

HALITOSIS

Some Dental, Oral and Systemic Aspects

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The mouth and teeth are the first functioning part of the gastrointestinal tract. Oral tissues are sensitive to various conditions, diseases and drugs and liable to various symptoms. Over the years, I have become increasingly conscious of the changes, including Halitosis (bad breath — mouth odour) brought about by certain diseases and other factors. Halitosis is sometimes mild, not so obvious and of a temporary nature but in other cases severe, prolonged and very unpleasant to the patient and relatives alike. The *raison d'être* of this paper is mainly to help us in diagnosing Halitosis as part of the dental or medical picture. Limits of space have necessitated condensation and the exclusion of other details that could have been advantageously added.

The mouth is a highly organized, highly specialised, delicately balanced and subtly motivated apparatus made up of tissues, muscles, teeth, bones, nerves, blood vessels, salivary glands, etc., intimately connected, correlated and co-ordinated. An intricately functioning mechanism, it contains within its confines a continuous salivary flow which is vital. Down the long concourse of human experience has come an intense appreciation of the fundamental importance of keeping mouth tissues and teeth as healthy as possible.

The normal output of saliva is approximately 1 to 1.5 liters in 24 hours. The parotid glands produce serous saliva, the submaxillary produce serous saliva and some mucous type, while the sublingual produce mostly mucous saliva and some serous type. Saliva is related to dental-oral health and also affects mouth odour. Its functions are: (a) Lubrication; (b)

Solvent action; (c) Cleansing action; (d) Emollient and demulcent (soothing) properties; (e) Moistening and softening; (f) Diluting action; (g) Antibacterial and bacteriostatic functions; (h) Mastication and deglutition; (i) Digestive functions; (j) Aids in speech.

Saliva is made up of water (about 99%), oxygen, carbon dioxide, phosphates of magnesium, calcium and potassium, carbonates of sodium, potassium and calcium, sodium bicarbonate and sodium chloride, glucose, ptyalin, amylase, globulin, etc.; all contributing to various processes and reactions. To give an example, carbon dioxide plays an important part in calculus formation. When the amount of carbon dioxide is too small, the saliva becomes more alkaline on reaching the mouth and calcium salts from the saliva precipitate out.

Halitosis should not be considered as a disease but a symptom of various conditions. However patients with halitosis sometimes live under a social handicap and are cautious not to be very near to people, because of the bad impression which they can give. Since several of the causes of this condition are due to poor oral hygiene, I feel that both medical and dental practitioners should be familiar with the factors responsible for this unpleasant condition.

When poor oral hygiene is the main cause, the breath odour is generally worse in the morning than later in the day, partly caused by the accumulation and putrefaction of epithelial and food debris in the mouth. The decreased salivary flow during sleep also favours putrefaction of the saliva. In practice we find that those people who have an intense papillary coating on the tongue

tend to have a more intense odour.

The principles of oral hygiene apply also to wearers of acrylic base dentures — both full and partial ones, otherwise a bad breath may ensue.

It is desirable to brush the denture after each meal or at least be washed in running water. The denture or orthodontic appliance can be cleansed effectively with good denture dentifrice. I wish to emphasize an important point: Dentures should be removed at night. This rests the supporting tissues and also eliminates the risk of dislodgment and hence the possibility of swallowing it. Although patients are told not to wear their dentures at night, many still keep them on.

Heavy smoking contributes to the development of a bad breath. Notwithstanding health education campaigns which point out the hazards of smoking and our efforts, a large number still smoke a lot. Regular toothbrushing and smokers' toothpaste help appreciably to lessen halitosis.

Halitosis of a rather sour type may occur in simplex parodontal disease or chronic gingivitis. The gingivae bleed, particularly on cleaning the teeth and are congested and soft. Calculus is generally present, both the supra-gingival and subgingival varieties, the latter being detected by a probe. Pocket formation gradually develops when no treatment is carried out and the bad breath tends to get worse. In untreated cases pus can sometimes be expressed from the pockets on pressure with the finger. This condition is also sometimes seen in uncontrolled diabetic patients.

