24. NEW LIGHT ON THE CAUSE AND CONTROL OF TOOTH DECAY IN MAN FROM FIELD STUDIES OF PRIMITIVE DISTRICTS PROVIDING IMMUNITY

Weston A. Price, D.D.S., M.S., Dental Research Laboratories, Cleveland, Ohio

Primitive races of the past, and their remnants of the present, have been and are largely immune to dental caries, while modern civilizations have so generally lost their immunity that tooth decay is now not only the most prevalent of modern diseases, but also one of the most serious affections of mankind. In these studies it has been found that individuals having *immunity* were receiving foods liberal in fat-soluble activators and high in minerals as provided in natural foods in association with energy-carrying factors that were not in concentrated form or high in calories; whereas, those individuals having high *susceptibility* to dental caries were receiving foods very high in energy-carrying factors and relatively low in content of minerals and fat-soluble activators. A circumstance of much importance has developed in all the groups with high immunity; namely, they had practically no knowledge of oral-hygiene methods nor showed evidence of oral prophylaxis. Their immunity to tooth decay existed in spite of the fact that they did not have the aid of an efficient oral-hygiene procedure.

These studies have also shown that the characteristics of the foods found adequate to produce immunity to dental caries have not been limited to any one formula nor dependent upon hardness or softness of foods. For example, cereals were an important part of the diet in the Alps and Outer Hebrides and Porto Santa; rye, in the former, and oats in the latter two; but no cereals are available in Tristan da Cunha. Dairy products were available in the Alps but almost absent in the Outer Hebrides. Fish products were available and used liberally in the Outer Hebrides and Tristan da Cunha, but not available in the Alps. These are only a few illustrations of the wide divergence of foods that are adequate to produce immunity to dental caries. If the factors that control immunity to dental caries are an adequate level of fat-soluble activators and minerals in available form, then the reinforcement of modern dietaries with these factors should accomplish a control or prevention of susceptibility to dental caries. This has already been accomplished in several groups, as previously reported.

In a particularly instructive investigation, in progress during the past two years, children with rampant tooth-decay have been fed one reinforced meal a day for six days a week, in order to determine the possibility that this reinforcement could change susceptibility to immunity. These studies are also accompanied by a detailed chemical analysis of the saliva of the individuals before, during, and after treatment, and also roentgenograms. In forty children receiving the author's special meal, from February to June, 1932, fed by the staff of the Broadway Methodist Episcopal Mission (Cleveland) under the guidance of Rev. E. A. Brown, there was apparently complete control of tooth decay, with no evidence of new cavities, as determined by clinical examinations and roentgenograms made before, during, and after treatment. There was also evidence of marked mineralization of decalcified dentin where teeth were not filled, and of a building-in of new pulpal walls where dentin had been decalcified to the pulp chamber. Associated with the change from susceptibility to immunity there has been a change in the chemical characteristics of the saliva in the behavior of inorganic P in the presence of powdered bone. The results indicate the establishment of a high factor of safety through the means of six specially reinforced meals a week.

These studies support the conclusion that the saliva determines the

environment of the tooth, and thereby provides the factors which control immunity and susceptibility to tooth decay. The level of these factors in the saliva is determined by the blood stream, which is controlled primarily by nutrition. The rôle of the aciduric bacteria is now clearer. (The text, of which this is an abstract, is liberally provided with illustrations, graphs, and tables. The personal field studies herein reported were made in 1931 and 1932 in the Alps, and in 1932 in the Outer Hebrides.)

25. DISCUSSION OF DR. PRICE'S PAPER

Henry Klein, D.D.S., Sc.D., Johns Hopkins University, Baltimore, Md.

The discussion considered the wide scope of Dr. Price's paper, and was chiefly concerned with pointing out the lack of detail, in the paper, concerning the methods used in the chemical analysis of the salivas and foods.