

ORAL CONDITIONS IN CHILDREN FROM THREE HIGHLAND VILLAGES IN GUATEMALA

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Summary—A dental survey has been carried out in three comparable Indian villages in the highlands of Guatemala to ascertain the oral status of children from 4 to 13·9 years of age, with the following results.

In general, the dental caries experience in the villages was comparable in each group at the same age and was greater than previously reported. The number of individuals who had less than 2 DMF and def surfaces appeared to be approximately equal for all villages and constituted 30-40 per cent of the children. The remaining 60 per cent had very high decay rates. Children in Santa Maria seemed to retain their deciduous teeth longer than children in other villages. The prevalence of hypoplasia was found to be very high, especially in the age groups 4-6 where it was generally associated with a linear hypoplasia of deciduous maxillary incisors. The prevalence of linear hypoplasia of deciduous maxillary incisors in Santa Catarina has been shown to be almost twice that of the other two villages and affected at least 40 per cent of children with maxillary deciduous incisors present. Suggestions were given as to the aetiology of the lesions and future lines of investigation. The prevalence of individuals displaying gingival lesions was about 50 per cent above age 8, which was greater than the 4-10 per cent reported in a previous survey by HURTARTE and SCRIMSHAW (1955). In general, Santa Maria Cauqué exhibited a higher prevalence of these lesions than the other two towns. The prevalence of the dental abnormalities of fusion, supernumeraries and agenesis was found to be higher than had been previously reported. The various types found were described. The prevalence of malocclusion was found to be as high as 40 per cent in some age groups, most of it due to crowding of the anterior permanent teeth.

INTRODUCTION

HURTARTE and SCRIMSHAW (1955) reported their findings on the numbers of decayed, missing and filled (DMF) teeth and periodontal lesions in 442 children aged 6-14 years in five rural Guatemalan highland villages. The average amount of dental decay for all ages 6-14, including both permanent and deciduous dentitions, was 2·4 DMF teeth per person. The percentage of children with gingival lesions was reported to have varied from 3·7 at age 7 to 9·8 at age 13.

An oral survey was undertaken in three highland villages now under study by the Institute of Nutrition of Central America and Panama (INCAP). The survey was designed to obtain definitive data on some oral conditions to be used as baseline data in the future to assess the effect of protein supplementation on oral pathology.

MATERIALS AND METHODS

Five hundred and thirty-five Indian children were examined. These children were residents of Santa Cruz Balanyá, the control village for INCAP'S project on the relationship between nutrition and infection, Santa Maria Cauqué, which has had intensive sanitary and medical care since the inception of the project in 1959, but has had no nutritional aid, either through education or dietary supplementation and Santa Catarina Barahóna, which has received no medical or sanitary aid, but each child under age 6 has received twice daily supplements providing approximately 15 g of protein. These supplements consisted of bananas and Incaparina (a low-cost all-vegetable protein supplement developed by INCAP and prepared with reconstituted dried skim milk). School children received daily supplements of reconstituted skim milk. All villages, in as many respects as possible, are comparable with each other.

The second and third villages were among the five previously surveyed by HURTARTE and SCRIMSHAW in 1955. Except for the supplements, the diets of the children were similar in all three villages.

The oral survey took place over a period of approximately 6 weeks, with 2 weeks in each village. The total school populations were examined to promote better public relations, but only those children up to age 13.9 have been included in the calculations. The 4-year-old child was selected as the youngest that could be examined in as exact a manner as the older children.

Each child was seated on a portable dental chair facing toward natural light and examined by one of us (EAS) using criteria to be described; the data were recorded by him on a special chart designed by the authors considering possible future machine analysis.

Each tooth was examined for dental caries with a sharp double ended explorer and a dental mirror. Lesions were recorded as being present only if decay could be felt at the base of pits and fissures. Each lesion was recorded on the chart according to the number of surfaces involved. All teeth present were noted as either permanent or deciduous. A deciduous tooth which had been exfoliated was not considered missing if a permanent successor was visible or if loss was compatible with the age of the child.

In one child the six anterior maxillary teeth had been extracted; each tooth was considered to be missing even though the child was soon to have permanent successors and no evidence of decayed roots was seen. No dental restorations were seen in any child. Hypoplasia of enamel was scored for each tooth on a scale of 0-3. Linear, or chronologic hypoplasia of the deciduous dentition was scored as hypoplasia, but was also noted separately if evidence could be seen that hypoplasia of a linear nature occurred on the incisal 2/3 of the clinical crowns of the maxillary deciduous central incisors and on the incisal 1/3 of the lateral incisors. Many incisor teeth were found which demonstrated the line and were decayed; other teeth were found with large amounts of decay but on which no line could be seen because of the decay. Where no line could be seen, these teeth were omitted from the prevalence calculations of this

peculiar lesion. This criterion was used because a number of children demonstrated approximal caries of the deciduous maxillary incisors not associated with linear hypoplasia; while more chronic in terms of rapidity of decay, this type of decay could not be disregarded as a cause of the loss of the many incisor crowns observed.

Malpositionings were noted for the individual teeth involved. This system indicates only in a general way the amount of malocclusion. It was not possible to establish as to whether the jaw relationships were Class I, II or III according to the classical terminology of Angle because of language and technical difficulties.

Marginal gingivitis was scored on a 0–3 scale and the number of quadrants involved noted. If only erythema was present, it was scored as 1; if erythema and slight oedema were present, as 2; and if the normal anatomy of the marginal gingiva was unrecognizable, as 3.