It seems that mouth odour has troubled man since ancient times. Dr. R. David, lecturer at Manchester

University and a team of specialists have been carrying out a fullscale examination and analysis of some Egyptian mummies. Using modern medical techniques, scans, X-Rays, endoscopes and chemical tests, they found that certain ancient Egyptians—probably members of Royal families or ruling classes, suffered from serious lung disease, bone conditions, hydatid cysts, bilharzia and very bad breath.

Bad breath secondary to diseases of the sinuses, the respiratory passages or the lungs is much less common than that resulting from dental and oral causes. If the breath odour arises from the lungs, this can generally be detected by having the patient seal his lips and blow through the nose. If the odour is not perceived during this test, it probably comes from within the mouth. If we are still in doubt, we can ask the individual to close his nares and exhale gently through the mouth.

The diagnosis of acute sinusitis will almost always be correct in the patient with nasal discharge, foul breath and cough that has persisted longer than about ten days.

Disturbance of mouth physiology may give rise to an unpleasant breath. Patients on a mainly liquid diet, such as those with gastric ulcers — who consume a lot of milk and cream tend to suffer from halitosis.

A percentage of elderly people also tend to get halitosis and this condition cannot be controlled in all cases. Aging is often complicated by an interaction of factors such as chronic diseases, metabolic disorders and psychosocial aspects. Dental and mouth changes are related to the interacting processes responsible for general systemic changes. I have also noticed that even minor dehydration (for example in very hot weather) tends to increase halitosis among elderly sick and bedridden. It is advisable to remind the elderly to drink fluids more often especially in summer and also to rinse their mouth regularly all the year round.

In a senile organism the metabolism and oxidation processes are greatly reduced and slowed down; this leads to a scarification of the tissue and toxic and unwanted products tend to stagnate in the tissue. Other causes of halitosis include: High temperature, anaemia, leukaemia, cachexia, pulmonary tuberculosis, diabetes, lung abscess and lung gangrene, purulent bronchitis, diphtheria, pneumonia, avitaminosis, actinomycosis, ulcerative stomatitis, gastritis, atrophy of the

liver, empyema, necrotic carcinoma in the mouth, larynx, pharynx, oesophagus and stomach. In these serious conditions, thorough mouth hygiene and deodorant or antiseptic rinses are beneficial but can achieve only a short-term relief. In some countries types of chlorophyll tablets are sometimes used with a view to bring about a feeling of freshness in the mouth, but again this is a temporary relief.

About one out of every six Maltese over the age of 45 are estimated to be suffering from mild or advanced diabetes mellitus. During my undergraduate years, we used to be taught that elderly patients with uncontrolled diabetes usually suffer from a typical unpleasant acetone breath. This is a fact but I have noticed that this acetone breath is less common in practice. However many elderly diabetics tend to suffer from halitosis in varying degrees.

It is well known that the resistance of diabetics to infection is appreciably less than in healthy individuals. In a large percentage of patients with uncontrolled diabetes, a gradual progressive loss of supporting tissues around teeth occurs over the years, with degeneration of the periodontal membrane and atrophy in varying degrees of adjacent bone structures. This can be seen macroscopically and microscopically and obviously with the help of radiographs. Atrophy is more marked in the mandible of elderly patients.

The aetiology of periodontal disease is complex. Neglect of oral hygiene, dental plaque and formation of supra or subgingival calculus play a part in its causation. However the soft tissues of the mouth are influenced considerably by systemic factors such as hormonal, dietary and other factors which are implicated in the causation of or predisposition to periodontal disease, or in altering the oral tissues' response to trauma or infection. In my opinion, a high proportion of Maltese diabetics are predisposed to periodontal disease which is the major cause of tooth loss.

Plaque initially forms at the tooth-gum junction, between the teeth and in the crevices (fissures) on the tooth biting surfaces. It consists of bacteria caught up and growing within the matrix of soft material (intercellular matrix) formed partly from saliva and partly from products of the bacteria themselves.

