

Dental Survey of Selected Thai Children: NUTRITIONAL OBSERVATIONS

By OD KRIDAKARA, B.D.S.,* RITH BOOZAYAANGOOL, B.D.S.,* ISRA YUKTANANDA, B.D.S.,* and
J. F. VOLKER, D.D.S., PH.D.,†

ALTHOUGH numerous surveys have been made of the prevalence of dental caries in children, only a limited amount of information has been accumulated on Asiatic peoples. A recent review by Finn¹ refers to studies in China, Tibet, Malay, Mongolia, India, and the Philippines. No reference, however, is made to the prevalence of caries in Thailand. The data herein reported are the result of a clinical survey of the prevalence of dental caries in over 2300 selected Thai children and observations on their occlusion and gingival health. Approximately half of the children were from the capital city of Bangkok, located in the south central portion of the country; the remainder were from Chiangmai and Lampang in the northern hill country. Bangkok, particularly in the postwar period, has had considerable personal and commercial contact with western civilization, while Chiangmai and Lampang are relatively isolated.

METHODS AND MATERIALS

The groups included in this study were attending school, kindergarten through high school. All examinations were made with mirror and explorer. Subjects ranged in age from 4 through 18 years and each clinician examined a random portion of each class and age group. At the end of each working day, the

observations of the respective clinicians were summarized and compared. They were found to be in good agreement. This suggests that their individual standards of examination are comparable. Dental caries experience was recorded in terms of D.F.‡ (decayed and filled teeth). Care was taken in the charting so that information on both deciduous and permanent D.F. rates could be calculated for the mixed dentition groups. Gingival health was recorded as normal, fair, or poor. Children with gingivitis limited generally to the papillae or to an isolated area of the mouth were considered to have fair gingival health. They were cited as having poor gingival health when there was more extensive inflammatory or degenerative involvement of the tooth supporting structures. Occlusion was recorded as normal, fair, or poor. Children with pronounced Class II and III malocclusion and those having such conditions as pronounced open or cross bites were considered to have poor occlusion. It was felt that these cases were in acute need of orthodontic treatment for functional or esthetic reasons or both. Children were classified as having fair occlusion where the molar relationship approached the normal but had crowding or rotation or both of one or several teeth, or abnormal protrusion or spacing of the anterior teeth.

Since the City of Bangkok had a considerable number of children attending Chinese and Islamic schools, and since the dietary habits of the Chinese and Islamic peoples differ from those of the Thai, the decision was made to in-

From the Dental School, University of the Medical Sciences, Bangkok, Thailand, and the University of Alabama, School of Dentistry, Birmingham, Alabama.

* Assistant Professor, Dental School, Univ. of the Medical Sciences, Bangkok.

† Dean, School of Dentistry, Univ. of Alabama.

This survey was undertaken in 1951 when one of the authors (J.F.V.) was serving as a dental specialist affiliated with the U. S. State Department under provisions of the Smith-Mundt Act.

‡ Since interviews showed the number of permanent teeth missing because of caries to be very small, the decision was made to report caries prevalence as D.F. (decayed and filled) rather than as D.M.F. (decayed, missing and filled).

clude in the survey children from each group. These data are presented separately. Only those children from Thai language schools in Bangkok are compared with the children from Thai language schools in Chiangmai and Lampang.

RESULTS

Table I shows a comparison of the dental health of Bangkok area children attending

lels that found in Chiangmai. The only exception is the higher caries attack rate noted in the Lampang five-, six-, and seven-year-old groups. It is pertinent that the Lampang schools reported in this study included an American missionary school. This group had a rather higher caries attack rate and was largely responsible for the elevated value reported herein for young Lampang children.

The gingival health of Thai children attend-

TABLE I
Comparison of Dental Health of Bangkok Area Children in Thai, Chinese, and Islamic Language Schools

Type school	No. examined	% Caries free	Average D.F.* deciduous teeth			Average D.F.* permanent teeth			Gingival health (%)			Occlusion (%)		
			5-7 yr	8-10 yr	11-13 yr	8-10 yr	11-13 yr	14-16 yr	Normal	Fair	Poor	Normal	Fair	Poor
Thai	552	7.6	10.3	5.1	0.7	2.9	4.0	5.1	46	35	19	43	33	24
Chinese	239	1.3	11.7	6.2	1.3	3.3	5.1	6.3	54	38	8	44	33	23
Islamic	225	3.5	9.8	6.0	1.4	2.4	3.8	5.8	47	43	10	42	35	23

*D. F.—decayed and filled.

