

Review

Oral hygiene and the use of plants

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Good oral hygiene is necessary for the healthy teeth, gum and fresh breath. A number of methods are used in oral hygiene to prevent and cure oral diseases. It is of importance to look at the roles plants play in oral hygiene as a number of them have medicinal properties. When compared to toothpaste, mouthwashes, denitrifies etc. plants used for oral hygiene stands out. In many African homes, teeth are cleaned in the morning by chewing the root or slim stem of certain plants until they acquire brush-like ends. The Babylonians recorded the use of chewing sticks in 7000 BC and its use ultimately spread throughout the Greek and Roman Empires, it is also used by Egyptians, Jews and in the Islamic Empires. It is believed that the counterpart of the modern day toothbrush was unknown in Europe until about 300 years ago. Presently, chewing sticks is being used in Africa, South America, the Middle East and Asia. The present review looked at the various traditional oral hygiene methods with their medical implications.

Key words: Oral hygiene, chewing sticks toothpaste, mouthwashes, denitrifies.

INTRODUCTION

Oral hygiene is the practice of keeping the mouth clean and healthy by brushing and flossing to prevent tooth decay and gum diseases. Oral hygiene can also be referred to as the general mouth cleanliness and there are various methods of cleaning to make it hygienic.

The chewing stick has different names depending on different societies for instance, Miswak, Siwak or Arak is used in Middle East, Miswaki in Tanzania, Datan in India and Pakistan. It is used deeply in many cultures (Almas et al., 1995). A number of plants are used as chewing sticks in West Africa, the lime tree (*Citrus aurantifolia*) and the orange tree citrus (*Citrus sinensis*) sometimes provides chewing sticks. The roots of senna (*Cassia vinnea*) were used by American Negroes and those of African Laburnum (*Cassia sieberianba*) were used in Sierra Leone. Neem (*Azadirachta indica*) is widely used to provide chewing sticks in the Indian sub-continent, these are just to mention a few of the plants used as chewing sticks.

Chewing sticks impart varying taste sensations such as a tingling, peppery taste and numbness elicited by

Zanthoxylum zanthoxyloides (Waterman) and (*Fagara zanthoxyloides* (Lam) root; a strong bitter taste and frothing from *Masularia acuminate* (G. Don) Bullox ex Hoyle stem and an initial bitterness followed by a sweetness elicited by *Vernonia amygdalina* (Deli root). In addition, other chewing sticks such as the root of *Terminalia glaucesens* planch, produce a discolouration of the mouth. The most popular chewing sticks are those having good flavour and texture and a recognised effect on teeth and supporting tissues. Freshly cut specimens are always desirable because they are more easily chewed into a brush. Some of them possess such tough fibers that penetrate the gum during use thus causing some discomfort (Lewis, 1980).

'As much as the use of parts of some plants cannot be overemphasized in their use as chewing sticks, in oral hygiene, some parts of other plants are also used for oral health. Such parts used are leaves of Eucalyptus, which are been chewed to cure bad breath. Preparation of onion and lime juices can also be gargled to relieve gingivitis or toothache, Nutmeg can also be used for sweet breath and masking bad breath when chewed and held in the mouth. Barks of some plants are also used in oral health such as sour sop. Seeds of some plants can also be useful in oral hygiene, for example, seed of cloves

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cloves and others'.

Modern toothpaste, mouthwashes, dentrifices etc are available in different forms, types, sizes, colours, and in different packs. Most toothpastes are clearly marked out with fluoride which is an element that is expected to prevent tooth decay. If fluoride really prevents tooth decay, does it have any side effect? Some other chemical components of toothpastes are aqua, hydrated silica, sorbitol, glycerin, PEG-G, sodium lauryl sulphate, flavour, titanium dioxide, xanthan gum, sodium saccharin, sodium fluoride and a number of others all these are good to health.

For cleaning to take place in our daily lives, a toothbrush is required which comes in different shapes, texture (hard or soft), colours etc. It is important to know which type of toothbrush is best for us; some tooth brushing cannot take away the remnants of food at the corners of the mouth, in between the teeth and even the inner sides of the cheeks (Akinremisi, 1997).

