apply it in everyday living, it is necessary to understand something about the factors which influence human behaviour. What a person will learn and the actions that he will take toward the maintenance of health or treatment of disease are determined by his attitudes and motivation. Motivation, like learning, is a process which involves multiple complex factors (Young & Striffler 1969).

The mere providing of information as what is good for health may not move people to action. Ericksen (1974), a noted psychologist, says motivation is important in bringing the centrally stored information into use. It is in this process that the dental health educator may serve as a mediator between theory and practice.

Some factor (or need) in the individual or the group must be sought which may bring about the required action. Sometimes it is an intrinsic resistance or a "block" that prevents an individual from adopting desirable health practices. Although knowledge plays an important part in establishing proper habits, it is merely an academic item if it does not effect improvements in dental behaviour.

Pelton & Wisan (1955)^{give:} the example of the use of sweets; in spite of the wide publicity given to the availability of restriction by nutritionists, dentists and dental health education, the sale of candy and sweetened beverages "goes merrily on".

Three principles may be enumerated here:

1. The first is that the motivational force required to move people must be found.
2. The second is that the individuals in a population group should be classified according to the motivational instincts dominant in them (eg. motivational factors in a group with a good education will be different from an uneducated group).
3. Third is that the dental health educator must establish motivation priorities (ie. in which direction motivation is desired most).

There are various factors and sources of motivation that drive an individual to seek dental treatment or to adopt dental health habits. These can be related to health reasons or non-health reasons, and some of the most powerful motives for following proper health practices are not related to health at all. Social studies have found that some mothers sought the services of a pediatrician not because they were convinced that their children needed routine medical supervision but because they wished

to conform to the accepted standards of their social group. Visiting a dentist, for instance, would be to conform to standards set by the family rather than health reasons.

Motives can be modified by social pressures or by personal preference. Social acceptance motivates an individual to keep his teeth clean, or he may practise oral hygiene for a secondary goal such as avoiding a more basic problem of pain. Social restrictions compel one to maintain good oral hygiene to prevent halitosis and ugly gums to conform to customs which society demands for social acceptance.

Young & Striffler (1969) are of the opinion that if the dentist and the dental health educator can find more than one reason for their patients to carry out a certain health action, the chances obviously are increased that the patients will do it. They go on to say that dentists and dental health educators who merely appeal to the health motives are failing to tap the richness and variety of human motivation.

Hochbaum (1959) has noted, "Health motives present only a very small aspect of the vast and complex motives of man ... As often as not, health motives are the weaker ones among such competing motives ... " Jackson (1970) said, "It appears that in most people a sufficiently strict

and continuous regime of oral cleanliness cannot be induced by implanting a health motivation, and hence if we are to achieve our desired ends we must introduce another motivation." He suggested that this could be cosmetic.

Jackson (1970) substantiated this suggestion by stating that during 1967, 75 percent more money was spent in the U.K. on hairdressing than on the total cost of the dental health service, and considerably more money was spent on cosmetics of all kinds. He goes on to say that if people can be persuaded to have their teeth scaled and polished every three months and before every important social occasion, we should go a long way to achieving the prevention and control of periodontal disease.

It is important to bear in mind always that the aim of health education is to help people to achieve health by their own actions. This applies particularly in oral health education because so much depends on home care. Treatment, advice on preventive periodontics are all good, but it finally comes down to the question, "What is the patient doing about his own oral health?" If our techniques do not motivate him to carry out his personal dental health prevention programs, following our advice, we have failed (W.H.O. 1976).

W.H.O. (1976), in summary, stated the basic principles of motivation for voluntary dental health action in the prevention of periodontal disease could be achieved by bringing home to people that:

1. Susceptibility is such that the prevalence of periodontal disease is virtually 100 percent at some point in the span of all people in present day communities regardless of their social or economic status.
2. The consequences are serious in that delay or failure to seek treatment leads to discomfort, pain, disfigurement, loss of function, impairment of general health and unnecessary waste of money, manpower and time.
3. Remedial measures are effective in that early and regular dental care can prevent the consequences of neglect and that, conversely, artificial replacements are poor substitutes for healthy natural dentition.
4. Preventive measures require simple commonsense and that diligence is not unpleasant; and modern advances in training, equipment, materials and anaesthetic methods can now remove the barriers of pain and fear.

5. Action will lead to attainment of social status:
in conformity with values which society places on
good personal appearance.

Prevention of periodontal disease depends largely on effective plaque removal. The principles of motivating patients to carry out effective plaque removal will be discussed in detail in "Patient Motivation in Effective Plaque Control" in Chapter 5 of this thesis.

4. DENTAL HEALTH EDUCATION AS A PREVENTIVE MEASURE.

4.1 Dental Health Education Team

Prevention does not just happen, it is made to happen; it is people who make it happen for people (Dingerson & Dingerson 1973).

The development of appropriate dental health education programs at the national level requires close co-ordination between the responsible health administrators and public health dentists, health education specialists and other health personnel (W.H.O. 1970). In any scheme, the fundamental principle to follow is the maximum utilization of all available personnel so long as they are suitably trained to play the role expected of them. There should be flexibility in the use of personnel and there is no valid reason why any of the existing dental health personnel should only play his or her traditional role (Wong 1972). The personnel should develop flexibility and become knowledgeable in the roles of the other staff members so that they may be able to assist or replace each other in times of need.

In planning, the administrator who should be a dentist himself, should first consider the groups of the population that should be reached; secondly, the

existing personnel through whom dental health education could be given, their qualification and training, and then, finally, decide how best to deploy them either on a part-time or full-time basis in his plan.

The team concept is a measure of utilizing selected personnel both dental and non-dental who work in close cooperation as a team to carry out health education activities. The dental health team offers a perfect opportunity for the dental profession to render dental health care (Silverman 1976).

The team approach has been shown to increase the availability of dental services. (Hobdel 1975). Utilization of personnel other than dental for dental health education activities will relieve some pressure on the dental profession, particularly in countries where there is a shortage of trained dental manpower. According to Barmes & Bailey (1972) the bulk of dental health education work can be undertaken by non-dental personnel such as schoolteachers, school nurses and health personnel if they are properly briefed for it. Involvement of these personnel is of utmost importance to minimize loss of operating time by dental personnel. (Barmes & Bailey).

The concept of the "dental team" has become well established and the team approach to preventive dentistry

has so many advantages that it is very difficult to think of circumstances in which it should not be used (McHugh 1974).

The dental health education team must bear in mind that they are very much going to be involved in public health relations. If they want to succeed in improving the dental health status of the community, they would have to do something to help change attitudes, habits, cultural barriers and traditional beliefs. They would have to learn to communicate with people - how to awaken their interest in dental health. Therefore, they must be sufficiently trained and should require adequate knowledge of dental health education before proceeding to work in the community. Dunning states that in any discussion of an educational program, the personnel doing the work must be carefully considered (Dunning 1970).

Dentistry is asking for greater responsibility from the patient in caring for himself and this requires an even greater responsibility from dentistry in helping people to help themselves (Dingerson & Dingerson 1973).

The dental health education team essentially comprises the following personnel:

The Dentist

The School Dental Nurse (New Zealand type)

The Dental Hygienist

The Classroom Teacher

Related Health and Educational Personnel.

4.1.1 The Dentist

The crucial person in the development of dental health education activities is the dentist himself, whether he works in a health institution or in private practice. As the head of the dental health team, he has the important mission of educating his patients and of seeing that other members of the health teams make the best use of all opportunities for educating patients (W.H.O. 1970).

The initial motivation comes to the dental personnel through the dentist's desire to provide complete and effective dentistry for his patients. For the dentist helping people help themselves becomes more rewarding than just working for the public, or doing procedures to people (Young & Striffler 1969).

It is through the dentist's leadership that other members of the dental health team establish this on-going commitment to dentistry. The dentist by virtue of his position automatically assumes the role of a leader

of the dental health team, and has full authority over what should be taught, how it should be taught and who should do the teaching. In general, he must "set the curriculum" for all who are to teach (Stoll 1977).

The dentists have unique opportunities for dental health education available to them both in the private office and in the community setting (Young & Striffler 1969).

In the surgery, the face-to-face communication with patients is the most effective method of dental health education. Most educators and communicators have concluded that education and communication are best conducted on a one-to-one basis at a time. Sandell (1962) has stated flatly, "The most effective dental health education can be accomplished in the dental office by the dental personnel ... the dentist in his office has the first educational opportunity available, if he will but use it." The most powerful, the most effective method of influencing people is through face-to-face communication, which may be defined simply as "to talk to someone and to get him to talk back with you". Sandell also pointed out that the dentist has the knowledge necessary to advise patients concerning dental health.

Every practitioner has an obligation towards his patients to educate them to look after their dental health,

to appreciate the dental services rendered to them, and to correct unfavourable attitudes that exist through previous dental experiences, misinformations and superstition (Stoll & Catherman 1968).

In the surgery the initial motivation comes to the dental personnel through the dentist's desire to provide complete and effective dentistry for his patient. When the idea of prevention and control of dental diseases catches hold of the staff, changes begin to occur. This can lead to even more cooperation among members of the dental office. It is through the dentist's leadership that members of the staff function to establish this on-going commitment to dentistry (Dingerson & Dingerson 1973).

The dental practitioner should realize that patient education begins with a person's first contact with the dental office - usually with the receptionist or the dental assistant who answers the telephone. Therefore, the dentist has an obligation to see that his assistant has at least a basic knowledge about dentistry and oral health practices (Young & Striffler 1969).

The dental practitioner should create an atmosphere in his office which is conducive for dental health education - as pleasant, positive and reassuring as possible.

The reception area should have attractive, informative dental health materials conveniently displayed. The publications should not be filled with unnecessary details of surgical procedures but should emphasize the positive benefits to be achieved by regular visits to the dentist and good home oral care.

Those people who visit the dentist are usually the better educated, have a better income, and are frequently the opinion leaders in the community. If the dentists and their office personnel use every chance to educate those who do get into the dental office, there is hope that these people will spread their information through their families, neighbourhoods, through child study groups and through parent teacher associations (Young & Striffler 1969).

The responsibility for introducing prevention and treatment of periodontal disease rests with the dental profession. Only the dental profession can evaluate the impact of this disease on the individual and on the community and only the dental profession can advise the health services how to manage this problem on a broad basis (W.H.O. 1961).

In the community, the dentist should give first priority to reaching the non-dental professional people in the community, such as physicians, pharmacists, nurses,

teachers, school administrators, social workers and hospital administrators (Young & Striffler 1969). They should also help plan the education program with school authorities, support the efforts of other members of dental health teams (Dunning 1968) and co-operate with teachers to make dental health education meaningful and interesting (W.H.O. 1970). In countries where there is a scarcity of dentists, their functions should be that of training other dental health educators.

As leaders of dental health education teams, dentists have the responsibility of formulating programs, identifying target groups and planning strategy for carrying out dental health activities in the area.

4.1.2 The School Dental Nurse (New Zealand type)

This type of ancillary was established in New Zealand in 1923 to deal with large amounts of dental disease present among the school children. She is permitted to diagnose dental disease and to plan and carry out certain specified preventive and treatment measures including some operative procedures in the treatment of dental caries and periodontal disease in school children (Elderton 1981).

