

THE ROLE OF DIETARY CARBOHYDRATES  
IN DENTAL CARIES

by

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## INTRODUCTION

Dental caries is one of the most prevalent diseases affecting mankind today. Heredity and nutrition influence the resistance of the teeth to dental decay throughout life.

During the past century extensive research has been conducted for the prevention of dental caries. Studies have shown that carbohydrates, principally sucrose, must be present in the crevices of the teeth for caries-producing organisms to grow (1).

Practical dietary advice on caries prevention is complicated by the introduction of a great variety of new foods in recent decades. Eating patterns have changed during the past fifty years to include frequent eating of snack foods, usually containing sugar, between meals. There is high consumption of refined carbohydrates, particularly refined wheat flours and refined sugars.

Research has indicated that it is not the increased consumption of carbohydrates in the diet alone causing the larger number of dental caries. The physical form in which they are eaten, other ingredients of the food with which they are compounded, the amount eaten, and the frequency with which they are eaten affect the susceptibility of the teeth to dental caries.

The purpose of this paper is to review the incidence of dental caries, to discuss its causes and to review the methods of prevention. The research concerning the relationship between dietary carbohydrates and dental decay is investigated thoroughly.

## EPIDEMIOLOGY OF DENTAL CARIES

Dental caries is found rarely in ancient skulls. It is considered a modern disease that increased with the development and adoption of civilized and sophisticated life styles that was caused, primarily, by increased consumption of refined foods and changed dietary habits to meet the demands of increased numbers of people in today's affluent society (3).

In some areas of the world such as India, Africa and Indo-China, dental caries still is considered a rare disease. However, in areas such as North and South America and Europe, 98% of the population have experienced some dental decay during their lifetime. Data from a dental caries survey (4) of groups of 20- to 24-year-old civilians from different countries throughout the world show that the greater prevalence of dental caries is in the Americas (figure 1).

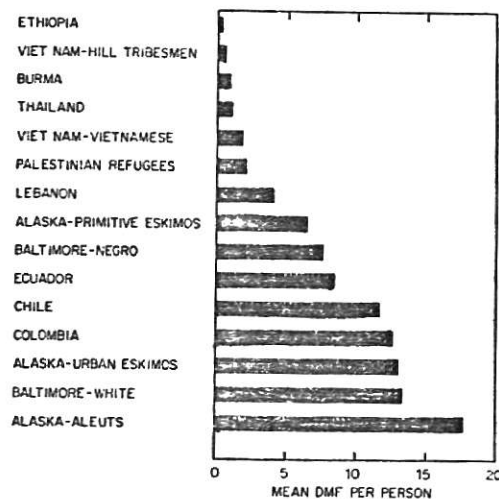


Fig. 1. Mean decayed, missing and filled teeth (DMF) per person for civilian groups aged 20-24 years.

Refined carbohydrate intake is correlated directly with increased prevalence of dental caries, as shown by Russell (5) in a dental survey (table 1).

TABLE 1  
Dental caries prevalence correlated  
with sugar consumption in 1963

	Dental caries prevalence	Sugar consumption
Far East and Ethiopia	lowest	6-16 kg/person/year
Near East (Lebanon)	intermediate	13-19 kg/person/year
United States, Central, and South America	highest	23-44 kg/person/year

Apparently, it is not increased ingestion of complex carbohydrates, such as starches, that increase dental caries incidence, but rather an increase in fermentable sugars. For example, the diets of the people in Ethiopia, Far East and Near East include all starch foods of the cereal type (wheat, corn, maize, rice, teff) and of the root type (cassava, yam), but the consumption of sugar and sugar products is low.

In the United States, dental caries is considered a native disease (6). Several independent dental caries surveys over a 100-year period have shown repeatedly that natives of the New England and northwestern areas of the country experience about twice as many dental caries as the natives of the south central states (6). There are several possible explanations for this observation. The presence of natural fluorides in the water supplies used by the natives of the south central states, no