The oral cavity contains the teeth used for mastication, the gum surrounded by periodontium and alviolar bone, the root of the mouth is known as the hard plate and posterior to it is the soft plate. These and other inner tissues of the cheeks are lined with oral mucous. The tongue is a mobile muscular organ contained in the mouth, it is concerned with speech, mastication, swallowing and taste because taste buds are present on it, the lips preventing contents in the mouth from falling out of the mouth. Since the oral cavity plays these roles with the various parts inside it, it becomes of importance to take the best care of it using the effective methods, materials and making the best use of the resources that are available for oral hygiene (Cawson, 1984).

PURPOSE OF ORAL HYGIENE

The purpose of oral hygiene is to keep the teeth free of plaque (a major cause of cavities) related problems such as gum infections and loss of teeth. {Plaque is the sticky substance that is felt on the teeth several hours after a meal when they have not been cleaned, it is mainly growing bacteria. As the bacteria grow, they produce acid, which eat into tooth enamel, causing the typical cavity. As further acids erode the tooth, it becomes painful. Since plaque adheres to the crevices and fissures of the teeth, when it is not removed on regular basis, it damages the protective enamel surface of the teeth, causing the formation of cavities (holes). Plaque can also lead to gum disease known as periodontal disease and tooth loss. When plaque is hardened on the teeth, it is called tartar.

New paragraph Tooth brushing and flossing removes plaque from teeth and antiseptic mouthwashes kills some of the bacteria that help in formation of plaque. Fluoride in toothpastes, drinking water or dental treatments- even

effective plant materials also help to protect teeth by binding with enamel to make it stronger. In addition to such daily oral care, regular visits to the dentist promote oral health. Preventative services that can be performed includes fluoride treatments, sealant application and scaling (scraping off the hardened plaque i.e. tartar).

PRECAUTIONS

Maintaining oral hygiene should be a lifelong habit. An infant's gum and later teeth should be kept clean by wiping them with moist cloth/cotton wool or a soft toothbrush. However, only a very small amount of tooth-paste (pea-sized) containing fluoride should be used since too much fluoride may be toxic to infants.

An adult who has partial or full denture is also expected to maintain good oral hygiene. Bridges and dentures must be kept clean to prevent gum disease. Denture should be relined and adjusted by a dentist as necessary to maintain proper fit so that the gums do not become red, swollen and tender.

Proper brushing and flossing should be performed thoroughly but not too vigorously. Rough mechanical action may initiate or damage sensitive oral tissues. Flossing may be accompanied with bleeding for the first few days after flossing is begun. However, bleeding continuing beyond one week should be brought to the attention of a dentist. As a general rule, any sore or abnormal condition that does not disappear after 10 days should be examined by a dentist (Bethany, 2001).

DESCRIPTION AND RISKS OF ORAL HYGIENE

Brushing

This should be performed with a toothbrush and a fluoride toothpaste at least twice a day and preferably after every meal or snack. Effective brushing must clean each outer tooth surface, inner tooth surface, the toothbrush should be held at a 45° against the gum and moved back and forth in short strokes (not more than one tooth width distance). To clean the inside surfaces of the front teeth, the toothbrush should be held vertically and the bristles at the tip (called the toe of the brush) moved gently up and down against each tooth. To clean the surfaces of the large back teeth, the brush should be held flat and moved back and forth. Finally, the tongue should also be brushed using a back-to-front sweeping motion to remove food particles and bacteria that may sour the breath.

Toothbrushes wear out and should be replaced every three month. Individuals are expected to get toothbrushes with soft, nylon, rounded bristles in a size and shape that allows them to reach all tooth surfaces easily.