The presence of supernumerary teeth and their positions were noted, along with a description of the clinical crown. Fused, or geminated teeth were identified as to position and whether deciduous or permanent. Agenesis of teeth was recorded in the same manner as fusions and supernumeraries. Clinical photographs were taken whenever possible to record these abnormalities.

RESULTS AND DISCUSSION

Table 1 lists the total number of children in each age group that were included in the calculations of this survey.

TABLE 1. NUMBER OF CHILDREN EXAMINED

Village	Age (in years at last birthday)					Total
	4–5·9	6–7·9	8–9·9	10–11·9	12–13·9	
Santa Cruz Balanyá	27	28	33	50	54	192
Santa Maria Cauqué	46	45	41	26	6	164
Santa Catarina Barahóna	27	35	24	46	47	179
Total	100	108	98	122	107	535

Dental caries

Table 2 presents the findings of the dental caries survey for def and DMF surfaces. The scores for deciduous teeth appeared comparable for each group in Table 2 except in the 6–7·9 group in Santa Cruz, which had an apparently higher score than either of the other towns. However, the standard errors were also very large, so that the difference from the other villages was not significant at the 5 per cent level. At age 12–13·9 in Santa Catarina there appeared to be a greater number of surfaces involved, which was also not statistically significant. No difference was observed among the villages in the number of affected permanent teeth. There was a trend toward lower scores in the three younger age groups from Santa Maria, which may be due to a delayed eruption of first permanent molars, hence the molars would have a shorter exposure to the oral environment.

TABLE 2. DENTAL CARIES EXPERIENCE OF DECIDUOUS AND PERMANENT TEETH EXPRESSED AS def* AND DMF† SURFACES

Village	Age (in years)									
	4-5-9		6-7-9		8-9-9		10-11-9		12-13-9	
	Mean	SEM‡	Mean	SEM‡	Mean	SEM‡	Mean	SEM‡	Mean	SEM‡
Deciduous										
Santa Cruz Balanyá	6.3	1.3	11.0	2.1	6.8	1.1	5.9	1.1	1.6	0.5
Santa Maria Cauqué	6.9	1.1	8.7	1.4	7.4	1.2	8.3	1.6	—	—
Santa Catarina Barahóna	7.3	1.4	7.9	1.6	6.9	1.3	4.9	0.8	2.2	0.7
Permanent										
Santa Cruz Balanyá	1.0	§	0.3	0.1	0.9	0.2	0.7	0.1	1.1	0.3
Santa Maria Cauqué	0.0	0.0	0.3	0.1	0.5	0.1	1.0	0.1	—	—
Santa Catarina Barahóna	0.0	0.0	0.4	0.1	1.1	0.3	1.0	0.2	1.5	0.3

* Decayed, extracted, filled.
† Decayed, missing, filled.
‡ Standard error of mean.
§ Only two individuals with permanent teeth.

In all other respects the data on def surfaces were similar for each village except that the scores for Santa Maria in the older age groups tended to remain high for a longer period, possibly due to a prolonged retention of the deciduous teeth. Indeed, the numbers of children in the 8-9-9 age group, who still possessed their maxillary deciduous central and lateral incisors, were in Santa Cruz five out of thirty-three children, in Santa Catarina only three of twenty-four, whereas in Santa Maria thirteen of forty-one still possessed them. This prolonged retention of decayed deciduous incisors would contribute to the slightly higher caries prevalence in the older age groups in Santa Maria. In addition, the prolonged retention of deciduous incisors would provide an increased chance for new decay. The data in Table 3 also indicate that the prevalence of decay in permanent teeth was low and that the average for the 12-14 year-olds in each village was about the same as found in the previous survey. HURTARTE and SCRIMSHAW (1955) reported a DMF-def score of 3.6 in 6-7 year-olds in Santa Catarina as compared with a value for DMF-def of 4.9 in our survey. At age 8 and 9 their values were 1.9 and 2.6 DMF teeth as compared with our combined values of 4.1 and 4.9 DMF-def teeth in Santa Maria and Santa Catarina, respectively. For ages

TABLE 3. NUMBERS OF INDIVIDUALS WITH TWO OR LESS DMF OR def SURFACES

Village	Age (in years)									
	4-5-9		6-7-9		8-9-9		10-11-9		12-13-9	
	Number	%	Number	%	Number	%	Number	%	Number	%
Santa Cruz Balanyá	10	37	6	21	7	21	17	34	22	65
Santa Maria Cauqué	17	37	13	29	11	25	5	19	—	—
Santa Catarina Barahóna	10	37	7	20	4	17	18	39	31	66

10–11·9, values of 1·3 and 1·6 were reported by HURTARTE and SCRIMSHAW (1955) in contrast to 4·4 and 3·5 reported by us for the same towns. The scores for the final age group of 12 and 13 year-olds are 1·6 in Santa Catarina and 1·7 reported by us for the same town. These latter values obtained by us agreed well with the uncombined DMF values for permanent teeth alone of 1·7 for girls and 1·2 for boys reported by HURTARTE and SCRIMSHAW (1955). Not enough children were present in this age group from Santa Maria to make a comparison meaningful.

Our caries prevalences probably were higher because a dental mirror was employed, which enabled the examiner to visualize surfaces of teeth not possible with a tongue blade examination.

