PREVENTION IN DENTISTRY.*

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PREVENTIVE dentistry is conservative dentistry, and, to be effective should include diet and nutrition, oral hygiene, so-called prophylaxis, operative dentistry and the education of the patient, all co-ordinated in a well planned programme based on a periodic recall system.

The part played by defective structure in the etiology of dental caries is disputed. Certainly, perfection of tooth form and structure does not bestow immunity to caries, but clearly imperfection of enamel structure makes less work for the destructive process. Thus nutrition plays an important part. It may well be that the soil theory, often called "the humus school", well elaborated by Turner, may offer true prevention to dental disease and it behoves us as dental practitioners to encourage the ingestion of more natural foods. Since calcification of the deciduous teeth commences before birth, attention must be first focussed on the expectant mother's nutritional requirements. Matters in this regard have vastly improved during the last twenty years, as has nutrition during childhood. Here perhaps it would be opportune to emphasise the importance of early skilled dental attention for children: two years of age is not too early. Most dental caries of the deciduous dentition appears between the third and fourth years.

The fifty-year old chemico-parasitic theory of Miller on the etiology of dental caries has received much scientific support in recent years. The work of the Baldings (Iowa) has shown how a reduction in the incidence of dental caries can be produced by a carefully worked-out dietary regimen aimed at reducing the presence in saliva of large numbers of mucoid-producing streptococci and causing the reappearance of the salivary streptococci which impart to saliva its significant inhibitory properties. Also Becks and Jensen have shown that in the presence of a heavy carbohydrate diet the lacto-bacillus count is high and that on its reduction the incidence of dental caries shows a considerable falling-off. Many other workers in this field have by carefully controlled experiments tried to show that the etiology of dental caries concerns itself with an initial decalcification of enamel by acid, which is largely a by-product of carbohydrate degradation within bacterial plaques normally formed on the surface of teeth.

But a second and wholly different concept of the mechanism of dental caries has come to the front recently, propounded by the late Dr. Bernard Gottlieb. Mainly histologically, Gottlieb has shown that the organic structures, including the prison sheaths, tufts or lamelle of the enamels formed the invasion roads, which can be travelled by proteolytic micro-organisms, leading to the necrotic mess which we recognise as an advanced carious lesion. By means of impregnation, using various chemical enzymes, he sought to obstruct the organic passage-ways to prevent their initial invasion by the proteolytic bacteria and build up

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the tooth's resistance. The treatment is well known, but has not been favourably accepted clinically.

Fluorine therapy is still largely in the experimental stage. The topical application of 2 per cent. fluorine as advocated by Knutson is rather similar to Gottlieb's impregnation work. It is known that the application of dilute solutions of sodium fluoride to the surface of enamel reduces its solubility in acids, while, from experiments with fluorine isotope we know that fluorine enters into the composition of the teeth. The effects of the addition of small quantities of fluorides to reservoir water has been under observation for some years, the North and South Shields experiment being one obvious case in England. The most recent report has been rather inconclusive in its findings.

I think that the most coherent and logical approach to the problem of caries control is that of Fosdick, which shies away from the attempt of so many to attribute dental caries to a single causative agent. Recognition of the balance and interplay of numerous environmental entities provides a workable basis for control and further research. The two fundamental factors influencing dental caries as set forth by Fosdick are:

(1) The rate of acid formation in the mouth.

(2) The rate of acid neutralisation in the mouth.

To control those factors clinically we must influence our patients to eliminate as far as possible the pabulum necessary for acid formation, i.e., the sugar-loaded proprietary foods and those criminally sweet biscuits which are so often the early staple diet, comforters moistened with glycerine; although orthodontists will, of course, demand the elimination of the comforter. The attack on the enzyme system still is in a very empirical stage, e.g., the use of 2 per cent. sodium fluoride, the use of vitamin K, and of high urea solutions.

The buffering capacity of saliva is of the greatest significance in acid neutralisation, but is not so easy to control, though it is known that an alkaline ash diet does enhance it. Other factors are certain physical features, both anatomical and mechanical. The anatomical concerns diet and nutrition; under mechanical features come the practice or neglect of adequate oral hygiene, the cleansing action of detergent foods and operative dental interference.

Mothers will often insist that they have fed their children all the proper foods, milk, eggs, fruit, etc., and yet their teeth are smitten with decay. This gives the dentist the opportunity of stressing the fact that dental caries is not a disease of malnutrition, i.e., a deficiency disease, but a disease of ill-advised dietetics. Hundreds of children examined in post-war Italy, all suffering from at least poor nutrition, showed two to seven times less caries than those of a similar age group examined in America (Schour and Messler). Numerous similar attempts could be quoted from the literature. It is not the inclusion of certain well-known protective foods in the diet that is important dentally, but the exclusion of sugar and starches. (Cf. the statistics for caries decrease in the hospitalisation treatment of diabetes on an extremely low sugar intake.)

The Bureau of Public Dental Health Dentistry, Michigan Department of Health, has instituted a Dental Caries Control Service, based on the established fact that with a greatly restricted carbohydrate intake the