The school dental nurse scheme was never intended to be just a treatment service and nothing else. Dental health education has always been part of the nurses' duties, though it was until recent years a fairly nominal duty. With fluoridation now reducing the treatment needs for caries, the school dental nurses' activities have been directed towards other areas of dental needs, in particular towards periodontal disease.

The activities of the school dental nurse include practical teeth brush drills for individuals and whole classes, dental health education talks to expectant mothers at health centres, conducting dental health education exhibitions, campaigns, competitions, and preparing dental health education materials such as posters, models and flip-charts as teaching aids. Stress is placed on maintenance of oral hygiene and gingival health.

During toothbrush drills dental nurse makes sure that every student acquires the correct technique of toothbrushing for effective plaque control.

When performing dental prophylaxis, or topical fluoride therapy or taking part in dental inspections of schoolchildren, she will have opportunities for individual dental health teaching. She can have discussions on problems of oral hygiene with the children and devote intense effort to difficult cases.

The trained dental nurse is basically competent in recognising abnormalities or conditions in the gingival tissues, but without the aid of radiographs or periodontal probing. Periodontal care is confined to simple and preventive measures relevant to the gingival conditions commonly found in children.

Their role of teaching the principles of oral hygiene and the prevention of dental diseases is not only to schoolchildren, but to teachers, women's organisations, parent-teacher associations and similar bodies (W.H.O. 1959).

In New Zealand, school dental nurses regularly carry out prophylaxis for all children up to the age of 10-15 years, although no figures are available on the proportion of time spent on this work. With reduction in restorative

dentistry, more time is spent in care at individual and group (class) level, and plaque removal and care of the gums feature highly in this program. Now with a little additional training, to their standard school dental nurse training, they can competently undertake simple conservative and periodontal procedures on a wide range of patients, including the handicapped. The nurses involved in this scheme have expressed a high level of job satisfaction. However, it appears that no assessment has been made of the effectiveness of the scheme (Jeffries et al 1983).

4.1.3 The Dental Hygienist

This type of ancillary was first employed in 1906 in a private dental practice in the U.S.A., and in 1913 the first formal training course for hygienists was established (Elderton 1974).

The dental profession recognizes the dental hygienist as the professional aid, qualified by education and examination to perform health services for the patient. The primary function of the dental hygienist is to interpret dental health facts and procedures in lay language so that the patient will be conditioned to practise good dental health habits. The duties of the

dental hygienist are essentially scaling and polishing of teeth, topical applications of fluoride and the provision of dental health education. They are employed both in private dental practice and in public dental services. There are dental hygienists in many countries, that with the largest number being the U.S.A. (Federation Dentaire International 1977).

The W.H.O. Expert Committee on Auxiliary Dental Personnel (1959) was satisfied that dental hygienists are most valuable in the field of preventive dentistry and by virtue of the practise of simple dentistry can extend the benefits of oral health to larger sections of the community. An enumeration of the functions of dental hygienists would include:

1. Cleaning of teeth.
2. Removal of calculus.
3. Individual and group instruction in oral hygiene.
4. Cleaning of the mouth on the orders of the dentist, before treatment is instituted.
5. In case of schoolchildren, liaison with local public health nursing services to ensure follow-up of recommendations or treatment.

The dental hygienist can play an important role in the control of periodontal disease. Every case of

periodontal disease requires thorough scaling and polishing of teeth. The scaling and polishing can be done as efficiently by a dental hygienist as by a fully trained dentist (W.H.O. 1961). Use of dental hygienists saves both time and money and they can be attached to nurseries child welfare centres, schools, factories, dental clinics in hospitals and private clinics of dental surgeons.

When employed in private practice, the dental hygienist, with more opportunities, should play a similar role as the dentist in patient counselling. She should establish good rapport with the patient, giving him confidence in her services and those of the dentist. Young & Striffler (1969) believe that the dental hygienist has even greater opportunities to provide patient education. This they say is because, she rarely is performing a procedure which is uncomfortable to the patient. Also, her professional education stresses the techniques of patient education. After a thorough discussion with the dentist and after participating as an observer in treatment planning sessions, the dental hygienist can develop a planned educational program for each patient. In this way she can have personalized dental health instruction for each patient.

With her special skills in dental health education, the dental hygienist can help develop individualized

teaching materials for the dental practice in which she is employed. Flip-charts and other visual aids can be designed by the dental hygienist for use both in her operatory and in the dentist's. She also can help to develop leaflets and other printed materials for the dental office (Young & Striffler 1969).

The primary purpose of the hygienist in private practice is to prevent dental disease and to maintain dental health. When the practitioner assigns a patient to the hygienist for prophylaxis, the hygienist has a propitious opportunity for developing dental health consciousness and behaviour. By helping the patients to feel at ease, by showing an interest in patients, by inquiring as to their health, and by maintaining at all times a friendly and pleasant attitude, she opens the way for her chair-side educational efforts to further oral hygiene habits (Sandell 1954).

The dental hygienist with additional training or experience in the field of education can function extremely well as a school dental health coordinator and can take part in actual educational activities to an extent to be determined by the degree of her training and of her acceptance by the local teaching fraternity. She should also be the resource person, who feeds teachers with relevant literature and educational materials,

participates in health fairs, presents toothbrushedrills in schools, clinics and exhibits at fairs (Dunning 1968).

Staff hygienists, because of their direct relationship with parents and children, have opportunities to influence the health attitudes, the health thinking and health practices of many people (Fiedler 1954).

Some hygienists become experts in the use of audio-visual material, such as pictures, films, slides, filmstrips, cartoons, charts, feltbooks, etc.

"Dental hygienists, irrespective of their field of service (private practice, institutions or civil service) are dental health educators and primarily interested in the preventive aspects of dentistry" (Betty Krippene 1954). In America the hygienists have made valuable contributions in the field of dental health education, both in public health programs and in private practice. (Pelton & Wisan 1954).

According to Gold (1978), to achieve job satisfaction or a higher quality of life, hygienists need to be given recognition of their usefulness, more responsibility towards their patients and work, and more adequate remuneration.

4.1.4 The Classroom Teacher

Authorities both in the field of education and in the field of health agree that the classroom teacher must carry a major share of the task of dental health education. According to the National Education Association of America, regardless of the extent of the school dental services, the teaching of oral hygiene is and must be a primary responsibility of the classroom teacher. It goes on to say that the teacher's interest in securing dental corrections is a major factor in developing pupil interest and action. Teachers with enthusiasm and persistence who are properly instructed in the principles of oral hygiene can stimulate children to seek dental service. It concludes by saying that the teacher is the keystone of the arch of dental health education.

Dunning (1970) gives strong reasons in support of this view. First, the preponderance of teachers over dental health personnel in the school system and because of the number of hours per day the teacher is in contact with the pupils. Second, the educational training of the classroom teacher and her constant practice in understanding of the minds and motives of her pupils.

Teachers possess skill as unique to their profession as are skills of the dentist, and they ordinarily

are far better equipped to instruct than are dentists and dental hygienists. Teachers have the skills and years of preparation to do the job of direct classroom instruction; they know their children and their vocabulary levels; they know what point in the school curriculum a project on dental health would be most appropriate. Young & Striffler (1969) feel that frequently dentists and dental hygienists go into classrooms and either speak in technical language above the heads of the audience or underestimate the level of their audience, and in some instances even talking "baby talk". Due to these reasons Young & Striffler believe it would seem much better for health professionals to spend their time working with those who in turn will do the teaching.

Among the many different aspects of periodontal health that can be taught, the classroom teacher should teach and cultivate the habit of toothbrushing in children, guide them in selecting foods for snacks and mealtimes and encourage regular visits to the dentist (Wong 1972).

Teachers can use their influence to encourage school canteens to improve both general and dental health by serving proper food.

The results of a survey carried out as part of a cancer education research program in teacher training

establishments, showed that a majority of primary school teachers felt that a teacher's main role was to equip their pupils with basic skills and they for the most part, appeared to consider that health education came into this category, and were expecting to teach it (Charlton 1981).

If the unique position of school teachers for dental health education is to be fully exploited, all school teachers should be provided with adequate knowledge in this field during their pre-service training. In Singapore the Teachers' Training College has embarked on a college curriculum which incorporates this as part of a much-needed health education curriculum. This is followed by regular issues of the specifically prepared literature in the form of dental health bulletins to keep teachers informed. For teachers in service, specific courses are arranged during vacation (Wong 1972).

The role of the schoolteacher in dental health education cannot be overemphasized. The dental team, with their specialized knowledge, can co-operate with teachers to make dental health education meaningful and interesting (W.H.O. 1970).

4.1.5 Related Health and Educational Personnel

Besides the dental health education team personnel already discussed, there are many others who could easily fit into the team with little training.

Members of other health professions have important roles in dental health education and should therefore receive training appropriate to the specific roles. These could include physicians, nurses, home visitors and social workers who have direct contact with people either in their homes or in health facilities. All these personnel should be equipped and encouraged to play the important role of advising people on home dental care and of referring them for treatment whenever treatment is needed. They should be familiar with community dental resources so that appropriate referrals can be made when necessary.

The physician occupies a special place in the health team. During his undergraduate medical training, attention should be paid to dental and oral health problems so that he can reinforce the educational efforts of the dental team (W.H.O. 1970).

In any event, dental health education of dentistry's professional colleagues is of high priority. If opportuni-

ties are not available, consideration should be given to judicious ways of creating them. The best chance to increase knowledge about oral health among professional personnel is to reach them while they are still in school - in medical schools, pharmacy schools, schools of nursing, teachers' colleges, and practical nurses' courses (Young & Striffler 1969).

Health educators are widely used in many countries. According to Dunning, health educators have a specialists' responsibility in all fields of health education and are usually found serving in school districts. In the United Kingdom, local authorities employ Dental Health Education Officers to teach prevention in the community (British Dental Association 1968).

Dental health cannot be segregated from general health. Similarly, dental health education cannot and should not be divorced from health education in general. (Health Education Council 1971). In the context of preventive health care extended to adults, ante-natal mothers and children, health personnel such as doctors, nurses and other health ancillaries could pay more attention to dental health.

The health personnel could easily incorporate oral health measures in their preventive general health programs

for ante-natal mothers, schoolchildren, and the public. A little time could be spent by the doctor or nurses to examine the mouth of the patient and give advice on dental health care. Any pathology directed at treatment required could be noted and the patient easily referred to the dentist for necessary treatment. The health personnel are well aware that poor oral health in an individual affects general health as well. Hence, they cannot afford to ignore dental health problems of their patients.

Members of the dental health education team should work closely together and meet occasionally to discuss any problems encountered and plan fresh strategy. Positive relationship between members of the team increases the likelihood that optimum dental health care can be provided to the community and that all the parties involved will feel good about their mutual effort.

However, success will not be absolute unless the community is prompted not only to accept but demand the service to which it is entitled (Leison 1970).

Unlike surgery or other operative procedures where one gets immediate gratification, in dental health education one has to wait over a long period to achieve any results of their prolonged efforts. However, when they do come, there is satisfaction for a job well done.

4.2 TRAINING OF DENTAL HEALTH EDUCATORS

4.2.1 Training of Dentist

If the dentist is to accept and carry out his important educational functions & responsibilities, he must receive appropriate training during his undergraduate dental studies. Leadership and management skills are not acquired automatically upon graduation, and cultivation of these attitudes should begin at the undergraduate years (Nuffield Foundation 1980).