Flossing

Flossing once a day helps prevent gum disease by removing food particles and plaque at and below the gumline as well as between teeth. To begin, most of an 18-in (45 cm) strand of floss is wrapped around the third finger of one hand. A 1-in (2.5 cm) section is then grasped firmly between the thumb and forefinger of each hand. The floss is eased between two-teeth and moved gently up and down several times with a rubbing motion. At the gumline, the floss is curved first around one tooth and then the other with gentle sliding into the space between the tooth and gum. After each tooth contact is cleaned, a fresh section of floss is unwrapped from one hand as the used section of floss is wrapped around the third finger of the opposite hand. Flossing proceeds between all teeth and behind the last teeth. Flossing proceeds between all teeth and behind the last teeth. Flossing should also be performed around the abutment (support) teeth of a bridge and under any artificial teeth using a device called floss threader. Dental floss comes in many varieties (waxed, unwaxed, flavoured, tape) and may be chosen on personal preference. For people who have difficulty handling floss, floss holders and other types of inter-dental (between the teeth) cleaning acids, such as brushes and picks are available (Bethany, 2001).

Both descriptions (brushing and flossing) might not be able to handle oral hygiene to their best. Both methods are difficult for some individuals especially in the cleaning up of each tooth effectively, compared to chewing sticks which is easier to hold (as holding toothbrush may be difficult for people with limited use of their hands although some brushes are modified by inserting it into a rubber ball for easier grip), in cleaning the surfaces of each tooth and even the tongue, because chewing sticks are very easy to hold coupled with their naturally selected properties such as foaminess, hardness or bitterness and moreso, chewing sticks can reach every corners of the oral cavity to give the best of brushing as described earlier in description of brushing.

Risks

Negative consequences arise from improper or infrequent cleaning of the oral cavity. The five major oral health problems are plaque, tartar, gingivitis, periodontitis and tooth decay (Bethany, 2001).

ORAL DISEASES OR ORAL FLORA

Diseases are any deviation from or interruption of the normal structure and function of any part of the body. It is manifested by a characteristic set of signs and symptoms, in most instances the aetiology, pathology and prognosis is known (as defined by medical dictionary)

dictionary) while oral refers to the mouth thus, oral diseases are simply malfunctions affecting human's oral cavity which are caused by lack of good oral hygiene.

Oral floss can simply mean the colonization of the oral cavity by micro-organisms which in most instances are non-pathogenic but which in particular circumstances can become pathogenic. A number of micro-organisms are found in the oral cavity but only a few bacteria can be considered true dental pathogens or odontopathogens. These odontopathogens are responsible for the most common bacterial disease in humans; plaque, tartar, gingivitis, periodontitis, tooth decay. (Harley, 2002)

ORAL DISEASES IN CHILDREN

Oral diseases cut across all age groups ranging from children to adults. In the former, oral diseases start as early as the teething period. The chief problem in children is that of dental caries. Childhood caries differs from that in the adult in respect of its great rapidity of development, secondary dentine often cannot form fast enough to protect the pulp. The deciduous teeth can sometimes decay down to the gum level in a quite remarkably short space of time.

Dental diseases

Both caries and gingivitis starts early but childhood is the time when caries is most active as the teeth are more vulnerable and sweet-eating or the use of syrup-soaked conformers accelerates the process. The management of caries and its sequels or preferably its prevention from the vast bulk of dental treatment for children is very difficult. At this stage, gingivitis is reversible or entirely preventable if the teeth are brushed effectively.

Interacting with both diseases in many children is the need for orthodontic treatment. Irregularities of the teeth can create additional stagnation areas and make plaque control more difficult. Conversely, early loss of teeth (usually as a consequence of decay) can create a need for orthodontic treatment to enable the permanent successors to erupt into the arch. However, orthodontic appliances themselves enhance stagnation so that plaque control is more difficult.

Premature loss of deciduous teeth can leave too little space for the permanent successors, which can become mal-positioned as a consequence. To maintain an intact arch for as long as necessary, various types of pulp treatment are often used in children, in whom a less long-lasting effect is needed than in adult.

Orthodox endodontic treatment of deciduous molars is technically difficult because of the narrow and often curved root canals and limited access. In any case, such efforts are rarely justified when the aim is to retain the

tooth only for a limited period. Neglected caries and periapical infection of a deciduous tooth can also damage the underlying successor, but this is rare.

