

# Effects of Certain Diseases and Drugs on Dental-oral Tissues

**DR. C.J. BOFFA**

**BChD BPharm FICD**  
DENTAL SURGEON, PART-TIME LECTURER,  
DEPARTMENT OF HEALTH

The mouth and teeth are the first functioning part of the gastro-intestinal tract. Oral tissues are sensitive to various conditions, diseases and drugs and liable to various symptoms. The hallmark among other symptoms of pernicious anaemia, leukaemias, allergy, acute infection, vitamin deficiencies, syphilis, tuberculosis, metallic and other poisonings may be seen here. The sharp jerky movements of the tongue in chorea are among its symptoms. Drug sensitivity and poisoning may also bring characteristic lesions and changes in colour in oral tissues - factors sometimes taken into consideration in forensic medicine.

Countless medicines and related products developed by talented professionals and scientists and manufactured by firms of repute, having made a great contribution towards controlling diseases, lessening pain and saving millions of lives worldwide. Over the years, I have become increasingly conscious of the changes brought about partly by certain diseases and medical drugs on the oral tissues. These changes are sometimes minor, not so obvious and of a temporary nature, but in many cases quite clear and of a rather prolonged nature. The object of this paper is to help us in diagnosing these conditions as part of the medical or dental picture. Limits of space have necessitated condensation and the exclusion of other details that could have been advantageously added.

As a side-line, it is relevant to mention that with the onset of the machine and industrial age resulting in the setting of certain industries, social and economic processes were set in motion. High grade technology has brought about new problems in the field of health sciences.

The adverse effects of certain drugs and the systemic absorption over long periods of certain substances are of importance in community medicine and dentistry. Sodium diphenyl hydantoinate (dilantin sodium) and epanutin, which are widely used and of great benefit in the treatment of epilepsy is frequently associated with a marked gingival hyperplasia.

Cheilitis, smoothness of tongue papillae and small ulcers have been noticed occasionally during auremycin - chloramphenicol-chloromycetin therapy.

Atrabine was used extensively as an anti-malarial agent during World War II. It was given also to Maltese members of the Armed Forces serving in India and Egypt. On returning to Malta, several of them were suffering from uncomfortable mouth eruptions resembling lichen-planus, involving mainly the tongue. Regarding malaria, quinine therapy may bring about an unpleasant haemorrhagic stomatitis.

Other examples of drug induced changes which may occur, also after long-term intake or absorption and linked with biochemical, physiological and other factors are:-

- Pancreatic extracts - Oral ulceration and angular stomatitis.
- Gold Sodium thiosulfate - Stomatitis and minor small ulcerations on tongue surface.
- Tetracyclines, especially growing children, but not excluding boys and girls - Staining of teeth.
- Excess fluoride in natural water or diet - Staining of teeth.
- Vitamin D hypervitaminosis - Dental hypoplasia of varying degrees.
- Iron solutions, such as ferrous sulfate and ferrous gluconate - Fairly dark stains on dental enamel.
- Oral contraceptives - Some hypertrophy of gums.
- Gentian violet (not much used) - Oral ulceration when used for treating oral candidiasis in babies.
- Metronidazole - Metallic taste.
- Lithium Carbonate - Unusual taste.
- Acetylsalicylic acid - Tablets placed on or near painful cavities - small chemical burns due to denaturation of protein of the superficial epithelial cells of oral mucosa.
- Antihistamines and anticholinergics - Mouth dryness and occasionally thirst.

Local application of glucocorticoids to the oral mucosa may precipitate candidal overgrowth in oral cavity and throat. This applies also to certain antineoplastic drugs, immunosuppressant agents and the frequent use (not recommended) of hydrogen peroxide as a mouthwash.

Oral manifestations are occasionally seen during or after influenza. These include shallow ulcers in the mouth and along the commissures or on the lips which bleed easily - due to a breakdown of the mucosa. Stomatitis may also occur. However, in the serious types of influenza epidemics, secondary mouth infections are fairly common and may include oedema, inflammation, pain, Vincent's ulcerative stomatitis, noma, congestive dental pulpitis, parotitis and ulcers which gradually become covered with greyish-yellow patches of fibrin. Fortunately, the serious types of influenza epidemics have decreased.