Besides gaining knowledge in clinical skills, the student should have reached a level of professional maturity whereby he understands his role as a dentist in the community, expresses a concern for oral health of the people and achieves a level of professional judgement (Hazen 1976).

As leader of a team of health care personnel, the dentist will be called upon to use managerial skills and interpersonal skills to maintain a smoothly operating team which can provide a broad spectrum of care. As manager of patients, he must be equipped with basic skills of communication and facilities and must be able to translate a variety of cues and words into an understanding of patient needs and fears. The ability of manage patients and be responsible for their care should assume primary importance in any hierarchy of educational values (Rovin 1977).

Several studies have illustrated that the central problem in preventive dentistry is how to motivate the public to take necessary procedures to care for their oral hygiene continuously; however, an important point always forgotten is the motivation of the dentist himself. It is logical that if the dentist lacks the conviction, ideals and enthusiasm necessary to support him in developing a preventive program, it will be still born. Therefore, the dental student must be constantly stimulated and motivated to adopt a strict preventive background to grow with him into practice. The dental student of today can be the catalyst of initiating an increased periodontal public health awareness and cooperation.

Unfortunately the present curricula of many dental schools are poorly oriented towards preventive and public health dentistry, making it difficult to train dentists and related personnel to carry out their educational functions (W.H.O. 1970). The root cause of the ineffectiveness of many a dental health education program may be due to the inadequate and inappropriate training the dental health educator has received, thereby resulting in his lack of understanding and appreciation of the complexity of the problems associated with dental health education.

New, imaginative undergraduate training programs for dentists are sorely needed so that the preventive aspects of dentistry can receive proper emphasis. (W.H.O. 1970).

The curriculum of dental schools should provide opportunities for participation in a variety of dental health education activities, in school hospitals, clinics and industrial settings. In addition, basic concepts of education and motivation must be taught to dental students (Young & Striffler 1969). The important thing is that dental schools include, as one of their primary objectives, the effective preparation of graduates to assume responsibilities of dental health education.

4.2.2 Training of Other Dental Health Educators

Undergraduate curricula for dental nurses and hygienists should provide training in dental health education activities. It is important to provide trainees with experience in developing and applying a variety of educational procedures and materials. Special emphasis should be placed in individual face-to-face methods and on procedures applicable with small groups such as school-children and women in prenatal clinics. Throughout their training, educational concepts and behavioural principles related to ways of motivating people to take effective dental health actions should be stressed (W.H.O. 1970).

What constitutes a dental health educational activity, and what proportion of the total time of an operating dental auxillary should be devoted towards the

educational approach to dental health, should be outlined (Sundram 1966). According to Sundram any activity which motivates interest and action for dental health, is an educational one, and this he says is best done on a face-to-face level (1972). In the training of dental personnel, emphasis should be placed on the application of the behavioural and social sciences in dentistry. This would enable dental personnel to become more effectively involved as members of health teams.

In the training program for the other health personnel, short dental health courses appropriate to the specific roles they are to play should be included. Similar courses should also be organised for all public health nurses and social workers (Wong 1972).

Although it could be possible for key personnel in the dental health education service to receive training and gain experience in countries more advanced in this specialised field of preventive dentistry, Wong (1972) believes it is always desirable to provide training facilities in each country for its own requirements of dental health education, because of the large number of trainees involved and the different socio-economic, cultural and educational backgrounds in other countries. In Singapore, dental nurses are trained in their own school by the staff of the dental health education unit, and their training is supplemented by courses in poster and teaching aid

production, and in teaching methods conducted by Teachers' Training College. Short courses for paediatric nurses and public health nurses working in the school and maternal and child health clinics are conducted at the Dental Nurses' Training School. For the larger groups like the kindergarten and primary school teachers, arrangements are made with the Ministry of Education to use school premises that are centrally located (Wong 1972).

4.3 LEVELS OF PREVENTION

An interesting concept in thinking about preventive measures for any disease is that of levels of prevention (Leavell & Clark 1965). The health education requirement for each group of the community can be determined by the level of prevention that needs to be applied.

Prevention as used by Leavell & Clark has the meaning it had in Elizabethan times: "to come before or precede", and conforms with the present dictionary definition of prevent, "to anticipate, to precede, to make impossible by advance provision". Such prevention requires anticipatory action based upon knowledge of the natural history to make onset of further progress of disease unlikely. Anyone practices preventive medicine who utilizes modern knowledge to the best of his ability to promote health, prevent disease and disability, and prolong life. This means good medical and dental practices for individuals and families and good public health practice for communities.

Prevention may be accomplished in the prepathogenesis period by measures designed to promote general optimum health or by the specific protection of man against disease agents or the establishment of barriers against agents in the environment. These procedures have been termed primary prevention.

As soon as the disease process is detectable, early in pathogenesis, secondary prevention may be accomplished

by early diagnosis and prompt and adequate treatment. When the process of pathogenesis has progressed and the disease has advanced beyond its early stages, secondary prevention may also be accomplished by means of adequate treatment to prevent sequelae and limit disability. Later when defect or disability have been fixed, tertiary prevention may be accomplished by rehabilitation (Leavell & Clark 1965).

These three stages of prevention are related to periodontal disease. The W.H.O. Report (1978) on Epidemiology, Etiology and Prevention of Periodontal Disease, used the word "prevention" to describe both prevention and control of periodontal disease - primary prevention is the prevention of the initial lesion, and secondary and tertiary prevention are terms used to describe the control of early to established disease.

4.3.1 Primary Prevention

Primary prevention of periodontal disease is accomplished by the avoidance or removal of aetiological agents before they produce disease. It involves the promotion of oral health through dental health education to improve oral hygiene, periodic dental examinations with proper advice on prevention and onset of gingivitis, and education to raise the standard of nutrition and diet.

The main role of dental personnel at this level should be in health education, the control of dental plaque and the provision of treatment which will not introduce iatrogenic dental problems (Ewart et al 1983).

4.3.2 Secondary Prevention

Secondary prevention involves the early recognition and prompt treatment of the first signs and symptoms of disease of the periodontium in order to prevent their extension to deeper structures and hence loss of bone. It includes specific oral hygiene education directed at the removal of dental plaque, the application of fluoride to early carious lesions, and the detection and removal of plaque-retention factors, including calculus.

Secondary prevention may require surgical intervention to eliminate periodontal pockets, and such other therapy necessary to make the mouth cleansable by the subject.

Screening of subjects and recall examinations constitute a major part of this phase of prevention, together with the cleaning of teeth. Because the rate of development of periodontal disease varies greatly within a population, screening techniques should be used to identify those most at risk. Screening should include the periodic use of standard bitewing radiographs for early detection of bone loss.

When establishing schedules for recall examinations and treatment, consideration should be given to individual variations; the policy of habitual recall at six-monthly intervals should be changed to relate to individual needs. This process could result in groups requiring recall at 3-monthly, 6-monthly, yearly or longer intervals according to apparent needs (Ewart et al 1983).

4.3.3 Tertiary Prevention

Tertiary prevention involves treatment directed at controlling established periodontal diseases, preventing their progression, preventing subsequent complications and sequelae, and providing appliances to restore function and appearance. Delayed recognition and the institution of treatment at a more advanced stage of the disease characterises this level of prevention. It includes education for oral health maintenance.

As treated patients have already demonstrated that they are susceptible to periodontal disease, they will need long-term maintenance (control) treatment and care. When appliances or occlusal adjustments form a part of treatment the individual must be educated to care for these appliances and adjusted tissues (Ewart et al 1983).

4.4 TARGET GROUPS

Community dentistry is concerned with dental disease prevention and dental health care services to all the people of the community; the rich, the poor, the educated, the disadvantaged, urban and rural of every social, religious and ethnic group. However, it is beyond the means of even the most developed countries to provide the service to everyone due to economic reasons, and to this can be added the lack of professional manpower in the case of developing and underdeveloped countries. Thus, the situation that usually exists is of too much work for too few dentists with problems like, "Who gets what?", "What are priorities in public dental services?" (Holloway et al 1969). Since prevention of periodontal disease through dental health education is time-consuming and requires the team approach certain groups have to be identified who are given priority over the rest of the population. Children and expectant mothers are widely accepted as priority groups, but it must not be forgotten that other priority groups also exist (Holloway et al 1969).

The target groups should include:

Schoolchildren;

Pre-school children;

Pre-natal and nursing mothers;

Adults;

The handicapped.

4.4.1 The Schoolchildren

Many school systems throughout the world have incorporated dental health education as part of the school curriculum because of the rationale that "prevention is the key to controlling dental disease" and that knowledge and dental health practices can be instilled from a younger age (Rodder & Bart 1978).

Besides it is difficult to gain access to young people after they leave school, but, if they have been adequately exposed to dental health education during their school days, they should carry this into their adult life.

By far the largest and most independent organised group for dental health education to reach is to be found in the schools. The school setting offers a great potential for effective dental education. It provides an excellent opportunity for communication with all persons within the entire school-age group and in an explicitly educational context, where learning is emphasized and rewarded. Furthermore, continuing educational influences can be exerted on the target audience over a considerable time period. According to Young & Striffler (1969) the process can begin at an early age when habit patterns are still in the process of being formed rather than being firmly established and resistant to change as in adults.

Prevention of periodontal disease depends on a modification of patterns of daily living. Short-term educational

approaches which urge people "to do a specific thing now" are useful in attacking some problems, but are inadequate to change dietary patterns, toothbrushing habits, and patterns of visiting the dentist.

To develop correct patterns of living the focus should be on long-term educational goals and ^{not} on the adults of today, but as the adults of subsequent generations - to try to develop in children patterns of life in accord with sound health practices (Young & Striffler 1969).

The school setting also offers the advantage that the dental health educator can use both mass communication and face-to-face approaches on the same audience and derive maximum benefit from each. The school classroom setting also offers the possibility of making use of the powerful forces of group dynamics in inducing students to take appropriate dental health action.

The entire school population as a captive audience is a rare setting and should be fully capitalized (Young & Striffler 1969).

The curriculum in the school program should include not only dental health lessons of the lecture type alone but also activities and methods of teaching that will lead to the reinforcement and maintenance of dental health behaviour where this is satisfactory or a change to new

behaviour that will promote and improve dental health (Wong 1972).

A major challenge for school programs in the prevention of periodontal disease is to develop equally creative instructional materials and activities at all grade levels to explain and demonstrate the effect of plaque on teeth and its relation to periodontal disease. Over-emphasis on oral hygiene alone is not sufficient. The benefits of maintaining good oral hygiene in relation to periodontal disease should be explained and demonstrated to patients.

There are two types of curriculum that are commonly in use in the school program. The first and the traditional one is the isolated subject curriculum in which health with dental health is taught as a subject. The other is the broad-fields curriculum in which dental health is integrated into the teaching of other aspects of healthy living whenever opportunities occur in the class or school. Teachers are encouraged to include dental health topics in the teaching of other subjects as well. The choice of method and the situation in which dental health topics are included are left to the trained teacher who knows his pupils best. With this type of curriculum, however, teachers need to be regularly motivated by dentists and be fed with authentic professional information and teaching aids (Stoll & Catherman 1968).