Injuries to the teeth

Injuries to the anterior teeth are particularly common in children. Trauma or caries exposing the pulp of the permanent incisors brings with it the problems of root canal treatment of a tooth with open apex.

Oral diseases of children

It has been maintained earlier that caries is the chief dental disease of children in terms of frequency and destructiveness of the dentition.

It might be expected that development defects would be conspicuous in childhood but surprisingly often no complaint is made until adult's life. Highlights of some oral diseases that are likely to be seen in children are:

1. Defects of the teeth
 - a. Hypoplastic type
 - b. Hypocalcified type
- Dentinogenesis imperfecta.
- Tetracycline pigmentation
- Fluorosis

Other acquired factors:

1. Periodontal disease
 - Hereditary gingival fibromatosis
 - Juvenile periodontitis: (Syndromes associated with juvenile periodontitis melamin. The tumour is usually intraosseous, displacing tooth germs and producing a radiolucent area.
2. Mucosal disease
 - Herpetic stomatitis
 - Hand, foot and mouth disease
 - Candidiosis (particularly thrush)
 - White sponges naevus
 - Aphthous stomatitis
 - Geographical tongue
3. Tumors and tumor-like lesions
 - Congenital epulis
 - Progonoma (pigmented neuro-ectodermal tumor)
 - Cherubism (familial fibrous dysplasia)

Some of the diseases listed above are hereditary while some persist till adulthood. It is important to look at periodontal diseases in children in details even when they will still be looked at in the adult.

Periodontal diseases in children

The main consideration is the control of gingivitis by

effective oral cleaning. In adolescence, gingivitis often shows prominent inflammatory oedema (so-called hyperplastic gingivitis), it is usually controlled by orthodox means.

Oral diseases in children are expected to be treated in their early ages so as not to constitute a problem to them when they become adults. Oral diseases in adults range from plaque, gingivitis, periodontitis to tooth decay (Cawson, 1984).

ORAL DISEASES IN ADULTS

A number of diseases are associated with adulthood, although some of the diseases are as a result of untreated oral diseases at childhood. The dental problems of the older patients are the consequence of the interaction of the following factors:

1. Age changes in the tissues.
2. The advancement of periodontal disease.
3. Difficulties with dentures.
4. Oral diseases peculiar to or commoner in the adult.
5. Systematic diseases associated with age.

The changes seen in the mouth as age advances are partly the consequences of age itself, partly the result of wear and tear on the tissues and partly the consequences of the fact that certain diseases becomes more common as age advances. The changes include the following:

The teeth

The teeth can undergo attrition, abrasion, hypercalcification and if conditions are suitable, continued destruction by caries.

Attrition

Attrition is the wearing down of the occlusal surfaces of the teeth by mastication and is severe in those living on a coarse, gritty diet. Attrition may occasionally also be produced by nervous habits, particularly grinding the teeth at times of stress or during sleep. Chewing a pipe stem can cause localized attrition.

In advanced attrition, the incisal edges and cusps of the teeth are worn away until the teeth becomes peg-shaped with a flat or hollowed occlusal surface, sharp margins and wide exposure of the dentine.

Since the process is slow, attrition leads to progressive secondary dentine formation. This is made visible when wear advances so far as to show the original position of the pulp. Attrition is usually incompatible with active caries or periodontal disease as these cause destruction.

Mobility or loss of teeth before attrition can develop. Partly also the kind of diet that produces attrition is often not significantly cariogenic because of low sugar content. Attrition is however, associated with periodontal disease, the process itself, on the other hand, is not such as to prevent caries, although attrition ultimately destroys stagnation areas of the occlusal surfaces of the teeth, the process is too slow to prevent caries developing in the interim.

A special form of attrition is characteristics of dentinogenesis imperfecta where the enamel splits off exposing the dentine, which rapidly wears down until it level with the gums.

Abrasion

Abrasion is the wearing away of tooth substance usually by the mechanical effect of over-vigorous tooth brushing. The areas most severely affected are the labial or buccal surfaces of the necks of the teeth. In a right-handed person, the left canine and pre-molar teeth are usually most severely damaged.