We have noticed that when antibiotics -especially those with a wide spectrum are given for a long period, the normal flora and ecology of the mouth sometimes becomes unbalanced with adverse effects and ulcers form. Parts of the oral mucosa may break down with resultant ulcers which are uncomfortable or painful. This is further aggravated in cases of inadequate vitamin intake or weak patients. These ulcers may take long to heal. It is relevant to mention also the allergic reactions which may include vesicular stomatitis in patients hypersensitive to penicillin.

Certain chronically sick children and youngsters may require prolonged medication for the treatment or control of their medical condition. Liquid medicines are often prescribed for children because they may not find it easy to take capsules or tablets. With a view to make the preparations more acceptable to young ones, sugar is incorporated in several types and brands of liquid medicines. From the pharmaceutical-chemical aspect, it acts to some extent as a preservative and is a bulking agent chemically capable of producing the required viscosity. The current British National Formulary (Pharm. Press of G.B. 1984) states that although liquid preparations are particularly suitable for children, most contain sucrose which encourages dental decay; sugar-free tablets, medicines and diluents are recommended when medication is to be continued for a long period. In some countries including Sweden and the U.S.A., a list of sugar-free medicines is being published to guide medical and dental practitioners. We have clear evidence that sugar is one of the important dietary factors in the aetiology of dental caries and that a reduction in daily intake of sugar is one of the methods of decreasing dental caries. Sucrose, glucose and fructose are all cariogenic. It is advisable to tell parents who are giving sugar-based paediatric medicines, to make their young ones brush their teeth and rinse with water immediately afterwards. This applies also to confectionery makers and bakers. Like other professional colleagues, I have noted over the years, the high incidence of dental decay and periodontal diseases among the majority of confectionery makers and some bakers in Malta and Gozo, especially in those who have been in these occupations for many years. Cervical decay is common and due mainly to the flour dust-mucin plaques which furnish a favourable environment for bacterial growth and acid production. Sampling fairly frequently the confectionery

during its manufacture, which is necessary in this trade, increases more adverse unhealthy conditions for teeth and gums. The relationship between the consumption of highly refined candy and carbohydrates and the incidence of dental decay - carious lesions, is, besides other factors, obvious in caries epidemiology studies. Brushing or at least rinsing with plain water after sampling confectionery, helps to retain normal pH of the saliva and flora, lessen reactions, acid production and adverse effects on dental tissues.

En passant, I should mention that we have noticed an increase in dental caries around 8 to 10 year olds and, in certain patients, continues to increase in later years. The availability of sweets and related products is on the increase. The syrupy vitamin products for infants when sugar-based may be detrimental to the deciduous dentition, especially in weak teeth prone to caries.

Diabetes is an interesting disease historically. It's importance in Malta and Gozo is reflected in the laudable work being carried out by senior health officials, diabetologists and specialists under the auspices of the Department of Health in collaboration with WHO to control and lessen it. About one out of every six Maltese over the age of 45 are estimated to be suffering from mild or advanced diabetes mellitus. Probably there are also undiagnosed cases. Some European authorities say that during the last forty years or so, the incidence in various countries has increased slightly, due among other factors to:-

- (a) a more affluent population
- (b) in general, less strenuous manual work, much less walking and exercise due to the increased use of cars
- (c) many machine-aids in factories and in homes
- (d) overindulgence in food with resultant obesity
- (e) general ageing of the population, etc.

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. In dental practice, we are sometimes in a position to assist in its early diagnosis.

The aetiology of periodontal disease is complex. Neglect of oral hygiene and formation of supra- or subgingival calculus play a large 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.

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 the adjacent bone structures. This can be seen macroscopically and microscopically and obviously with the help of radiographs. Atrophy appears to be slightly more marked in the mandible of elderly patients.

During the years 1980 to March 1985, I recorded the following observations from 521 diabetics most of whom had attended for treatment at the Paola Polyclinic. With the exception of three juveniles, the age group ranged between 35 to 74 years and came from Paola, Tarxien, Żejtun, Żabbar, Cospicua, Senglea, Vittoriosa, Luqa, Birżebbuġa, Għaxaq, Gudja, Kalkara and Zurrieq.

