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## REVIEW OF CURRENT DENTAL LITERATURE

### A Study of the Diet in Relation to Dental Caries Activity in 212 Enlisted Men at the Pearl Harbor Submarine Base, Hawaii.

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DENTAL examination of a group of 212 enlisted men, twenty to forty years of age, on admission to the Pearl Harbor Submarine Base, Hawaii, revealed that 97.6 per cent of the men had one or more carious, filled or missing teeth, the average number per man being ten. Total number of defects (cavities, fillings and missing teeth) averaged 11.48 per man. Subsequent examinations after periods of service ranging from six months to five years showed that the incidence of caries had increased to 98.1 per cent, and the average number of defects per man to 14.79. The per cent of men who had developed one or more new carious lesions during this time was 77.3.

Increase in caries did not parallel age, but did, time of service at the naval base. The percentage increases in total defects per man were 23.52, 30.06 and 39.97 per cent for those who had been in service six to twelve months, one to two years and three to five years, respectively. Of the 109 men who had been in service six months to one year, 73.4 per cent developed new caries during this period of time, the average number of defects per man being 2.97. In this group, also, age was not a factor in caries activity.

The diet for a period of one year averaged daily per man: 17.2 oz. meat; 1 egg; 9 oz. whole milk; 1 1/3 oz. butter; 11 oz. bread and other grain products; 2 1/2 lbs. potato and other vegetables; 1 lb. fruit;

4 oz. sugar and syrup, and adjuncts. This amount of food (consumed), furnished 3613 calories; 136.78 gms. protein; 418.11 gms. carbohydrate; 154.95 gms. fat; 0.844 gms. calcium; 1.943 gms. phosphorus; 0.027 gm. iron; 18.8 cc. N alkali (excess); 8074.9 standard rat units of vitamin A, and 219.1 standard units of vitamin C. A daily average of seven and one-half hours of tropical sunshine furnished vitamin D.

Dental disease is regarded as an expression of a metabolic imbalance which may result from faulty diet, unfavorable combinations of diet and climate, systemic disease and other causes. The marked increase in caries in the men during their short period of service at this station— notwithstanding they had reached an age when caries activity is usually greatly lessened, were living in a sun-flooded environment, and were enjoying a diet which scores as "excellent" if valued by accepted standards—is explained on the basis of metabolic imbalance resulting from a diet which, though rich in all food nutrients thought to be essential for good health and sound teeth, was *too low* in potential alkalinity for dental perfection under existing conditions.

It is pointed out that, although fruits and vegetables (with few exceptions) yield an alkaline ash, the different varieties vary so tremendously in *degree* of potential alkalinity that *kind*, as well as *quantity* of vegetable in the diet must be considered in evaluating its acid-base balance. Likewise, choice between sugar-cane syrup, which is rich in minerals and is potentially alkaline in reaction, and cane sugar or corn syrups, which are almost, if not entirely devoid of minerals, makes a profound difference in the mineral content and acid-base balance of the diet. The navy ration is an illustra-

tion of a type of diet which contains unusually large amounts of fruits and vegetables, but is so constituted that its potential alkalinity is relatively low.

A warning is sounded of the dangers of a diet containing *too* large a proportion of fruits and vegetables with *too high* a degree of potential alkalinity. Such diets are associated with decay-free (enamel) but loose teeth and, in extreme cases, with resorbed roots as well as atrophy of the alveolar bone.

The existence of a factor or factors in fruits and vegetables which increases immunity to dental caries is generally recognized, though its identity is not yet established. Comparative analyses of studies on diet in relation to dental caries by outstanding workers force the conclusion that this factor is not calcium, phosphorus, iron, any of the known vitamins or any known combination of these food constituents, *per se*. Also, that sugar and starch, as such, do not necessarily increase susceptibility to caries. These studies do suggest, however, a relationship between the potential alkalinity of the so-called "adequate" diet and caries activity. Until more facts are discovered, the potential alkalinity of a diet containing all of the known essential food constituents in "adequate" amounts appears to be not only our best, but only guide for the control of dental disease.—Condensed from *United States Naval Medical Bulletin*, 34: 181, 1936.