The main contributory factors are the vigorous use of toothbrush with a horizontal sawing action and sometimes the use of abrasive tooth powders. With the abrasion of tooth substance the gingival margin wears away progressively exposing the roots. This recession is often severe, but usually, combatible with healthy gingivae became a vigorous tooth-brush that effectively removes plaque from around the teeth and leaves the gingivae pale, firm and lightly attached. The combination of deeply abraded teeth with firm healthy gingivae indicates the great resistance to the gingival margins to mechanical injury.

Erosion

Erosion is the progressive dissolution of tooth substances usually by acid solution but sometimes of unknown cause.

Erosion of the labial surfaces of the teeth is occasionally an occupational disease where there is exposure to acid fumes. The habitual sucking of citrus fruits may have a similar effect and many soft drinks have an acid reaction.

A few patients suffer from chronic regurgitation of acid gastric contents. Under these circumstances, the lingual surfaces, particularly of the upper teeth are most severely affected.

Another uncommon type of erosion of unknown cause that is occasionally seen in young people is characterized by shallow polished depressions usually of the labial or buccal enamel of the incisor teeth. The cause of this change is not known but the polished appearance suggests that tooth brushing may be partly responsible, it

will be presupposed that the enamel is abnormally softened.

This in turn may be due to the taking of excessive quantities of lemon juice or acid soft drinks particularly if these sucked past the teeth instead of being quickly swallowed in the usual way.

The mouth

Some of the disease of the mouth causes soreness of the mouth, these diseases includes the following:

1. Aphthous stomatitis
2. Glossitis
3. Lichen planus
4. Dry mouth

Aphthous stomatitis

These ulcers are remarkably uncommon among edentulous patients. This is partly an age-related phenomenon, as these ulcers reach their peak frequency much earlier in life.

If recurrent aphtae starts or becomes worse after middle age, an underlying systematic cause should be looked for. A deficiency state, particularly vitamin B₁₂ deficiency is a strong possibility at this age.

Glossitis

Soreness of the tongue is not uncommon complaint among older patients. Though it may be blamed on the denture (lack of tongue space), there is no evidence that a denture can cause diffuse soreness of the tongue. It is important to exclude systemic disease particularly ion deficiency or pernicious anaemia. The latter increases in frequency as age advances. Depression is also common in the elderly.

Dry mouth

The complaint of dry mouth becomes more common as age advances. The main causes are usually drugs and sjogren's syndrome (Cawson, 1984).

Other major oral health problems associated with adults are:

1. Plaque
2. Tartar
3. Tooth decay
4. Gingivitis
5. Periodontal disease (periodontitis)

Table 1. The Plaque index system.

Scores	Plaque
0	No plaque
1	A film of plaque adhering to the free gingival margin and adjacent area of the tooth. The plaque may be seen in situ only after application of disclosing solution or by using the probe on the tooth surface.
2	Moderate accumulation of softy deposits within the gingival pocket, or the tooth and gingival margin which can be seen with the naked eye.
3.	Abundance of soft matter within the gingival pocket and/or on the tooth and the gingival margin.

Table 2. Calculation of scores for the index.

Surface	Scores
Buccal	2
Lingual	1
Mesial	1
Distal	2

Plaque

Plaque is a tenaciously adherent deposit on the tooth, it is soft, consists of bacteria in a matrix of organic material. The matrix is mainly bacterial in origin consisting of polysaccharides and protein but part of it are derived from the saliva. Plaque is colourless and it grows on the hard and rough surfaces of the teeth.

Plaque can be supra or sub gingival and differs in composition and in its effects in these different sites. Plaque is involved in both genesis of both dental caries and periodontal disease but the nature of the bacterial population and to some extent the site are factors which determine the effects of plaque on the tissues.