There are various types of teaching and learning methods that may be used during the class period in dental health education. Procedures should be adapted to the needs of the class and to the subject matter that is to be learned.

Lectures.

The lecture as a method of teaching is a formalized presentation of factual material by the teacher. The main function of a lecture is to provide a foundation of understanding upon which other types of instruction may depend. Besides a number of facts and concepts can be presented in a short time to a large number of students (Stoll & Catherman 1968).

Lecture-Demonstration Method.

As the name suggests, this method combines telling with showing. The purpose of the demonstration is to set forth facts in concrete form. It is used very successfully in teaching toothbrushing and flossing. Various appealing teaching aids such as posters, charts, film-strips, flannel-graphs, flip-charts, and audio-visual aids can be used.

The correct technique of toothbrushing and flossing is demonstrated by the dental health educator; followed by class discussions and questions. Students repeat the demonstration immediately. The chief value of the lecture lies in the economical use of time and in the concentration

of attention. It also provides learning experiences that are more interesting and meaningful than an oral presentation alone.

Toothbrush Drill

A large percentage of children either brush their teeth very haphazardly and infrequently and many of the toothbrushes used are unsuitable for children.

Counsell(1970) has suggested that practical learning may be more effective than didactic instruction and that group participation offers particular advantages because it makes use of a natural inclination to engage in collective activity and can strengthen the motivation of the individual through agreement between peers. Toothbrush drills under a supervision on a daily basis should be encouraged in schools. Doing toothbrushing daily as an exercise will ensure that all children will brush their teeth thoroughly at least once a day. Suitable toothbrushes and dentifrices for effective plaque removal should be available at prices within the means of every child. Production of charts and simple notes on recommended toothbrushing techniques and plaster models of jaws should be available to assist dental health educators in toothbrushing to children. The classroom teacher should assist in these programs and allow students time each day in school to brush their teeth.

At the same time correct methods of flossing, using a large set of teeth can be demonstrated to the student.

Plaque disclosing tablets and solutions should be used to demonstrate the presence of plaque. This is found to be very effective with schoolchildren as they can see their teeth are not clean and are motivated to brush their teeth at home so that they will not be shamed by their school friends during mass toothbrush drills at schools. This helps prevent the initiation of periodontal disease in schoolchildren and helps them acquire habits which hopefully they will carry throughout their life.

There are other dental health education activities that could be included in school programs such as:

Dental Health Exhibitions.

Exhibitions can be held on important days such as the School Speech Day, Parent Teachers Day, or during Dental Health Week. These exhibitions draw a lot of attention from students, parents and teachers. Series of posters on periodontal health can be displayed on a rotating basis, one at a time. Leaflets entitled for example "Introducing Plaque - the Invisible Destroyer", "Beware of Plaque, it causes teeth loss", which contain facts on why plaque is dangerous and how to combat plaque can be distributed to those attending the exhibition.

Film-strips on periodontal disease and good brushing and flossing techniques can be shown. Various types of toothbrushes can be exhibited with an evaluation of each on a card. A snack party which includes raw vegetables,

nuts, fruits and milk can be displayed.

Poster Competitions

Competitions in which competitors have to submit posters with given captions are good activities in that they involve some mental participation by their competition. Such competitions are easy to conduct through schools (Wong 1972).

Essay Competitions

These competitions are good too, for intending participants need to do research and discover dental health facts for themselves. Here, as well as in the poster competition, topics based on local needs should be selected (Wong 1972).

Dental Health Contests

This contest is based on the contestant's oral health status, not only providing some motivation to all intending participants, but also serving well to stimulate greater interest in dental health amongst indirect participants and many others when the contests and particularly the basis of judging are widely publicised.

Jean Frazier (1980) is of the opinion that the educational methods employed by many school dental health programs have advanced from the days when students were simply told about cavities and brushing, and then admonished

to go to the dentist. Frazier says that today sophisticated instructional strategies are used that go beyond viewing the learner as a passive recipient of information. Principles of small group instruction are incorporated; learning is viewed as an active process and participation in actual skills, such as for oral hygiene practice, is brought directly into the classroom. Children observe plaque directly in their own mouths (as well as in the mouths of their classmates) and practice removing plaque under supervision.

Frazier (1980) cites the Sydney Program (Woolley 1979) as an example of a contemporary dental health education program which illustrates the use of student involvement in small groups as an effective instructional technique. The Sydney Program develops some of these principles:

1. Trained instructors use materials and methods designed to gain a high level of interest and attention;
2. Students are actively involved, following demonstration, and participate in small groups;
3. Students directly visualize the problem of plaque and are encouraged to remove it; they are involved in self-assessment through the use of disclosing tablets.
4. The small group approach is supplemented by several methods of individual reinforcement as well.

Dental health presents many opportunities for children to dramatize. These experiences allow the learner opportunities for role playing. Puppetry is a form of lecture, with words and actions that can convey facts and ideas on periodontal health. A Good Teeth Puppet Theatre was devised by the Dental Health Foundation in Sydney to take the dental care story to younger children. An early evaluation study of the Puppet Theatre program carried out by the University of Sydney revealed that after 6 months, children were able to recall as much as 74 percent of the dental message (Pyke 1970). At the same time, a study of the Dental Health Educator program indicated a recall of more than 70 percent.

As many elementary school programs rely heavily upon the use of entertainment, Frazier (1980) says three principles should be mentioned regarding the role of entertainment in instruction. The entertainment portion of the instruction should function, she says, as an interest arouser; as such it should : (a) be brief, (b) generate interest in learning the information or skill and (c) should not constitute the total educational experience, because control may be lost over what is actually learned.

One important aim of any school system should be to reduce the sale of refined sweets. Principals and teachers can use their influence to encourage school canteens to

improve both general and dental health by serving proper foods. In most schools catering is aimed at the demands and not the needs of the children. In Sydney, the Dental Health Education and Research Foundation has made available tuckshop menus, including recommended sandwich fillings. An adequate standard lunch the "Oslo" meal was designed to provide all the essential foods which children need. Because the fillings are so appetising, this type of meal encourages children to develop a liking for the foods which are essential for them (Dental Health Foundation 1974).

Posters could also be placed near drinking fountains to encourage students to brush their teeth if feasible, or rinse their mouths after eating.

A review of published studies related to school dental health education programs done by Professor Young (1969) did not provide firm data on which to base future program planning. There was no consensus on the most effective methods of motivating students to adopt better dental health practices. She adds until more systematic methods of analysis are employed to evaluate the impact of various educational approaches to motivate desirable dental health behaviour, program development in dental health education will be largely based on individual and group preferences and on professional opinion and personal experience.

Program Evaluation

Well-conceived and carried out program evaluations provide information upon which the worth of the program may be judged in terms of degree of success in achieving stated goals and objectives. Such information may also serve as a diagnostic tool to identify program components which may be ineffective, thus pointing out new directions for program development (Frazier 1980).

Evaluating effectiveness provides an opportunity to test the validity of assumptions which may underly any particular program (Barnes & Cohen 1973).

Ideally, evaluation methods should be planned and well defined prior to program initiation so that if change is to be measured appropriate baseline assessments may be made. Poorly conceived and conducted evaluations can produce information that is misleading, that can be misinterpreted, which may be misused and which may lead to a false sense of security (Frazier 1980).

4.4.2 Pre-School Children

Health educators, aware of the value of initiating preventive measures during preschool years, have developed procedures for reaching this age group.

Dunning (1970) quotes Freud who says that as a child develops, the foundations laid during the primary process can be broadened, particularly when the dentition starts appearing. Thus the child can be conditioned for further acquisition and utilization of important health preventive information. What is later necessary is to maintain a supply of this information throughout the life and the individual should continue to absorb and utilize this information.

Pre-school children can be reached through day nurseries, baby care centres and kindergarten classes. Dental health education programs for this age group should be an orientation lesson to periodontal health. It is important for the educator to establish rapport with the child in the beginning of the school year, and to alleviate any fears concerning dental care. Harmful effects of sweets, chocolates, toffees and biscuits should be stressed. Because technical facts are not useful until they are understandable, teaching devices such as flannel board stories can be used to explain the cause and prevention of periodontal disease. Puppet shows which stimulate much interest in pre-school

children can be staged with a dental health education theme. Stories, songs and poems with dental health education themes can be taught.

The Dental Health Foundation in Sydney produces and distributes many thousands of dental educational items each year for use by teachers, educators, and dentists: "Good Teeth for Life" badges and lapel buttons with dental health slogans; "My Dentist Loves Healthy Teethy Teeth and a Happy Smile" balloons; colourful oral hygiene slogans and bathroom mirror stickers and "Good Teeth for Life Diplomas" were devised by the Foundation to help younger children identify with the dentist as a friend, and to understand the role he plays in their dental health (Dental Health Foundation 1982). These colourful, exciting, animated motivational aids are distributed by dentists and dental health educators.

Many investigators are of the opinion that parents' own dental health practices have an important influence and that children's dental practices may be relatively impervious to change if educational efforts are directed to children alone. They say motivation of parents is essential to the procurement of adequate dental care for pre-school and school-aged children and a number of studies, using different motivational techniques, have been published.

Parents can also be reached during the Parent Teacher

Association meetings. The question of dental health in their children is always of interest and they would be glad to listen to qualified speakers on health subjects.

Whenever possible, parents should be included in dental health education talks, so that they can oversee that the child enforces these practices at home.

4.4.3 Pre-Natal and Nursing Mothers

It has been shown that mothers' dental health practices are one of the most influential factors in determining the nature of their children's practices. Therefore, facts of the developing dentition and the need for good oral hygiene practices both for themselves and for their offspring during the earliest formative years must be explained to the mother.

Dunning (1970) says that expectant mothers and nursing mothers are almost always in need of dental health information and are motivated to make use of it.

Lamb and Ford (1960) state: "A clearcut dental health education program needs to be initiated for the mother during the child's prenatal period as well as for the pre-school and the school-aged children through informed parents..." Davies (1967) suggests that a start should be made in antenatal clinics, in consulting rooms

and in the home; and that there is a need to get the doctor and family health visitor to include concerns for dental health with the total health of the child.

This group can usually be reached through pre-natal and post-natal clinics. Here dental health education talks and activities can be carried out by dentists, dental nurses or other dental health educators. The objective of the talks is to bring awareness that teeth matter to to her child and that her child's future dental health is largely in her hands. She is told of the chances of ruining her child's dentition at an early age, by sugar products, the dangers of sweet snack habits, neglecting oral hygiene and the pride she can take, justifiably, if she brings up her child free of dental disease. Correct methods of flossing and toothbrushing can be demonstrated. Dietitians can also be contacted to ensure that their advice will include the problem of oral health.

Various investigations into the relationship between pregnancy and gingival inflammation in general have shown that there is increased gingival inflammation in pregnancy with partial resolution during parturition. (Löe & Silness 1963; Cohen et al 1969). Generally during pregnancy, the periodontal conditions of the pre-natal mothers deteriorate because of the hormonal influences on the periodontium. Pre-natal mothers should be routinely referred to dentists by medical personnel for check-up and

necessary treatment.