The degree of severity of dental decay in affected individuals is indicated by the data in Table 3, which lists the number of children in each age group who were either caries-free or had less than two affected surfaces. These data show that 63 per cent of children in the 4- and 5-year age group with more than two carious surfaces must have had an average caries experience greater than ten surfaces per child.

In view of these caries data, the statement by HURTARTE and SCRIMSHAW (1955) that "dental caries in primary school children in the highland area of Guatemala studied, appears to be very low" must bear some revision, to take into account the nearly 100 per cent higher dental caries experience observed in this survey. Certainly, with almost 25 per cent of the available teeth affected, the prevalence of caries cannot accurately be described as "very low". In comparison with a group of Boston, Massachusetts school children whose def tooth scores for the ages 4–6, 6–8, 8–10 were about 3·7, 4·8 and 5·1, respectively (DUNNING, 1962), the scores in Guatemala were higher. Boston children are considered to demonstrate a high caries experience. The caries susceptibility of the permanent teeth of Guatemalan children appeared to be much lower than that of the deciduous teeth.

Hypoplasia

The overall percentage of individuals exhibiting enamel hypoplasia is relatively high, as shown in Table 4. However, the greatest number of cases occurred between ages 4–7·9, and most were associated with a linear, or chronologic, hypoplasia of deciduous teeth to be discussed separately. The scores of severity were similar for all villages, hence only the prevalence is given. The prevalence of non-specific hypoplasia in the lower two age groups was not determined, but in the judgment of the examiner, it did not appear remarkably different from populations seen in the United States, and is probably represented by the 6–12 per cent seen in the age group 8–9·9. No evidence of dental fluorosis was seen.

Linear hypoplasia of maxillary deciduous incisors

From the data presented in Table 4, it is apparent that linear or chronologic, hypoplasia is rather common. The overall prevalence in any town in our survey was never less than 22 per cent of those children who had deciduous incisors present and in a condition which allowed detection of the lesion by the criteria described earlier in this report. The prevalence of this lesion in Santa Catarina was nearly twice that of either of the other two villages, both of which were similar to each other.

TABLE 4. PERCENTAGE PREVALENCE OF INDIVIDUALS SHOWING ENAMEL AND LINEAR HYPOPLASIA

Village	Age (in years)					Overall total (%)
	4-5.9	6-7.9	8-9.9	10-11.9	12-13.9	
Enamel hypoplasia						
Santa Cruz Balanyá	40.0	38.4	6.1	10.0	14.8	19.2
Santa Maria Cauqué	32.5	15.9	12.2	4.2	—	17.1
Santa Catarina Barahóna	48.0	15.6	9.1	2.2	6.5	14.8
Linear hypoplasia*						
Santa Cruz Balanyá	22.2 (6)	30.0 (6)	20.0 (1)			25.0
Santa Maria Cauqué	31.9 (15)	22.2 (3)	8.5 (1)			20.0
Santa Catarina Barahóna	53.5 (15)	25.0 (7)	66.6 (2)			40.7

Figures in parentheses are actual number of cases.

* Percentage of only those with deciduous maxillary incisors present.

POMES and MENÉNDEZ (1961) noted the presence of this lesion in Guatemala and suggested that the line possibly represented a hypoplasia of enamel laid down at the time of birth plus or minus a month. This opinion is also shared by the authors and partially by DAVIES (1956), although the latter gives a time span of up to 10 months postnatally. Three stages of the lesion and the possible end result are shown in Figs. 1-4. SIMONTON and JONES (1927) reported a type of massive decay which they called odontoclasia, which appears to describe the type of decay associated in our studies with a linear hypoplasia. They stated that both microscopic and macroscopic hypoplasia were found associated with the lesion which they called odontoclasia. However, they preferred not to ascribe hypoplasia as a prerequisite for the decay because some teeth showed decay without any remaining evidence of hypoplasia, while others demonstrated hypoplasia without odontoclasia. In a later report, JONES, LARSEN and PRITCHARD (1930) surveyed the ethnic groups in Hawaii. They found that in the age group 3-4, as many as 78 per cent of the children demonstrated odontoclasia. This type of decay has also been reported from New Zealand by DAVIES (1956) and KIRKPATRICK (1935), New Guinea by SINCLAIR, CAMERON and GOLDWORTHY (1947), Burma by BURNETT (personal communication), Panama by SCRIMSHAW (personal communication) and San Salvador by ASCOLI (personal communication). Thus odontoclasia appears to be of wide occurrence and might represent the most common form of deciduous tooth decay on a world basis if more epidemiologic data were available.

A massive type of decay described by FASS (1962) was associated with prolonged bottle feeding of milk to infants and was not particularly related to grossly hypoplastic areas. In our experience, this type of decay is usually initiated in the gingival area of fully erupted teeth. The decay seen in Guatemala resembled more closely that described by SIMONTON and JONES (1927) than that described by FASS (1962).

Even if feeding or dietary habits were the eventual reason for the decay, one must still try to explain why such a high number of children in these relatively primitive societies demonstrated a linear hypoplasia. It is difficult to envisage a nutritional insult to the growing tooth germ while the child was *in utero*, except in the most frank of maternal nutritional inadequacies, especially to as many as 50 per cent or more of the children. Many studies have shown that in most maternal deficiency states, the foetus was rarely affected, growing at the expense or depletion of the maternal stores, with the exception of vitamin A stores. Possibly because of a lack of maternal stores, a newborn might possess inadequate vitamin A stores, hence display a relative avitaminosis A as these stores were utilized until the intestinal absorption of vitamin A from milk was adequate. If such a hypoplastic incident were the result of maternal illness in the last month of intrauterine existence, one would not expect 25–50 per cent of all mothers to have suffered such an illness during the same period. Therefore, the case for maternal infection causing such a lesion is probably not very strong.