Early plaque formation can be easily seen when tooth cleaning or brushing is stopped for 12 - 24 h. The labial surface of the incisors can then be seen to be covered by a translucent film with a ground-glass surface texture that dulls the surface of the otherwise smooth shiny enamel. Plaque forms thick deposits where it is undisturbed but, in all except stagnation areas, its thickness is continuously reduced by the movements of the adjacent tissues and by food during eating. A fibrous diet does not however remove plaque entirely even from accessible areas. This can only be done by thorough tooth cleaning or brushing. Although some plaque is deposited even under conditions of starvation, it forms most rapidly and in greatest quantity on a high sugar diet.

A high sugar diet provides material for the elaboration of polysaccharides, which form the bulk of the plaque. The rate of plaque accumulation varies widely between different individuals and this may affect their susceptibility to dental diseases.

ORAL HYGIENE INDICES AND MEASUREMENTS

The measurement of the state of oral hygiene by Silness-Loe plaque index is based on recording both soft debris and mineralized deposits on the following teeth. Missing teeth are not substituted.

Each of the four surfaces of the teeth (buccal, lingual, mesial and distal) is given a score from 0 - 3. The scores from the four areas of the tooth are added and divided by four in order to give the plaque index for the teeth with the scores and criteria as shown in Table 1.

Calculation example

Example, showing how to calculate the scores for the index is shown in Table 2. From Table 2:

$$\text{Plaque Index} = \frac{2+1+1+2}{4} = 1.5.$$

According to the plaque index system this means the plaque index for the tooth is moderate accumulation of soft deposit within the gingival pocket, or the tooth and gingival margin which can be seen with the naked eye. The indices for the following six teeth may be grouped to designate the index for the group of teeth: 16, 12, 24, 36, 32, 44.

The index for the patient is obtained by summing the indices for all six teeth and dividing by six. For instance, if the following indices are given for the teeth:

Tooth	Index
Maxillary right first molar (16)	1.5
Maxillary right lateral incisor (12)	1.3
Maxillary left first bicuspid (24)	1.2
Mandibular left first molar (36)	1
Mandibular left lateral incisor (32)	1.6
Mandibular right first bicuspid (44)	1.3

Then the index for the patient will be:

$$\frac{1.5 + 1.3 + 1.2 + 1 + 1.6 + .13}{6} = 1.4$$

(Moslehzhadah, 2000)

THE POSITION OF PLANT IN ORAL HYGIENE

Plants have very effective and important roles to play in oral hygiene. A number of popular plants are fashioned into chewing sticks, most of which has different substances in them that can keep the buccal cavity healthy as a whole. Some plants shows that they posses anti-microbial activity against oral microbial flora, although to varying degree when tested by the cup plate agar method. This indicates that these chewing-sticks (plants), in addition to providing mechanical stimulation to the gums, also destroys microbes present in the mouth, a feature which is absent is the common toothpastes in the market (Lewis, 1990).

These days a number of plants are used in the preparation of some toothpastes. This is mainly due to the presence of a number of chemical composition present in the plants; example is Propolis which is a resin rich in flavonoids, it is manufactured by bees from plants. The *in vitro* anti-microbial activity of flavonoids and propolis is well documented, the former have been shown to be active and especially the well known anti-microbial and flavonoid-rich herb *Scutellaria baicalensis* (Baical skullcap).

A silicate toothpaste containing propolis demonstrates good plaque-cleaning, plaque-inhibiting and anti-inflammatory activities.

Other essential oils from plants, incorporated into modern toothpastes have also shown different effects on oral diseases, examples; essential oils of Eucalyptus, tea tree, clove, cinnamon, fennel to mention just a few. Different parts of plants are used in oral hygiene be it the root, barks, young stems, seeds, leaves and water infusion from some of plants.

PLANTS USED IN ORAL HYGIENE

A number of plants are used in oral hygiene; some of them are herbs, shrubs and trees. The following plants and their various parts are used in oral hygiene for healthy teeth gum and fresh breath:

A. Azadirachta Indica, *Melia azadarachta*

Others names: Neem, Nimb, Nimba.