Oral contraceptives have been shown to affect the periodontal health of patients (Perry 1981; Pankhurst et al 1981). Studies conducted in India by Das et al (1971) indicate that women taking oral contraceptives exhibited more gingival and periodontal disease than the comparable groups. The ingestion of hormones contained in the drug is said to have affected the gingival inflammation which ranges from measurable increases in gingival exudate to pregnancy-like gingivitis and tumour. There is also a possibility that hormones increase the inflammatory response of the gingiva to heat irritants. Hence, patients should be informed of the effects of oral contraceptives on periodontal tissues and the need to maintain good oral hygiene. Pre-natal mothers must also be warned of the dangers of taking drugs and antibiotics such as tetracycline which damage teeth of their children.

Pre-natal and nursing mothers should be considered a priority group for dental health education. Studies by Kriesberg & Trieman (1962) have indicated that attitudes of parents in preventive dentistry can influence the child.

4.4.4 Young Adults

Dentistry has been so concerned with the attempt just to get school-age children into the dental office that

the important area of educating the parents has frequently been overlooked (Young & Striffler 1969).

A number of studies have highlighted the influence of parents in promoting children's dental health practice. A program by Johns & Muhler (1965) showed that before dental health education could be meaningful to the child, the parents had to be taught the practical importance of dental health. However, methods of teaching and reaching parents have not been well defined. Vincent (1965) believes that the problem of dental education for parents should be a matter of concern to all dentists and that the average practitioner devotes too little time to this important phase of dental practice.

Most adults are not informed about the causes and hazards of periodontal disease, and that it can be prevented by maintaining good oral hygiene. This ignorance and unawareness of periodontal disease can be attributed to the fact that in the past very little or even no dental health education activities and facilities were available for the general public. Most dental health education activities were concentrated on school children and other priority groups, so that the general public was neglected and only received treatment. But Young (1969) quotes Douglas and Ore who said that if a choice must be made between cleaning time and patient education time, the latter would serve the cause of oral health better.

For the adult population, dental health instruction can be carried out by direct face-to-face education (by far the more effective) or by indirect education through mass communication media such as pamphletts, newspapers, radio and television, and through regular exhibitions. The content of the mass media program must be dictated by the needs of the community as revealed by surveys and the communication media to be used will depend on factors such as literacy rate, the extent of the radio and television networks, the availability of educational materials and the economics of operation (Wong 1972).

Use of a well-constructed exhibit with simple and interesting explanatory notes is quite an effective method in adult education. Wong (1972) finds that some of the reluctance to visit the dentist can be reduced by educating the public to recognise, through the holding of regular dental health exhibitions, the various common dental conditions, to know something about the consequences of neglect and the effects on their health. Wong adds in order that the use of prepared exhibits is fully [exploited], a permanent museum to house selected exhibits is recommended. This is especially applicable to periodontal disease because of its high prevalence.

Forums on periodontal disease can be broadcasted by dentists over radio and television. Dental health messages can be displayed in popular departmental stores

and in supermarkets. Dental health displays and preventive dentistry promotions can be incorporated in certain organisations like civic centres, sports clubs and youth organisations. In an endeavour to educate members of the public on the importance of plaque in the aetiology of periodontal disease, the Dental Health Foundation decided to offer dental plaque disclosing services to members of the public attending dental health displays.

- Some industrial leaders, aware of the relationship of dental health, general health and working environment, have organised dental programs in their establishments.

The need for and importance of parental education in dental health is widely and strongly supported (Young 1969).

4.4.5 The Handicapped

Massler (1957) defines a handicapped child as "any child where there exists a physical, mental or emotional defect which interferes with his ability to meet with and solve life's problems and which prevents him from integrating into normal daily activity".

There are three main categories of handicap which affect the maintenance of good dental health (Holloway et al 1969):

1. The first of these is any physical condition which complicates the performance of technical dental procedures, e.g. cerebral palsy.
2. The second is any condition which endangers the health of the child during dental procedures, for example, haemophilia.
3. The third is any mental or emotional problem which reduces the child's ability to co-operate during routine dentistry, e.g. mental retardation.

Frequently, two or more of these conditions will exist in the same child.

Periodontal Conditions in the Handicapped.

Periodontal disease is perhaps the most common oral pathologic condition affecting the general adult population, but where handicapped individuals are concerned it is the most prevalent dental problem affecting all ages (Steinberg 1976).

This appears to be true particularly of many mentally handicapped institutionalized patients whose heavy bacterial plaque accumulations lead to the initiation of periodontal disturbances at an early age.

The antiepileptic drug phenytoin (Dilantin) induces a gingival hyperplasia in many patients. Since handicapped individuals often require this medication, they exhibit

a rather high incidence of phenytoin-induced gingival hyperplasia (Steinberg 1976).

Besides factors such as inadequate oral hygiene, eating soft foods lacking any detergent action, and poor muscular coordination may result in heavy accumulations of bacterial plaque on the teeth of physically and mentally handicapped persons.

Treatment Planning

For all children included in the three classes of handicap described earlier, the problem is either the difficulty of receiving or accepting dental treatment, or the changes associated with it, but in all cases these problems are avoided altogether if no dental disease develops. Effective prevention is there^{fore} of great importance to these children. In fact, after the general well-being of the child, the prevention of dental disease is the most important aspect of the treatment plan (Holloway et al 1969).

Dental Health Education in the Prevention of Periodontal Disease

Parental counselling is desirable before instituting a plaque control program. Before these measures can be adopted, parents or guardians must understand the nature of periodontal health, appreciate the methods of prevention, and know how to perform these effectively.

There are two areas where handicapped children can be reached - in institutions, and in their own homes.

Oral Hygiene Advice

Handicapped people may have disabilities that interfere with their ability to carry out oral hygiene practices. It is the role of the dental health educator to find ways to overcome these disabilities. To the greatest extent possible, the individual should be responsible for maintenance of his own hygiene. However, because of variations in disabilities, the amount of independence possible will range from adequate hygiene performed by the handicapped person to total dependence on another person.

Teaching Plaque Removal

Since tooth cleaning is a learned behaviour, it is logical to approach the development of oral hygiene skills through the use of learning principles. (Wessels 1979). Methods of tooth-brushing have to be developed to suit the individual requirements of the child and parent.

For people who have learning impairments, it is necessary to break down tasks into component parts and to begin instruction with the simplest components. Size and nature of the components into which the task is divided are dependent on the abilities of the individual (Wessels).

Positioning

Johnson & Albertson (1972) pointed out that proper positioning of the child and the person performing the oral hygiene procedures is crucial to effectiveness.

The position chosen must provide support for the head and body, be comfortable for all involved, allow adequate visibility, and have a good light source. It also depends largely on the disability that the individual presents. For many patients, these requirements cannot adequately be met in a bathroom. A room with a soft chair or couch and plenty of space makes a better place to clean the teeth.

Plaque Removal Techniques

Dr Graeme Dunn (1973) says it is ^{firstly} ~~finally~~ necessary to have the correct gear for plaque removal techniques. Dr Dunn says a suitable toothbrush should have a small narrow head with a multitude of flexible bristles trimmed to an even length. This allows a person to reach the inaccessible areas where plaque collects more easily.

Since there is no evidence that indicates one method is clearly superior the technique used should be the most simple method that is effective in the hands of the individual performing the brushing. The brushing technique should be a systematic coverage of all areas

of dentition (Wessels 1979).

Electric toothbrushes are often worth the additional expense, says Dr Dunn, as many parents and handicapped people find them more effective and easier to manage. The handicapped child needs to be conditioned to the noise and vibration of the appliance, and this can be done by allowing them to hold it in their hand or against their face while it is running.

The use of unwaxed dental floss has a prominent place in an effective plaque control program. Several authors advocate the use of floss in plaque removal where a caretaker is performing the flossing (Wessels, 1979). Experience indicates that for some even severely retarded people flossing is a realistic goal especially if a holder is employed. Again, the individual abilities of the handicapped person must dictate the extent to which he can be expected to perform his own hygiene tasks.

The oral hygiene teacher should closely observe the patient's technique and periodically examine the gingiva in order to prevent possible gingival damage.

With the handicapped more can be gained by focussing all plaque removal efforts on one effective cleaning a day rather than several haphazard attempts. This is especially beneficial for patients who do not co-operate well.

For patients who have greater independence in oral hygiene care, more frequent brushing, especially after meals, is desirable and should be encouraged.

For people who have limitations of movements in their hands or arms, toothbrushes and floss holders have been adapted to reduce the effect of this disability.

Oral hygiene procedures should be started in very young children before periodontal disease has had a chance to begin.

The considerable problems encountered in restorative and surgical treatment of handicapped children bring the concept of prevention of dental disease to the forefront of treatment planning.

5. PREACHING PREVENTIVE PERIODONTICS

When preaching preventive periodontics, information provided should suit the target group in content material and technique of dissemination, so that message that is wished for and conveyed can be easily understood. According to Blinkham and Verity (1979), the suitability of educative material for a target group should be carefully considered during the planning phase.

For effective prevention of periodontal disease, the following factors need to be considered:

- 5.1 Effective Plaque Control.
- 5.2 Nutritional Counselling.
- 5.3 Preventive dental check-ups for early recognition and treatment of the disease.

5.1 EFFECTIVE PLAQUE REMOVAL.

Preventive periodontics consist of many inter-related procedures, but plaque control is the keystone of the prevention of gingival and periodontal disease. It is the basis to the practice of dentistry, without it oral health neither can be obtained nor preserved. For the patient with a healthy periodontium, plaque control means the preservation of health; for the patient with periodontal disease, it means optimal post-treatment healing; and for the patient with treated periodontal disease, plaque control means the prevention of the recurrence of the disease (Glickman 1972).

Ramfjord and his co-workers (1982) established that there is ample evidence that lack of plaque removal over long periods leads to periodontitis both in animals and man. They also state that periodic removal of plaque may cure gingivitis and arrest the progress of periodontitis.

5.1.1 Patient Motivation in Plaque Control

Motivation of the patient is the key to the achievement and maintenance of optimal oral hygiene, because the patient is the only one who can remove plaque regularly and thoroughly (Wentz 1978).

In no other field of medicine can the patient so effectively assist in preventing and reducing the severity of a disease as can be done in relation to gingivitis by toothbrushing, supplemented according to individual needs by interdental cleansing with dental floss, rubber and wooden interdental cleansers and water irrigation under pressure (Glickman 1972). While professional plaque removal has an important role in the prevention and control of periodontal disease, the best results have been obtained when scrupulous levels of home care were also practised by the individual (Wentz 1978). Time spent in the dental office teaching the patient how to cleanse his teeth is a more valuable health service than cleansing his teeth for him (Glickman 1972).

Success in patient motivation toward an efficient plaque control program is based on the application of the principle of educational psychology. A structural program of education has more chance of success than one based only on intuition of the dental health educator (Wentz 1978).

Before an individual can be taught what to do, he must know why he is doing it. Instruction in proper oral hygiene technique is not enough. The patient should understand what periodontal disease is, what its effects are and what he can do to protect himself (Derbyshire 1964).

He must be motivated to want to keep his mouth clean for his own benefit and not to please his dentist. During this time movies and written materials which contain factual information about periodontal disease should be provided. Disclosing dyes should be used to demonstrate plaque and its close relationship to disease lesion explained. This helps to emphasize the patient's role in prevention of the disease.

Once the patient understands the cause and nature of the disease, the patient could be motivated by appealing to the inner needs of the patient. Most patients do desire to improve their appearance, prevent halitosis and keep their teeth for life. Short and long-range goals should be set and these should be meaningful, attractive and attainable (Wentz 1978).