A tendency for multiple cases to occur within families was observed, suggesting that something was operant at the family level, either social or genetic, which could create a familial predisposition to the lesion.

The infection-fever theory is also a very attractive one to explain the lesion; but data from INCAP has definitely shown that most of these children were wholly breast-fed and as a result were relatively healthy for the first 6–9 months postnatally and definitely did not have febrile episodes as a common occurrence during the first postnatal month.

A preliminary correlation was made between the occurrence of the hypoplasia described and the presence on X-ray films of the wrist of the so-called Harris Lines of the radius which are believed to represent periods of arrested growth.

Periodontal lesions

The data in Table 5 indicate the percentage of children in each age group who demonstrated a marginal gingivitis. In Santa Cruz the prevalence was found to be slightly lower than in comparable groups from the other two villages, reaching an

TABLE 5. PREVALENCE AND DEGREE OF SEVERITY OF MARGINAL GINGIVITIS

Village	Age (in years)									
	4–5·9		6–7·9		8–9·9		10–11·9		12–13·9	
	% preva- lence	Av. score	% preva- lence	Av. score	% preva- lence	Av. score	% preva- lence	Av. score	% preva- lence	Av. score
Marginal										
Santa Cruz Balanyá	4·3	1·0	29·0	1·1	36·0	1·4	41·0	1·3	37·0	1·3
Santa Maria Cauqué	2·4	1·0	39·0	1·2	61·0	1·4	60·0	1·4	—	—
Santa Catarina Barahóna	8·0	1·0	30·0	1·2	50·0	1·3	47·0	1·1	50·0	1·5

average of 36–41 per cent from age 8 to 14. Santa Maria tended to display the highest prevalence of gingivitis at all ages above 4–5·9 years. Younger children in Santa Catarina had a slightly higher prevalence than the other two villages but approached the values for Santa Maria in the older age groups. The degree of severity of the inflammation was comparable in the three villages, ranging from a score 1·0 to 1·5.

Our prevalence data concerning gingival lesions was markedly greater than those of HURTARTE and SCRIMSHAW (1955), who reported values of only 3·7 per cent at age 7 as compared with our prevalence of approximately 33 per cent for the same age group. Their value at age 13 was 9·8 per cent, while our observations placed the prevalence for this age group at greater than 40 per cent. Such a large difference was difficult to explain in any way except that different criteria were used to define gingivitis in the two studies and in the condition of the examinations.

That such a high prevalence of gingival lesions was seen was not surprising in view of the minimal oral hygiene and the fact that the diet of these children contained a large proportion of carbohydrate in a relatively sticky form, as tortillas and bread. However, no advanced cases of periodontoclasia were seen, with bone loss, pocket formation, or suppuration, in the children.

Fusions

Table 6 indicates that all fusions observed in the villages were found only in the mandibular deciduous dentition and involved only the central and lateral incisors of one or both sides. No difference was observed in the frequency of occurrence between quadrants; however, in Santa Maria three of the seven cases involved bilateral fusions (Figs. 5 and 6).

In calculating the prevalence of fusions, individuals with bilateral fusions were each given a value of two assuming that each fusion was independent of the other, hence the higher prevalence in Santa Maria. If the prevalence was expressed as percentage of children showing at least one fusion, the values would be more equivalent. To state that Santa Catarina demonstrated less inbreeding by reason of the lower prevalence of fusions would be very tenuous because of the small number of fusions involved in these calculations.

Few prevalence data are available for fused teeth. STONES (1962) states that fusions are relatively rare. MOODY and MONTGOMERY (1934) reported on the geneology of three families in which unilateral fusions of the deciduous mandibular central and lateral incisors were observed. One family had three generations investigated. Only females showed the trait and only if the maternal parent had also displayed the trait. The other two families' geneologies covered only the P_1 and F_1 generations; again only females showed the trait. In our survey, the occurrence of fusions displayed no sex relationship, as they were noted equally in either sex.

NISWANDER and SUJAKU (1963) have reported that in 901 Japanese children with deciduous dentitions generally intact, they found that from 2·5 to 3 per cent of the children demonstrated unilateral fusions. In comparison, we have found in our Indian populations a prevalence of 5·4–14·7 per cent.

Supernumerary teeth

The prevalence of supernumerary teeth in each village appeared to be similar, as seen in Table 6. In every instance, the extra tooth was found only in the permanent dentition and always in the maxillary incisor area. Such teeth were usually found near the midline, either in the dental arch or palatal to the normal incisor. In one instance, the supernumerary was found between the maxillary left permanent lateral incisor and deciduous canine.