Local names: Dogonyaro (Hausa), Eke-Oyinbo (Yoruba)

A. indica belongs to the family Meliaceae.

Originally, it is native to India but seen in Indonesia,

Malaysia, Australia, Sri Lanka, Burma, Pakistan and Africa. In Nigeria it is found commonly on farmlands, homes and streets. It is one of the fastest growing trees in semi-arid and arid regions. *A. indica* has been used for centuries as the country store of developing nations. The Neem posses different compounds; example is azadirachta-A to azadirachtin-G.

Other forms of oral hygiene using plants

Dentifrices

Abrasive substances in most commercially available toothpastes are now largely of inorganic origin, but in place of this, natural abrasives are widely used. Plants are used as abrasives, examples of such plants are *Acorus calamus* (sweet flag) and *Rumex crispus* (yellow dock) whose powdered roots are used in Europe and north America.

Similarly, the powdered bark of *Cinchona officinalis* (Peruvian bark) is used in South East Asia, Europe and North America. Ashes of burned branches of *Vitis vinifera* (European grape) are used as dentrifice in England. Also the powdered stem of toothbrush tree is used in Central America. Users also attribute gum strengthening and tooth whitening properties to these natural products (Hardie, 1995).

Chewing gums

Gums form *silphium* sp. (Rosinweed) were used by North American Indians and early settlers, to clean their teeth and keep them white. Also gum from *Myroxylan balsamum* is chewed continuously by Indians in South America to keep their teeth clean, to tighten and sooth them as well. Gum exudates from trunk of *Croton xalapensis* is likewise used in Mexico for cleaning teeth.

In addition to the chewing gums from plants, latex is also chewed from plants such as *ficus platyphylla*. These gums and latex are quite bitter, unlike the commercially available gums that are flavoured with mint and sugar to improve taste and flavour. Sugary substances encourage the incidence of caries. Therefore, use of plants (gums and latex) has advantages over commercial chewing gums that promote caries.

Chewing sponges

These are popular means of cleaning teeth in Ghana. They are prepared from certain plants such as *Acacia pennata*, *Hibiscus rostellatus* and *Lasianthera africana*, which grows in cape coast region. The stems or vines are collected from the forest, bark removed and beaten on

rocks until they become fibrous. This is washed and made into sponges that are about five inches in diameter. To clean teeth, a small portion of the sponge is placed in the mouth and vigorously chewed for few minutes (20 - 30 min). This activity produces foam and stimulates saliva flow.

After chewing the sponge is then taken in the fingers and nabbed over the teeth and gums. Water is then used to rinse the mouth.

RECOMMENDATION

Having seen the chemical compositions of both modern/fluoride and plant/herbal based oral dentrifices, toothpastes, mouthwashes, etc, it is glaring that using plants or herbal based methods for oral hygiene is more effective than modern or fluoride based toothpastes, mouthwashes etc that are composed of different ingredients which are causative agents of other infections such as allergy, irritations (canker sores). The use of herbal based toothpastes which are free from artificial ingredients is strongly recommended.

Nonetheless, the use of chewing sticks, infusion from plants as Astringents, chewing gums and sponges from plants remains very effective means of preventing, controlling and curing oral diseases in all users irrespective of age. The usage of plants has been practiced from time immemorial and their effects on oral hygiene have been encouraging. The continual usage is very important so as to prevent and cure oral diseases that affect individuals. If constantly used, the incidence of oral diseases will reduce to the lowest, because of the natural healing substances that are present in them.

CONCLUSION

Tooth brushing with brushes and fluoride based toothpastes have been found to be accompanied by some disadvantages such as the usage of hard toothbrushes with horizontal sawing action which causes abrasion in adults, tooth brushing is also suspected to be responsible for erosion of tooth. Plants have been seen to have an upper hand in curing oral diseases rather than incurring infections or diseases to the users.

The use of plants for oral hygiene cannot be overemphasized because they have abilities to act on plaque, bacterial and inflammations as it has been mentioned in earlier.

Conclusively, chewing sticks remove food particles from between the teeth and in crevices, as does the toothpaste and brush method. The advantage of chewing stick over the conventional toothpaste and brush could explain why many Africans have stronger teeth than Caucasian People (Sofowora, 1993).

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