Plaque Control

Plaque formation can be prevented by the following two ways:

1. Mechanical plaque control;
2. Chemical plaque control.

5.1.1.1 Mechanical Plaque Control

Today toothbrushing and other mechanical cleansing procedures are the most reliable means of controlling

dental plaque, provided the cleansing is sufficiently thorough and performed regularly (Löe 1979).

The development of an effective home care plaque control program requires a great deal of time and patience. The first instructional session on plaque control should consist of audiovisual material or verbal exploration of the nature of the disease. Disclosing solutions should be used and the location and amount of plaque shown to the patient with a mirror. A brushing demonstration should be given on a model, stressing the exact placement and activation of bristles, and the patient shown how to carry out the same procedure in the mouth.

Various toothbrushing methods have been described by different authors. However, research indicates that there appears to be little difference between these methods in their ability to remove plaque (Schmid et al 1976). The scrub method emerges as the simplest method available and one that is no less effective than any other; it requires minimal manual dexterity and patient concentration (Federation Dentaire Internationale 1983). Electric toothbrushes are useful for handicapped persons or others with limited manual dexterity. The comparative effectiveness of manual and power-driven toothbrushes has been relatively well studied. It appears that both are effective if used properly (Federation Dentaire Internationale 1983).

Research suggests that the type of toothbrush used is unimportant (Suomi 1971; Horowitz 1980). Children clearly should use a smaller brush than adults, and the dentist and hygienist may want to recommend different sizes and degrees of softness depending on each patient's manual dexterity, enthusiasm, and oral health. But these recommendations are based on common sense rather than on firm evidence (Federation Dentaire Internationale 1982).

Dental Floss

A multitude of studies have shown that interdental cleanliness can rarely be achieved through toothbrushing alone. Accordingly, additional techniques and devices such as toothpaste and dental floss are recommended. Also due to the incompatibility between sizes of the bristles of the common toothbrushes and the dimensions of the natural pits and fissures of the teeth, toothbrushing alone cannot prevent plaque development at these sites (Löe 1979).

Studies by Gjermo & Flotra (1970) and more recently by Ableson (Ableson et al 1981) and Lobene (1982) reveal that dental floss was effective in removing plaque from interproximal surfaces and substantially improving gingival health.

It is unimportant whether floss is waxed or unwaxed, the only important thing is that it be used properly

and without causing injury (Hill et al 1973).

Frequently periodontal patients have splinted contacts or bridgework which requires extra aids such as wire or plastic needles to assist the patient in threading the floss for cleansing. Floss holders can be used which carry the floss under fixed bridges, between splinted teeth and under low solder joints to remove plaque and food debris (Dingerson & Dingerson 1973).

Floss holders are helpful to the handicapped, to those who have a strong gag reflex, and to those who because of their age or physical condition, are unable to manipulate the floss, and to those who emotionally cannot floss without assistance (Dingerson & Dingerson 1973).

Water Irrigators

Water sprays are used in dentistry to irrigate the gingival crevice. Although the use of the irrigation devices does not remove bacterial plaque, it does remove some bacteria and bacterial products and aids in gross removal of retained food particles. The irrigation devices should be used with warm water and with minimal pressure to prevent tissue injury (Allen et al 1968).

Oral irrigation devices are recommended in patients who have orthodontic appliances and fixed prosthesis. It

is an effective oral hygiene aid when used in addition to toothbrushing.

Other methods of plaque removal include dentifrices, interdental cleansers such as wooden tips (Stimudents), toothpicks and pipe cleaners. Interdental cleansers are useful for cleansing interdentally and in furcations particularly in spaces too small for the rubber tip. Interdental cleansers are also useful for removing debris in the period immediately following periodontal therapy when the condition of the tissues does not permit vigorous brushing.

5.1.1.2 Chemical Plaque Control.

Mechanical cleansing with toothbrush and supplemental aids is the most effective method for controlling plaque and calculus formation so far available, but it is tedious and cannot be relaxed without risking new accumulation and the onset of gingival disease. There is a constant search for chemical aids which could prevent or significantly reduce plaque and calculus formation and lessen our dependence upon mechanical cleaning.

Commercial mouthwashes for breath sweetening do not remove plaque and are ineffective in preventing periodontal disease. But chlorhexidine gluconate, used

as a mouthrinse (10 ml. gluconate, 0.2 percent concentration used daily) a topical application (1.0-2.0 percent concentration used daily), or a dentifrice (0.4-1.0 percent concentration) has been successful in reducing supra-gingival plaque in a number of studies (Löe 1977; Ainamo 1977). Alexidine dihydrochloride mouthrinse (10-15 ml, 0.035-0.05 percent concentration) has given similar results, though the effectiveness of both compounds is not unqualified. (Federation Dentaire Internationale 1982).

Recently Wennstrom (1982) studied the effect of a new anti-plaque agent CK-056-A on fourteen dental students using mouth rinses. His results demonstrated that CK-0569A prevented the colonization of motile ~~it~~ curved and spirocheates in developing plaque. Furthermore, rinsing twice daily with 0.1 percent solution CK-0569A significantly reduced dental plaque and retarded the development of gingivitis (Wennstrom 1982).

Chlorhexidine is now marketed both as a mouth rinse and as a dentifrice and is used in most countries around the world.

Chlorhexidine has become a valuable aid in treating individuals with juvenile periodontitis, severe progressive periodontal destruction and also useful in treating handicapped and mentally retarded patients.

Studies of the toxicology, teratology and metabolism of chlorhexidine have shown that it is one of the safest antiseptics known (Foulkes 1973), and that the side effects are inconsequential.

Other chemical plaque controlling measures such as antibiotics and enzymes have failed to show any beneficial effects on plaque control conclusively, though antibiotics such as penicillin and tetracycline have shown to inhibit plaque formation in animals. But Loe (1977) says that, although some antibiotics have shown plaque-reducing properties and even though some inhibit plaque formation completely, the potential danger of maintaining a continuous antibiotic regimen cannot be doubted. And Loe goes on to say that it is therefore difficult to see how antibiotic agents can offer a practical means of life-long plaque control in man.

However, there has been considerable evidence recently of the topical effects of fluoride rinses on plaque formation. Studies by Svatum and co-workers (1977) have shown that daily rinsing by sodium fluoride and stannous fluoride solutions will inhibit plaque formation.

5.1.2 Nutritional Counselling

The individual's nutritional status affects the condition of the periodontium, and injurious effects of :

local irritants and excessive occlusal forces may be aggravated by nutritional deficiencies. However, no nutritional deficiencies of themselves cause gingivitis or periodontal pockets, local irritants are necessary to produce such changes (Glickman 1972).

According to Nizel (1972) the maintenance of periodontal health and/or the prevention of recurrence of periodontitis may be helped in part by supportive nutrition. This is especially true, he says, for those who have poor eating habits.

The purpose of nutritional counselling is to inform and help people eliminate those foods that are implicated as obstacles to periodontal health (Dingerson & Dingerson 1973).

Application of diet improvement comes about through the motivation required by the patient. The dental health team's real contribution is to provide information and facts that can be converted into action (Dingerson & Dingerson 1973).

Nutritional counselling should be aimed at helping the patient understand the importance of proper nutrition and motivating him or her to modify his/her diet to include (or delete) nutrients which are missing or inadequate in quantity or quality.

In order for the patient to understand the reason for this nutritional guidance service, the role of food and nutrition in periodontal health should be explained. Patients tend to be more cooperative if the nature of the problem and the rationale for making some alteration in their dietary patterns are explained (Nizel 1972).

Once the relationship between diet, nutrition and periodontal disease has been explained to the patient Nizel (1973) says they can be advised to improve their diet by (1) cutting down on "plaque-forming sugars", i.e. sugar sweetened foods. Nizel (1972) says that sugar is important in promoting the numbers of plaque bacteria and their ability to clump together in a sticky mass. Therefore, he says, if patients can be motivated to eat less sugar, or better still eliminate it completely, there will probably be less plaque forming and accumulating.

(2) Replacing sweets with firm and fibrous foods that will retard the formation of plaque, and (3) selecting a well-balanced, varied adequate diet to provide all essential nutrients in order to support overall health, in general, and the health of the dental supporting structures, in particular.

Nizel (1972) says when it is necessary to prescribe a diet, it is always important to keep in mind the behavioural food habits and eating patterns. In short, he says, radical changes should be avoided; only acceptable behavioural modifications that the patient is willing to make should be

initiated. This is a realistic approach and one that can be rewarding.

5.1.3 Seeking Regular Dental Care.

Education of patients to have periodic dental visits is in itself an important preventive measure (Glickman 1972). Dental health educators should motivate patients to have regular dental check-ups.

The dental health educators should also convey to the community that periodontal disease is preventable and that it can be successfully treated if one seeks treatment at its early stages. For this however, the community must be made aware of the simple signs and symptoms of early periodontal disease so that immediate dental care can be sought. Redness of gingival margins, bleeding during brushing can easily denote abnormality in the gingiva. Most people do not seek early dental care either because of ignorance or that they do not regard "bleeding from the gums" as having any serious consequences. Dental health talks and lectures, therefore, should correct wrong conceptions, and motivate the patient to seek periodic dental care or at least early dental care if any of the symptoms of periodontal disease are noticed.

Early detection of periodontal disease can be easily carried out on school-children by dental therapists or dentists based in the schools, by systemic regular examinations of the school-children. Similarly, pre-natal mothers during their regular pre-natal check-up could be easily diagnosed for early periodontal disease and treated accordingly.

Each dentist should ensure that he provides a meaningful preventive service at every visit the individual makes. To provide the maximum benefit to the individual, Glickman (1972) suggests that oral prophylaxis should be more comprehensive and include the following:

1. Use disclosing solutions or wafers to detect plaque.
2. Remove supra- and sub-gingival plaque and calculus, and other surface accumulants.
3. Cleanse and polish the teeth.
4. Check restorations and prosthesis and correct over-hanging margins and proximal contours of restorations.
5. Check for signs and symptoms of food impaction.
Plunger cusps, abnormal proximal contacts and worn marginal ridges should be corrected to prevent or correct food impaction.
6. Identification of oral habits which have been identified as direct aetiologic agents in destroying the soft and hard tissues of the periodontium.

Evidence suggests that a thorough professional prophylaxis at 2-4 months intervals, combined with daily individual oral hygiene practiced at home, will maintain periodontal health (Federation Dentaire Internationale 1983).

Many persons, however, are unable to meet the necessary standards for home care for a variety of reasons. In such cases, dental professionals should probably consider carrying out the professional plaque removal procedures more frequently (Federation Dentaire Internationale 1983).

It is also important that the dentist should put the patient on a recall system. The patient should be reminded to come for a check-up either by telephone or letter. Recall procedures are recommended to encourage regular dental visits. They should be used for administration of preventive procedures, measurement of oral hygiene status and existing disease, and further instruction and encouragement in self-care procedures. The time period between periodic recall visits should be based on each individual patient's needs rather than be standardized (Federation Dentaire Internationale 1983).

Elimination of Iatrogenic Dentistry

Iatrogenic may be defined as any condition or abnormal state produced in a patient by either inadvertent or erroneous treatment (Vandersall 1977). In dentistry,

this phenomenon can be elicited by either a dentist's act of commission (inappropriate treatment) or acts of omission (inattention of treatment) while performing his work.