TABLE 6. PREVALENCE OF FUSED AND SUPERNUMERARY TEETH, AND DENTAL AGENESIS

Village	Fusions			Supernumeraries			Agenesis	
	Total No. of cases	Site and No. of cases	% prevalence in children with $\overline{A} \overline{A}$	No. of cases	Shape	% prevalence in children with $\underline{1} \quad \underline{1}$	No. of cases	Sites
Santa Cruz Balanyá	4	$\overline{AB} = 1$	10.1	4	Cuspid	2.9	2	$\underline{2} \underline{2}$
		$\overline{BA} = 3$						$\underline{2} \underline{2}$
Santa Maria Cauqué	7	$\overline{AB} = 2$	14.7	2	Bicuspid	3.0	2	$\overline{B} \overline{B}$
		$\overline{AB} = 2$						
		$\overline{AB AB} = 3$						
Santa Catarina Barahóna	2	$\overline{AB} = 1$	5.4	4	Cuspid	2.8	2	$\overline{B} \overline{B} \quad \underline{1} \underline{2}$
		$\overline{AB} = 1$						

A striking difference was seen in the morphology of the supernumeraries found in various villages. In Santa Cruz and Santa Catarina, the only crown shape encountered resembled a cuspid or cone (Fig. 8), which was the most common shape according to STONES (1962, p. 145). The only tooth shape seen in Santa Maria had a very square type of crown (Fig. 9) with a pronounced occlusal surface and four other flat surfaces that gave it a bicuspid or pseudomolariform appearance.

MACPHEE (1935) reported on the occurrence of supernumerary teeth in 4000 British school children age 6–14. He found twelve cases of erupted supernumerary teeth, each of which was associated with the permanent dentition. The overall prevalence in his study was 0.3 per cent. The data in Table 6, however, were calculated only for those having erupted permanent maxillary incisors, thus explaining in part why our prevalence was 10 times that reported by MACPHEE (1935).

NISWANDER and SUJAKU (1963) have reported that they found a prevalence of 3·8 per cent for supernumerary teeth in over 3000 children examined. This is greater than our values, but their survey included a P–A skull film X-ray for each child and hence they would have found teeth which were unerupted. Indeed, they point out the need for X-rays in definitive prevalence data by stating that less than 20 per cent of the supernumerary teeth were visible without X-ray.

Agenesis of teeth

Two cases of agenesis were seen in each village, as shown in Table 6. The two cases observed in Santa Maria involved agenesis of deciduous mandibular incisors (Fig. 7). Because of drifting of the two incisors present, it was impossible to determine whether the lateral or central incisors were the missing teeth. These cases were not representative of a double fusion for the incisors present were of normal size, neither had two incisors been lost, for the parent was closely questioned about this possibility.

Malpositioning of teeth

The major number of cases of malpositioning noted involved crowding of the anterior teeth of the maxilla and/or mandible with consequent overlapping, torsion, labioversion, or linguoversion of involved teeth.

TABLE 7. PER CENT PREVALENCE OF INDIVIDUALS WITH ONE OR MORE MALPOSITIONED TEETH

Village	Age (years)					Overall total (%)
	4-5·9	6-7·9	8-9·9	10-11·9	12-13·9	
Santa Cruz Balanyá	0	7·7	36·4	40·0	33·3	27·0
Santa Maria Cauqué	0	11·6	19·5	45·6	—	18·6
Santa Catarina Barahóna	0	0	30·4	35·5	43·5	25·3

From the data in Table 7, no malpositioning was observed in any village until the age of 6–9 when permanent incisors began to erupt. The frequencies of malpositioning in the three villages were roughly equal in view of the absence from the calculations of the age group of 12–13·9 in Santa Maria. On the basis of the data from the other two villages, this group would constitute a high risk, and hence would probably have increased the overall prevalence close to those of the other two villages. A factor very likely operant in creating malpositionings was a loss of space for permanent premolars, caused by the high prevalence of approximal decay of deciduous canines and molars with a consequent mesial drift of teeth. The lack of malocclusion in the two youngest age groups from Santa Catarina is interesting. Possibly the adequate protein has allowed a greater growth of the maxillo-facial bony structures, hence large teeth have adequate space. Certainly other bone centers in children have been shown to benefit from the nutritional supplementation of this town (GUZMAN *et al.*, 1964).

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Résumé—Une étude dentaire a été entreprise dans trois villages des pays montagneux du Guatemala pour connaître l'état bucco-dentaire chez des enfants, âgés de 4 à 13,9 ans.

La fréquence de la carie dentaire dans ces villages est généralement comparable dans chaque groupe, d'âge identique; elle est plus élevée que celle notée antérieurement. Le nombre des individus, ayant moins de 2 DMF et surfaces def apparaît approximativement identique pour chaque village. Il s'agit là de 30–40% des enfants. Les 60 pour cent restants ont un très grand nombre de cavités. Les enfants de Santa Maria semblent présenter une rétention plus importante de leurs dents de lait que celles observées dans les autres villages. Le nombre des hypoplasies paraît élevé, surtout chez les enfants âgés de 4 à 6 ans, chez lesquels elles sont souvent associées à une hypoplasie linéaire des incisives temporaires supérieures. La fréquence des hypoplasies linéaires des incisives temporaires supérieures à Santa Maria est presque le double de celle des deux autres villages et au moins 40 pour cent des enfants, présentant des incisives temporaires supérieures, en sont atteints. Des suggestions sont faites concernant l'étiologie de ces lésions et les futures recherches à effectuer. La fréquence des lésions gingivales est d'environ 50 pour cent, au dessus de l'âge de 8 ans: ce chiffre est plus élevé que les 4 à 10 pour cent notés dans l'étude antérieure de HURTARTE et SCRIMSHAW (1955). En général Santa Maria Cauqué présente un pourcentage plus élevé de telles lésions que celui des autres villes. La fréquence des anomalies dentaires, comportant des fusions, agénésies et dents surnuméraires, est plus élevée que celle notée antérieurement. Les différents types observés sont décrits. La fréquence des malocclusions s'élève jusqu'à 40 pour cent dans certains groupes d'âge: la plupart sont dues à un encombrement des dents permanentes antérieures.