Calculus (tartar), the position or crowding of teeth, ledges on old fillings and old partial dentures which do not

fit properly on the contours of the gums and teeth increase the severity of periodontal disease. As periodontal disease progresses, the gum separates from the tooth forming a periodontal pocket and more fermentation of food debris and bacteria goes on — sometimes initiating halitosis. These pockets also retain plaque and are not easy to clean, particularly when calculus forms within them, so aggravating the whole process.

The substances responsible for producing periodontal inflammation are mainly the products of the bacteria within the dental plaque. However, the affects of these substances on the tissues can be modified by the state of those tissues themselves so altering or modifying the clinical picture of the disease. For example, hormonal changes associated with pregnancy may increase the severity of a pre-existing gingivitis, although the effect is generally transient. During pregnancy or menstruation, certain women tend to suffer from a mild form of halitosis. Pregnant women should all be advised to have dental and gum check-ups.

Within a relatively short time after teeth are brushed with a toothbrush a bacteria free pellicle forms on the surface. This is known as acquired pellicle and is less than 0.4 mm thick. This pellicle is closely related to plaque. Plaque contains very large numbers of microorganisms and a lot of interbacterial substances. Initially this layer is not very harmful as the bacteria present are usually gram-positive ones and some spirochaetes. However if the plaque is left undisturbed more bacteria show up and increase fairly quickly in numbers including more harmful strains such as gram-negative ones, fusiform, Lactobacilli, vibrios and small rods. Other constituents of plaque are salivary mucins, carbohydrates, sucrose, toxins and bacterial by-products.

Teeth, especially when there is a crowded arch favour the accumulation of deposits. The warmth, humidity, presence of food debris, microorganisms, fermenting particles and desquamated epithelial cells all play a part in the chain reaction — one end result being a bad smell.

Due to similarities that exist in the salivary matrix, it is believed that the glycoproteins of the plaque matrix are derived from salivary glycoproteins.

Calculus consists of plaque which has become calcified over a long period of time and we classify it as supra and sub-

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gingival. Calculus is composed of approximately 70% inorganic salts and 30% organic material. The hard deposits on teeth consist mainly of calculus. The exact composition differs from one person to another and is influenced appreciably by diet. The main constituents are calcium hydroxyapatite, calcium carbonate, calcium whitelockite, magnesium and octacalcium phosphate. It also contains traces of sodium carbonate.

The microorganisms found on the surface of calculus are more or less similar to those of mature plaque with predominantly gram-negative cocci, bacilli and filamentous organisms. Deeper down, gram-positive filamentous organisms predominate, but the centre of calculus may be sterile.

Periodontal disease develops slowly. Some warning signs are: (a) Bleeding gums when brushing; (b) Red, tender

or swollen gums; (c) Gums that are rather detached from the teeth; (d) Pus comes out from the periodontal pockets when gums are pressed; (e) Permanent teeth that are a little loose in their sockets; (f) Bad breath. In advanced periodontal disease, bacterial breeding grounds are entrenched in the pockets and cleaning alone cannot reverse the gum condition. It's nearly impossible for patients to keep such pockets free of plaque and bacteria. Surgery is sometimes indicated to remove calculus from deep pockets, to reduce the pockets, to arrange the tissue into a shape that will be easier to keep fairly healthy and remove stagnation pockets. Gingivectomy or flap surgery can be of great benefit to certain patients.

Hygiene techniques are aimed at removing plaque from the teeth. With regard to periodontal disease the effectiveness of brushing is more

ill-fitting old dentures, crowding of teeth and periodontal pockets which make plaque removal difficult is the responsibility of the dental surgeon. Similarly, calculus or tartar which may all cause some degree of halitosis needs to be removed by meticulous scaling and polishing by the dentist or dental hygienist.

Dentrifices have been used since early times and therapeutic claims for them have long been promoted. A lot of laudable research has been going on in various countries to improve the properties of toothpastes. There are some very good brands of toothpastes on the market. It is clear that tooth-brushing alone is not the only factor in promoting oral hygiene and controlling halitosis, as without dentrifice, people would fail to clean their teeth properly.