Thai, Chinese, and Islamic language schools. It will be noted that the prevalence of dental caries in the deciduous and permanent teeth, the gingival health, and the occlusion of the three groups of children are generally comparable. The only exception would seem to be the smaller percentage of Chinese children that are caries-free. There is also an indication that the gingival health of the Thai children is somewhat poorer than that of the Chinese and Islamic children.

Figure 1 compares the dental caries prevalence in the 552 Bangkok Thai children with 673 Chiangmai and 652 Lampang Thai children. Although only 8 per cent of the Bangkok children were found to be free of caries, 55 per cent of the Chiangmai children and 38 per cent of the Lampang children had not experienced tooth decay. It is obvious that the prevalence of caries in Bangkok at any age from 5 to 18 years is much greater than that observed in Chiangmai. The average child in Chiangmai has a deciduous D.F. of slightly less than 3 at six years of age and his Bangkok counterpart has a D.F. of approximately 10. At age 18, when Chiangmai school children have an average D.F. of 1.5, Bangkok school children have a D.F. of 5.5. In general, the caries attack rate in Lampang children paral-

ling Bangkok, Lampang, and Chiangmai schools is seen in Figure 2. It will be noted that in no instance does the percentage of children with normal gingiva reach 50 per cent. The overall gingival health of the Chiangmai children was poorer than that of the Lampang and Bangkok children. It was noted that a considerable number of the Chiangmai children showed evidences of dietary deficiencies. Cheilosis and tongue symptoms were commonly seen.

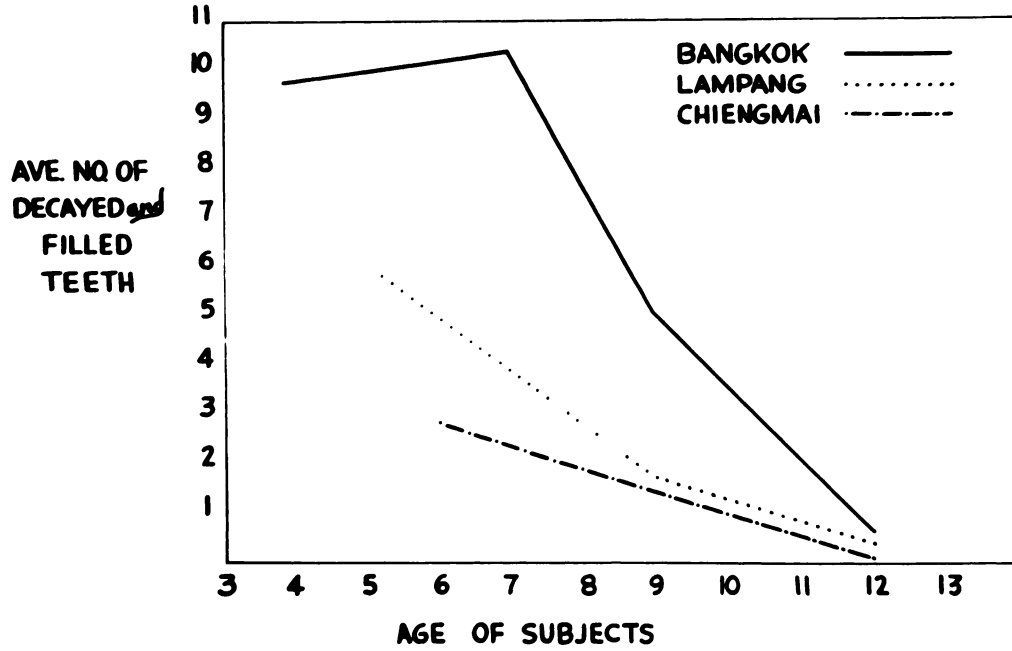
The occlusion of the Bangkok, Chiangmai, and Lampang children is recorded in Figure 3. In general, the occlusion of the Chiangmai children was superior to that of the Bangkok children. Approximately 60 per cent of the Chiangmai had normal occlusion, while only 15 per cent could be classified as being poor. In contrast, only 43 per cent of the Bangkok children had normal occlusion and 24 per cent had poor occlusion.