Zusammenfassung—In drei vergleichbaren Indianerorten im Hochland von Guatemala wurden zahnärztliche Untersuchungen durchgeführt, um den Mundbefund von 4 bis 13,9 Jahre alten Kindern mit folgenden Resultaten festzulegen:

Allgemein gesehen war der Kariesbefall innerhalb jeder Gruppe und bei gleichem Alter in den Dörfern vergleichbar, und er war grösser als früher berichtet. Die Anzahl derjenigen Individuen, die weniger als 2 DMF- und def-Oberflächen besaßen, schien für alle Dörfer annähernd gleich zu sein; sie betrug 30–40% der Kinder. Die übrigen 60% wiesen sehr hohe Kariesraten auf. Die Kinder in Santa Maria schienen ihre Milchzähne länger als die Kinder anderer Ortschaften zu behalten. Hypoplasien wurden sehr oft beobachtet; ihr Auftreten war besonders in der Altersgruppe von 4–6 Jahren mit einer strichförmigen Hypoplasie der oberen Milchschnidezähne vergesellschaftet. Die Prävalenz dieser strichförmigen Milchschnidezahnhypoplasien in Santa Catarina wurde als fast zweimal so gross wie die in den anderen beiden Dörfern gefunden, sie betraf wenigstens 40% der Kinder mit oberen Milchschnidezähnen. Hinsichtlich der Ätiologie dieser Läsionen und weiterer Untersuchungen werden Überlegungen angestellt. Die Prävalenz gingivaler Läsionen betrug bei Personen über 8 Jahren über 50%, sie war damit grösser als die in einem früheren Bericht von HURTARTE und SCRIMSHAW (1955) berichteten 4–10%. Allgemein ergab sich in Santa Maria Cauqué eine höhere Prävalenz dieser Läsionen als in den anderen Ortschaften. Die Häufigkeit von Zahnanomalien wie Fusion, Überzahl und Agenesie war höher als früher berichtet. Die verschiedenen beobachteten Typen werden beschrieben. Die Häufigkeit von Fehlokklusionen betrug in einigen Altersgruppen 40%, zumeist waren sie durch Engstand der vorderen bleibenden Zähne verursacht.

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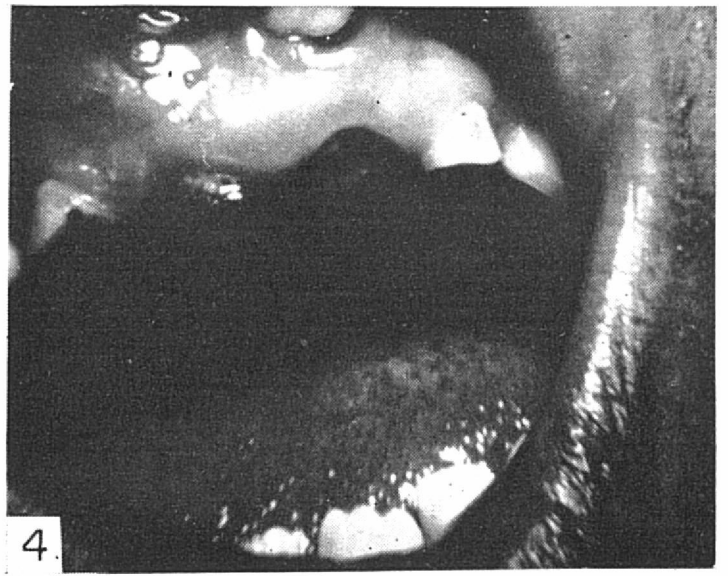
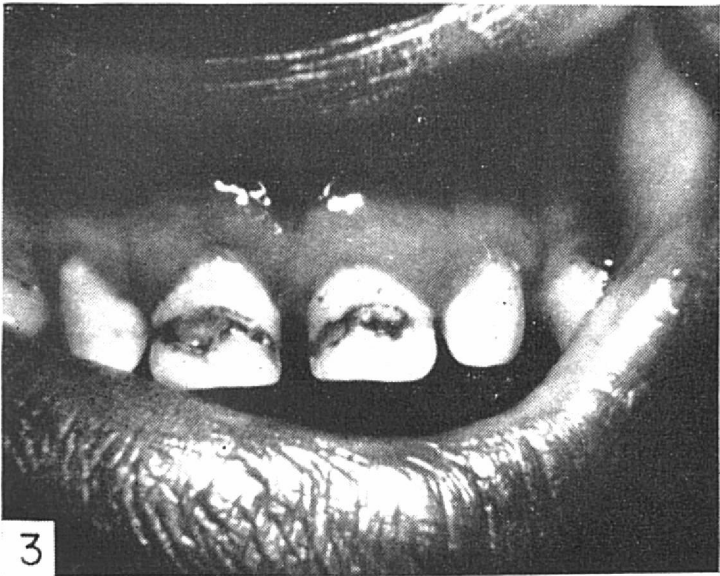
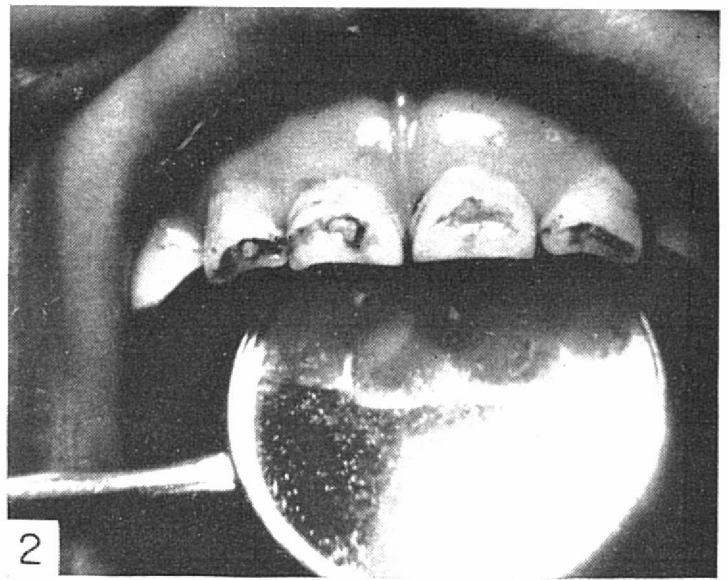
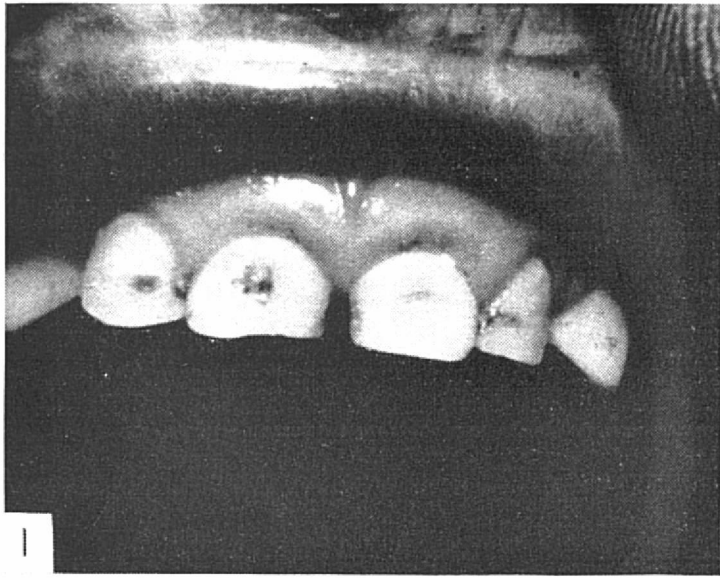