With the exception of a relatively small number of cases, I did not find evidence that dental caries increases in controlled diabetics. However it appears that in untreated diabetes when decreased salivary flow occurs (a dry mouth) this indirectly plays a role in increased incidence. As already stated earlier, normal saliva and normal pH is essential for the wellbeing of oral tissues, cleansing action, etc. The reduced alkaline reserve favours the deposition of calculus. Although it occasionally occurs, the presence of salivary glucose in uncontrolled diabetics is not a constant finding.

Other observations from 521 diabetics (percentages given to the nearest figure) were as follows:-

402 (77%) were forty years or more at the onset of the disease, or was noticed following the usual tests. Acetone breath was present only in 22 elderly patients (4%), 15 of whom had uncontrolled diabetes of long standing or did not follow the doctor's instructions. 152 (29%) suffered from recurrent periodontal, root or dental abscesses.

Some form of periodontal disease was present in 360 (70%) of diabetics:-

- (i) Gingivitis.
- (ii) Gums, especially interproximal area slightly swollen, spongy and tend to bleed with even minor trauma or brushing.
- (iii) Occasionally a violaceous hue is present.
- (iv) Periodontal pockets of varying indices.
- (v) Slight loosening of teeth especially in uncontrolled patients and others who had commenced treatment.
- (vi) Calculus.
- (vii) Recession of gingivae.

Oral hygiene in 232 (45%) was unsatisfactory or very poor.

Excluding edentulous patients, after 6 to 12 months systemic medical and periodontal care, there was a gradual but marked improvement in the periodontal tissues with teeth becoming fairly or progressively firmer and much less gingivitis in those who co-operated fully in the treatment programme, especially those in the early and middle age brackets.

63 (12%), the majority in age group 44 to 59 and not adequately controlled, suffered at one time or other from rather localised severe odontalgia caused by pulpitis in one or more teeth. About half of the affected teeth did not show any carious lesions. This type of inflammation of the pulp is obviously more common in diabetics.

15 (3%) complained from time to time of an uncomfortable sensation or burning of tongue with enlargement and hyperaemia of the fungiform papillae. 21 (4%) complained of aphthous ulcers or ulceration every now and then. I have also seen several cases of hypertrophy among denture users. Breakdown of oral tissues with resultant ulcers is more common among uncontrolled patients.

Diabetics require early systemic, dental and preventive care as lack of these may lead to early loss of teeth and an edentulous mouth.

Atrophic symptoms in the tongue were present in 96 patients (19%), the majority showing central papillary atrophy. The frequency of central papillary atrophy was not related to the control of the diabetes as measured by plasma glucose and urine analysis. It is possible that vascular damage occurring before the diagnosis of diabetes is the main underlying cause. This may explain why the degree of control, as measured by plasma and urine analysis was not related to their prevalence. One rather puzzling fact is that the central region of the tongue rather than the periphery is most commonly affected. The central area is a relative stagnation area. If vascular changes are the primary cause (?) this site may be the most susceptible to such changes.

Other factors which may adversely affect mouth tissues are:

Petrol additives and certain industrial compounds which have been implicated in transmission of harmful amounts of lead to man. The Burtonian line occasionally seen in lead workers exposed to inhalation of lead dust or particles is a case in point. In addition to the Burtonian line, pigmentation of the buccal mucosa may be present opposite calculus-tartar on teeth. Cases of petrol (or allied derivatives) poisoning occasionally do occur. A person may attempt to suck petrol out of a car tank through rubber tubing and a sudden rush of petrol goes into the mouth, and throat. Inflammation and oedema of tongue may follow.

The aromatic oils, such as oil of cloves or oil of eucalyptol which are included in certain dental products and medicaments may produce superficial slough or necrosis when touching sensitive tissues.

When acrylic dentures (methyl methacrylate) are not processed/cured well enough or inadequately refined base materials are used, a reaction may occur on the denture contacting area resulting in irritation or stomatitis venenata. Sometimes this is referred to as denture allergy, but in most cases it is due to a chemical cause.