DISCUSSION

The most significant finding in this study is the very high caries prevalence in Bangkok children. It is in excess of that reported by most observers of European and American children in comparable age groups. One possible explanation is that in this area the basic



DENTAL CARIES IN THE DECIDUOUS TEETH OF SELECTED THAI CHILDREN



DENTAL CARIES IN THE PERMANENT TEETH OF SELECTED THAI CHILDREN

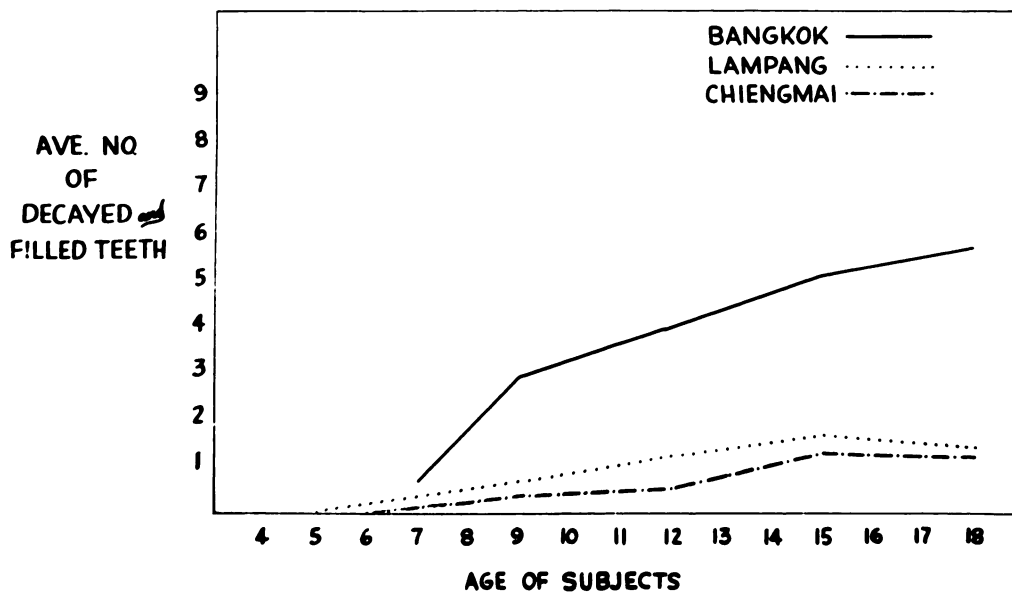


Fig. 1. Points on graph represent the averages for subjects in age groups covering three years. For example, point at age 6 represents the average for 5-, 6-, and 7-year-old children.