FIG. 1. Linear hypoplasia with minimal decay and staining.

FIG. 2. Linear hypoplasia showing moderately advanced carious lesions and staining.

FIG. 3. Linear hypoplasia showing severe decay on the central incisors and an unstained line on the decayed lateral incisors.

FIG. 4. Severe caries, possibly preceded by linear hypoplasia.

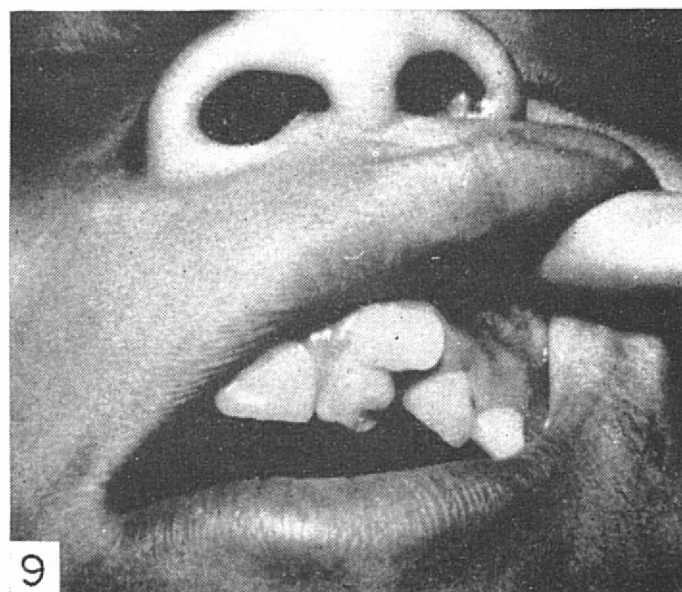
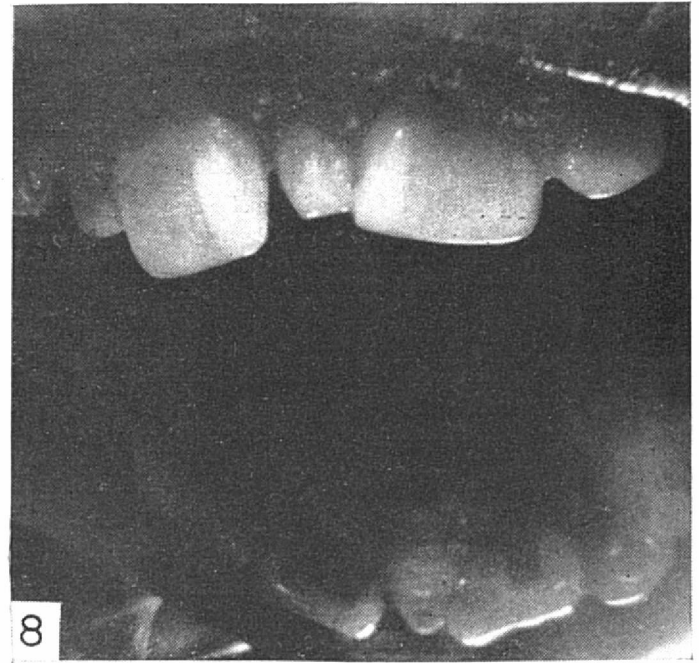
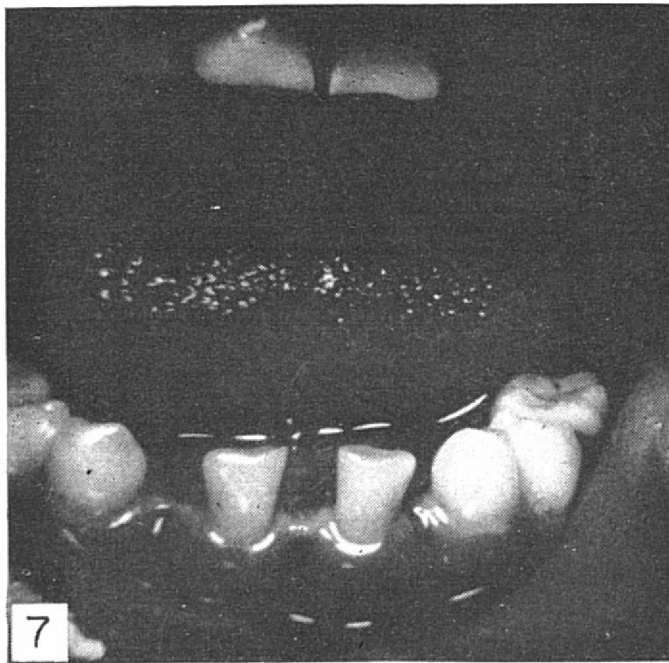