Prosthodontic, restorative and orthodontic dental treatment may cause severe periodontal damage by:

1. Direct mechanical impingement on the tissue.
2. Facilitation of food retention and impaction, thus increasing plaque accumulation.
3. By producing some transitory pain which, if unexpected, may result in the patient avoiding oral hygiene for some time, enabling calculus formation to begin.

These consequences can often be avoided or minimised by early advice and control of any existing periodontal disease. The reduction or elimination of any aggravating cause will make subsequent procedures easier to perform, while at the same time reducing the danger of iatrogenic complications (Altman & Wendon 1974).

Paradoxically, iatrogenic dentistry may be inflicted upon the periodontium through the practice of periodontics, by perpetuating the very disease it is meant to treat. This occurs when periodontal diseases are either erroneously diagnosed (inattention to treatment) or when treatment plans are not compatible with the pathophysiology of the disease, or sound biomechanical and scientific principles are not observed (inappropriate treatment). (Vandersall 1977).

The challenge of preventive periodontics is to avoid initiating or aggravating periodontal disease. It is, therefore, the responsibility of every dentist to ensure that he does not initiate periodontal disease through iatrogenic dentistry.

5.2 DENTAL HEALTH EDUCATION MEDIA.

The term "media" should theoretically include all vehicles for communication, whether by example or by word. Media, however, are more usually understood to be the specific tools used for formal teaching, other than the human voice (Dunning 1979).

These tools are best grouped in two categories:

- 5.2.1 Audio-visual aids used in teaching individuals or small groups;
- 5.2.2 Mass media used in reaching the public.

5.2.1 Audio-Visual Aids

Audio-visual aids are used as methods of building concepts. They are not meant to take the place of the teacher or to assume the actual task of teaching (Stoll & Catherman 1972).

Stoll says if audio-visual aids are properly used, they contribute to the formation of desirable concepts, provide interest for abstract ideas and tend to make learning permanent. According to a Manual on Health Education, issued by the Department of Public Health in New South Wales (1969), an effective audio-visual aid should have some of the following characteristics:

1. It should attract attention without reducing the audience's attention to what is being taught;
2. It should increase the audience's interest in the subject;
3. It should help the communicator to communicate his intentions;
4. It should increase understanding.

Audio-visual aids include motion pictures, film strips, slides, models, charts, exhibits, and the like.

Motion-pictures, Film-strips, Slides & Television.

These materials and media are grouped together because they are known as "passive materials" in their effect on the learners (Stoll & Catherman 1972). Films should be used as a teaching device rather than as a means of amusement in dental health instruction. The main value of films is that they provide realism and motion. Motion pictures for school-children and adults relating to dental health should be carefully selected and previewed and the reception to these pictures will vary from audience to audience.

Evidence has proved that people can learn skills, information and sometimes change their attitudes from films, provided they are prepared to learn (Division of Health Education, Department of Public Health, 1969).

However, the health educator is not always fortunate enough to be provided with a properly motivated audience and cannot depend on films alone to do the job.

Video Systems

In recent years, dental educators have developed an interest in using the video system as a teaching aid. It is a valuable aid in teaching dental health education for small groups or for individualized instructions, making good visual impact.

The advantage of using the video system over television for education is that it fulfills one of the conditions of learning, in that there is a learner involvement by response to an instructor-provided stimulus. Secondly, the video system can be operated by a non-professional and a person with a little know-how could easily manipulate it. The unique feature of this system is its easy-load, push-button operation, and quick forward and reverse motion. This allows the learner to obtain access to information stored on the tape quickly and easily (Mangiaracina & Sawyer 1973).

Mangiaracina & Sawyer (1973) say that a tape segment can be arranged to include verbal and visual descriptions, pertinent examples, stress an important point, and question with an optional opportunity to permit the learner to think and provide answers. They further state that the

sequence would be completed with correct answers, repeated re-statements of important facts, or correction of incorrect answers.

Video cassette television possesses all the characteristics needed to become an exciting new educational medium. Its compactness and easy packing permits ease of handling and storing.

Posters and Bulletin Boards.

Posters and bulletin boards are important as visual materials in teaching dental health.

A poster should convey a simple message, preferably illustrated with figures with which the viewer would like to identify himself. Posters in essence are attractive, temporary reminders rather than original informers. They should convey simple messages and emphasize one idea at a time. Posters should be attractively coloured, to attract the attention of the reader. Pirrie & Dalzell (1962) say the first requirement for a successful poster is that it should attract attention to itself by its design, position, wording, originality and challenge. It should give a purely visual message and the passers-by can see its meaning at a glance. Posters are probably one of the best methods of attracting the attention of large numbers of people with the object of making them look, think and act.

Bulletin boards can convey several ideas at one time and can be displayed for a longer period of time to be seen by all learners. It should be kept up-to-date with interesting new ideas and new materials. Stoll & Catherman say if properly used, a bulletin board could be a good motivational force for increasing interest in dental health.

Charts

Charts are primarily conveyors of information, more detailed than slides and designed for long-term exhibit. Initially they require teacher explanation (Dunning 1979).

It does not need any special equipment to project on display. There are two types of charts:

- (a) Wall charts. These are used as displays to summarize certain points of the lesson or as permanent displays.
- (b) Flip-charts. They perform the same function as slides or film strips. Flip-charts are more frequently being used to replace the blackboard to capture the ideas of the audience during a discussion.

Charts are an excellent method of obtaining student participation.

Flannel Boards

Flannel boards are hard boards covered with flannel or velvet and are commonly used during dental health talks

and lectures since materials can be placed, removed and rearranged at the will of the health educators. It is convenient to use, easily transported, takes up little space and all the materials can be prepared ahead of time.

5.2.2 Mass Media

The mass media in common use today are pamphlets, newspapers, radio and television. Each is launched widespread to an audience which, though selected to a certain extent, is unseen and must be both attracted and informed in the same operation.

According to Dunning (1979), mass media can convey simple facts fairly well, but because of their impersonal nature, such media may form, but seldom change, basic attitudes and motives. Most commonly, he says, they remind people of needs already felt and understood.

Glickman (1972) says to increase the public awareness of the importance of preventing periodontal disease, mass communication media such as the press, radio and television must be utilized to "conduct psychological warfare" on the public.

5.2.2.1 Pamphlets and Leaflets

Pamphlets and leaflets are widely used in the attempt to disseminate knowledge to people. They are found in almost any dental clinic, government or private practice, and which patients can take away. They are also widely distributed during dental exhibitions and dental campaigns to promote dental health.

According to the W.H.O. Expert Committee on Health Education (1954), leaflets and pamphlets have two main functions:

1. To familiarize rapidly a large number of people with some new or recurrent theme.
2. To follow and reinforce advice given by word of mouth.

Such publications should be short, illustrated if possible, attractively presented, and cheaply produced. It should be recognized that few will be kept, and that the impact must be achieved on first reading. Before preparation, it should be decided exactly for whom the pamphlet is designed and exactly what idea it is intended to convey. The draft should then be tested on some of the people for whom it is intended and their comments noted. Any ambiguities in the text or illustrations can thus be removed (W.H.O. 1954).

Pamphlets can occasionally be distributed by mail or by placement where people who are interested are likely to congregate, such as the public health clinic.

5.2.2.2 Newspapers

Newspapers have a wide distribution in almost every country. New articles, feature articles and advertisements relating to dental health can be carried by the newspapers. Newspapers can give wide coverage of dental campaigns and exhibitions that are held or to be held so that the public is aware of them.

5.2.2.3 Radio and Television

Radio and television are effective media in the propagation of dental health messages. Radio and television can carry special messages at special times, such as Dental Health Week, but are also very valuable on a periodic basis throughout the year. The use of specialists in preparing scripts and visual effects is recommended.

Radio is another health education tool: not a teaching process complete in itself, but a tool to be used along with press releases, pamphlets, films, demonstrations and schools. It draws attention, quickens

interest, makes action announcements, presents needed information; informs but doesn't educate in the full sense (Dept. of Public Health, N.S.W. 1969).

However, expert health television and radio usage may gradually win public confidence by accurate material well presented, and above all, timely and useful to splendid target audiences. Personal effort by health educators, well trained in these media, is a necessity.

5.2.2.4 Dental Exhibitions and Campaigns

Dental health education exhibitions and campaigns may be defined as concerted propaganda publicity efforts, conducted on a more elaborate scale and with a greater intensity than the everyday activities of dental health education. The aims of these activities are generally to increase public awareness of the need for oral health and to motivate the people to seek dental health care.

Health exhibitions, according to the W.H.O. Expert Committee (1954) have two definite functions in a program of health education. If properly organized and publicized, they attract large numbers of people who might otherwise never come into contact with a variety of new ideas on health matters. On the other hand, their organization can draw into activity numerous people, such as the

editor of the local newspaper, photographers, school-teachers, and other prominent citizens, who might not normally come into contact with the health department's activities.

There is a tendency for all concerned to relapse into inactivity when the exhibition is over. Planning beforehand should envisage the exhibition as the beginning or climax of continuing activity, and one or two themes should be selected in advance for continuity (W.H.O. 1954).

Mobile exhibitions are effective if used at key-points of interest, such as the health centre, or the waiting rooms of hospitals.

5.3 EVALUATION

Evaluation may be defined as the attempt to determine the effectiveness of a program in achieving its intended purpose (Division of Health Education, Dept. of Public Health, N.S.W. 1960).

Evaluation of dental health education programs is extremely important, especially if the goal is to provide a basis for comparison and setting priorities among alternative programs (Freed & Matthias 1980).

Usually health education efforts end without participants bothering to appraise the effects of their teaching. Many devices and media have been used with considerable expenditure of time and funds with no evidence that behaviour has been changed. But health educators are now awakening to the value of determining the efficacy of procedures before utilizing them (Pelton & Wisan 1955).

Striffler, Young & Burt (1983) say that once educational experience has been conducted and adequate time has elapsed, appropriate evaluation of the learning objectives must occur. Evaluation of the dental health programs is as important as implementation of the program itself.

The Report of the W.H.O. Working Group on Dental

Health Education (1976) states that it is necessary to establish the value or worth of any dental health education program. Evaluation will determine whether the required outcome and the planned output are actually occurring, i.e. whether or to what extent the planned objectives are being achieved.

Such evaluation can demonstrate the benefits of the program to the community and indicate adjustments that may be required from time to time. Also a good periodic evaluation can be of great assistance in obtaining public and financial support.

The primary purposes of evaluation are to provide objective estimates of achievements and to provide guidance for the conduct of activities of a program. Unless periodic reviews of what is being done in community projects are made, deterioration of effort due to lack of stimulus is likely. Constant evaluation stimulates interest and at the same time clarifies objectives.

Dental health is a continuous challenge, say Stoll & Catherman(1971) with many unsolved facets. Hence, evaluation becomes a necessary part of any community effort.

Evaluation also helps to answer many questions such as: is the program travelling the right direction, or are there better ways of doing what we have continued to do for several years.

Baseline data have to be collected prior to commencement of the program in order to provide a basis for comparison with actual outcomes in the evaluation process.