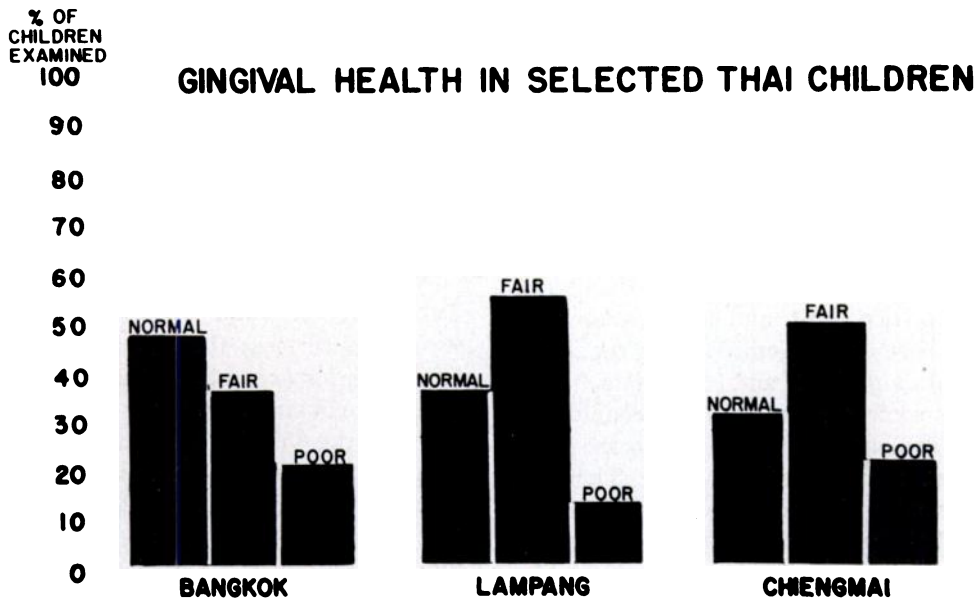


Figure 2

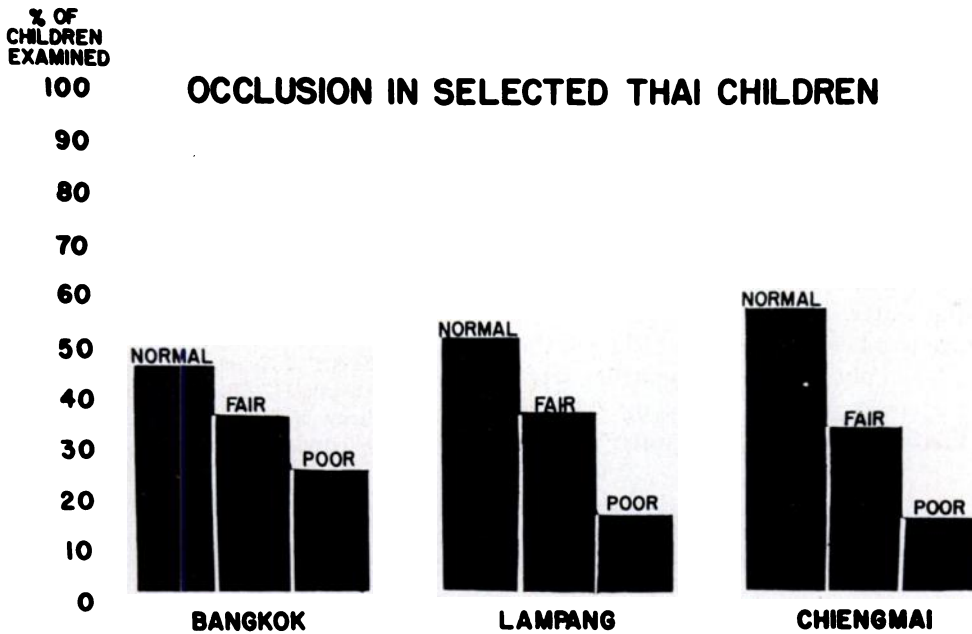


Figure 3



TABLE II
Sugar and Wheat Flour Consumption in Thailand

Year	Amount in metric tons	
	Sugar*	Wheat flour†
1945	7,270	100
1946	4,781	3,084
1947	3,274	5,246
1948	18,192	4,995
1949	28,424	10,210

* Home produced and imported.

† Imported (no appreciable home production).

Thai diet of rice, fruit, and fish has been replaced in part or supplemented by sugar and starch-containing foods and confections. This view finds some support in data accumulated from government sources relative to the sugar and wheat flour consumption in Thailand. This information is presented in Table II. It will be noted that for the five-year period, 1945 through 1949, sugar consumption increased by approximately 400 per cent, while wheat flour utilization increased from 100 metric tons to over 10,000 tons. From firsthand observation it would seem that the great majority of the increased amounts of sugar and flour was consumed by Bangkok area people. These data suggest that a rice, sugar, and wheat flour diet has considerable potential for producing dental caries. This general view finds support in observations reported on experimental animals, particularly the rat and hamster.

It is, of course, possible that the low caries susceptibility of the northern Thai children might be explained by the presence of fluoride in drinking water. During the examinations, special care was taken to detect mottling of the enamel. The only evidences of mottling were found in a small group of Lampang children from a limited area who drank water from a

TABLE III
Dental Restorations in Selected Thai Children

Location	No. of children	No. of permanent teeth	No. of cavities	No. of restorations
Bangkok	552	12,023	2183	242
Chiengmai	673	14,401	625	24
Lampang	652	13,852	850	1

common well. Pictures of their dentition are available.

A final observation of interest is shown in Table III. It is indicative of the great need for dental services throughout Thailand. In Lampang, for example, 850 unrestored carious teeth were observed and only 1 restoration was noted in the 652 children examined. Even in Bangkok, where 552 children had 2183 teeth needing restoration, only 242 carious teeth had been restored. It is obvious that this unmet need for dental services calls for an expansion of the present dental education facilities.

SUMMARY

Over 2000 Thai school children from 4 to 18 years of age were given dental examinations. Observations were made of caries prevalence, gingival health, and occlusion. The most significant finding was the high caries attack rate in the deciduous teeth of children living in the Bangkok area. It is suggested that this may be due in part to the increased sugar and wheat flour consumption.

REFERENCE

1. FINN, S. B.: *A Summary of the Literature of Dental Caries*, pp. 117-73. Publication 225. National Academy of Science-National Research Council. Washington, D. C., 1952.