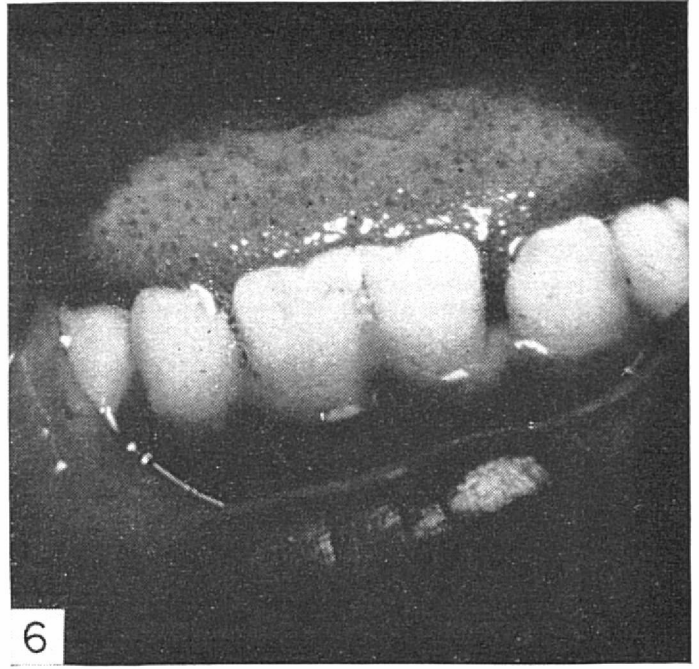
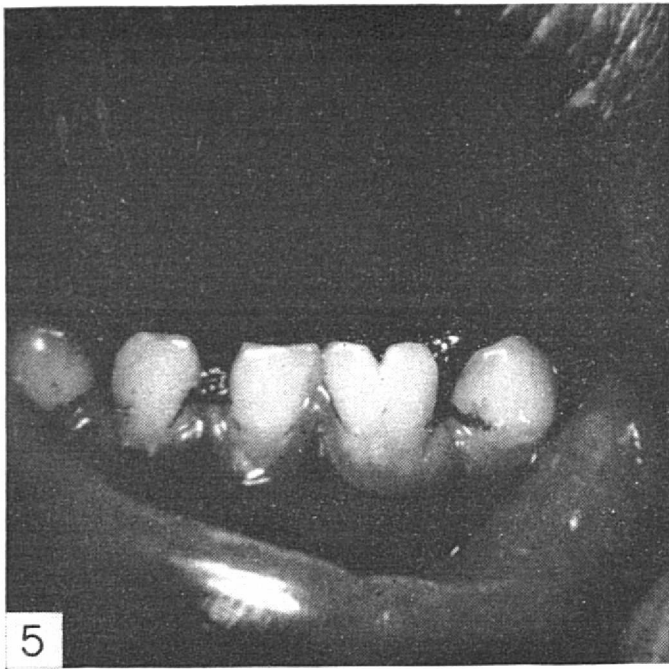


FIG. 5. Fused mandibular left deciduous central and lateral incisor.
FIG. 6. Bilateral fusions of mandibular deciduous central and lateral incisors.
FIG. 7. Agenesis of mandibular deciduous central or lateral incisors.
FIG. 8. The conical form of supernumerary incisor.
FIG. 9. The bicuspid or pseudomolariform type of supernumerary incisor.