The W.H.O. Working Group on Dental Health Education (1977) suggested using a combination of criteria for evaluating the success of a program (in relation to the target population). For convenience, these criteria for evaluation are presented in three generally accepted categories as follows:

Cognitive Domain

- Knowledge of diet and the role of sugar in periodontal disease.
- Knowledge of dental plaque and its significance.
- Knowledge of oral hygiene and the use of:
 - (a) toothbrush
 - (b) dental floss
 - (c) natural cleansers
- Knowledge of the need for regular visits to dentists.
- Knowledge of gingivitis.

Affective Domain

- Percentage of acceptance of dental care offered.
- Regularity and frequency of toothbrushing.
- Amount and frequency of consumption of sweets and

refined carbohydrates.

Psychomotor Domain

- Ability to brush properly.
- Percentage of target groups able to brush properly.

The importance - and difficulty - of evaluation cannot be overstated (Green 1977). Because so many variables contribute to whether clients actually choose to act on the basis of what they have been taught, one can almost never state with certainty that education was responsible for changes observed. Yet seldom is the level of disease - or improved or maintained health status - part of the evaluation. Because reduction of oral disease and maintenance of oral health are the ultimate goals, such measures should be included in the evaluation when there is evidence that the measure does, in fact, reduce disease (Striffler et al 1983).

The difficulties in evaluating programs have long been recognized. However, it is possible to carry out evaluation of one dental health education program or action, or to survey the effect of a whole series of programs, and it is possible to say that each method of dental health education application should or could have a special method of evaluation. Ideally, while designing an education program, its evaluation and its method should be worked out at the same time.

Evaluation, as well as carefully designed research, must assume greater prominence in health education: in spite of the inherent difficulty in achieving documented results, they are essential for progress (Young, Striffler & Burt 1983).

A task force sponsored by the John E. Fogarty International Centre for Advanced Study in the Health Sciences and the American College of Preventive Medicine stated:

It is of utmost importance that evaluation ... be built into all preventive efforts so that their value may be objectively and precisely measured, thus providing a basis for comparison in setting priorities for health programs at every level and for providing feedback to delivery systems for improvement of services. Without such efforts, decisions can only be made on a philosophic basis, clearly inadequate to serve the purposes of policy making in the health care field at every field.

(Preventive Medicine U.S.A. 1973).

Constant evaluation in health education is necessary:

1. to learn to use resources economically;
2. to become competent and efficient;
3. to motivate dental health education by providing evidence of achievement;
4. to define and to check on aims and programs and the responses of the community;
5. to decide between alternative methods;
6. to become familiar with negative as well as positive patterns of response;

7. to maintain ethical standards, as anyone who sets out to influence behaviour;
8. to develop improved and simple instruments for testing public behaviour and reaction.

6. DISCUSSION

Although inflammatory periodontal disease is one of the most widespread diseases of mankind, present knowledge is adequate for the prevention and control of the disease at the individual and community levels. The basis for the prevention and control of periodontal disease is the control of microbial plaque. Microbial plaque constitutes the major and possibly the only extrinsic agent in the aetiology of inflammatory periodontal disease. Research to develop methods of plaque control that are not dependent on mechanical removal by the patient, has not produced an acceptable preventive agent suitable for general use. The only preventive measure for periodontal disease, apart from limited use of anti-septic solutions, is regular and thorough removal of plaque. Plaque removal can be carried out by dental professionals to some extent, but ultimately the prevention of periodontal disease largely depends on individual action. Therefore the key to prevention and control of periodontal disease is education towards oral health.

But the delivery of dental health education is not without problems or barriers. Dental health education, like all other educational activities, is based upon existing knowledge, beliefs, cultural patterns and habits of the population or group towards whom the educational

processes are directed, and also upon their misinformation and taboos. Planning for dental health education should therefore take into account not only the forces within the individual that affect behaviour (e.g. beliefs, attitudes, interests, values, needs, motives, expectations, perceptions; and biological factors) but also the external forces that interact with these internal ones and have an impact on a person's behaviour (e.g. family, kinship, and friendship groups, health and medical facilities and services). Since all these forces are in a constant state of dynamic interaction, the process of dental health education should be flexible and should be continually tailored to take account of changing personal and situational factors.

Major factors contributing to the high prevalence of periodontal disease are unawareness, ignorance and misconceptions amongst the people. This can be attributed to the fact that in the past no major efforts had been made to educate the public on periodontal health and care. The first step therefore, in the prevention and control of periodontal disease through dental health education, is to create awareness of the disease in the community. Health education programmes should aim to raise public consciousness to the fact that periodontal disease can be prevented and that prevention is much more to be desired than treatment, which is time-consuming and costly.

Basic information on the causes and prevention of periodontal disease should be widely disseminated by utilizing the various mass media for educating the public.

The aim of health education is to persuade people to concern themselves with effective health practices. However, this goal is not easily accomplished because the success of all individually-based preventive procedures depends to a large degree on the interest, motivation, and enthusiasm of the patient concerned. Motivation of an individual to perform oral hygiene procedures requires that the individual understand the need for carrying out the time-consuming tasks involved. The individual must not only know the mechanics of the cleansing procedure but also why it is being done. On a one-to-one basis, that is, dentist-to-patient, the dentist must learn as much as possible, in order to find the most practical ways to motivate the patient. Oral health programmes for the prevention of periodontal disease will have limited success unless the problem of how to motivate people is solved.

It appears that the most effective way of controlling periodontal disease is to promote dental health education using specially trained personnel. The concept of the "dental team" has become well established and the team approach to preventive dentistry has so many

advantages. Utilization of personnel other than the dentist for dental health education activities will relieve some pressure off the dental profession, particularly in a country where there is a shortage of trained dental manpower. Classroom teachers should carry a major share of the task of dental health education to school children. Teachers have the skills and years of preparation to do the job of direct classroom instruction; they know their children and their vocabulary levels; they know at what point in the school curriculum a project on dental health would be most appropriate.

Successful patient education seems to be largely dependent on the personality, persuasiveness and interest of the dentist and other dental health educators, as well as on their commonsense and sensitivity in dealing with people. It is essential that in the training of dental health educators, emphasis be placed on individual face-to-face methods and on procedures applicable to small groups such as school children. Educational concepts and behavioural principles related to ways of motivating people to take effective dental health actions should be stressed. School teachers should be provided with adequate knowledge in this field during their pre-service training.

Dental health education activities should be directed to special target groups, such as pre-school and school

children, the handicapped and pre-natal and nursing mothers, in order to concentrate resources and allow specificity of the information provided. School children should be considered the priority group because they can be easily reached in schools and habit patterns are still in the process of being formed. The school setting offers a great potential for effective dental health education. The school setting offers also the advantage that the dental health educator can use both group communication and face-to-face approaches on the same audience and derive maximum benefit from each. The curriculum in the school programme should include not only dental health lessons of the lecture type alone but also activities and methods of teaching that will lead to reinforcement and maintenance of dental health behaviour where this is satisfactory or a change to new behaviour that will promote and improve dental health. Over-emphasis on oral hygiene alone is not sufficient. The benefits of maintaining good oral hygiene in relation to periodontal disease should be explained and demonstrated. Creative instructional materials and activities at all grade levels should be developed to demonstrate the effects of plaque on teeth and its relation to periodontal disease. It is imperative that this group first be approached prior to the onset of disease via dental health education for the institution of preventive measures and secondly, that this group be inspected regularly to detect early lesions.

Pre-natal and nursing mothers should be considered a priority group for dental health education since mothers' dental health practices seem to be one of the most influential factors in determining the nature of their children's practices. Besides various investigations have shown that there is increased gingival inflammation in pregnancy because of hormonal influences on the periodontium. This group can easily be reached through pre-natal and post-natal clinics. Here dental health education talks and activities can be carried out by dentists, dental or medical nurses.

Periodontal disease presents a major problem for the handicapped. The difficulty of receiving or accepting dental treatment and the dangers associated with surgical treatment explain the need to prevent periodontal disease from developing. The handicapped should be considered an important priority group and should not be forgotten.

Preventive periodontics consists of many inter-related procedures, but plaque control is the keystone of the prevention of gingivitis and periodontal disease. Today, toothbrushing and other mechanical cleansing procedures are the most reliable means of controlling dental plaque, provided cleansing is sufficiently thorough and performed regularly. Instructional sessions on plaque control should consist of audio-visual material or verbal explanations of the nature of the disease. Dis-

closing solutions should be used and the location and amount of plaque shown to the patient, and its relation to periodontal disease explained. A brushing demonstration should be given on a model, stressing the exact placement and activation of bristles and the patient shown how to carry out the same procedure in the mouth. Use of other cleansing aids such as dental floss and interdental cleansers should be encouraged. Dental health education should also include nutritional counselling and encourage people to go for routine dental check-ups.

Patients should be strongly encouraged to return to the dental office at regular intervals, and can be reminded to do so by postcard or telephone. The rationale for these periodic visits is to: (a) check the patient's oral hygiene status and other self care procedures; (b) detect, and if necessary treat, any disease at an early stage; (c) to reinforce dental health education messages and (d) apply appropriate preventive procedures. Periodic recall is recommended as a valuable contribution towards disease prevention.

In the propagation of dental health education, the use of the media is equally essential. Audio-visual aids such as motion pictures, film strips, television, video, slides, models and posters can help to build concepts and can be a valuable aid in teaching dental health education for small groups or for individual instruction, making a

good visual impact. Mass media such as the television, radio and newspapers can be effectively used in promoting dental health. Dental health exhibitions and campaigns should be held more often as such campaigns and exhibitions are powerful means of communication with the public.

It is of utmost importance that all dental health education programmes should be evaluated, so that their value may be objectively and precisely measured, thus providing a basis for comparison in setting priorities for dental health education programmes at every level, and for providing feedback to delivery systems for the improvement of services. Ideally, evaluation methods should be planned and well defined prior to programme initiation so that if a change is to be measured, appropriate baseline assessments may be made. Poorly conceived and conducted evaluations can produce information that is misleading, that can be misinterpreted, which may be misused and which may lead to false sense of security.

CONCLUSIONS

1. Prevention and control of periodontal disease largely depends on the individual. It is a disease that is preventable and controllable by regular practice of plaque removal by oral health self-care procedures. It is therefore the task of the dental profession to educate the public on preventive periodontics through intensive dental health education programmes.
2. Many internal and external factors and forces affect the outcome of the educational process and these must be recognized in planning dental health education programmes.
3. It is the responsibility of the dental profession to increase public awareness of periodontal health and disease and its association with retention of teeth for life. Mass communication media such as the press, radio and television must be utilized to "conduct psychological warfare" on the public.
4. Major emphasis in all dental health education programmes should be placed on primary prevention, with special focus on correct techniques of motivating people to carry out plaque control programmes.

5. Dental and non-dental personnel who form the dental health education team and who are knowledgeable, well-trained, and motivated, can play a vital role in educating the community on dental health. In the training of dental personnel, emphasis should be placed on the behavioural and social sciences in dentistry.
6. The most powerful and the most effective method of influencing people to carry out dental health practices is through face-to-face communication. This should be the method of choice in all dental health education activities.
7. Intensive dental health education programmes should focus on special target groups like school children, the handicapped and pre-natal and nursing mothers.
8. Evaluation of dental health programmes should be carried out at regular intervals to determine whether the programmes are progressing satisfactorily towards the set objectives and goals.

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