Malocclusion in the Deciduous Dentition in White, Black, and Apache Indian Children

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Although the literature contains many reports concerning the prevalence and type of malocclusion in school children, there is a paucity of information regarding the prevalence of malocclusion in the preschool child. A summary of the prevalence of Class II molar relation in some school-aged populations has resulted in estimates ranging from 8-13 per cent for North American black and Indian children to estimates ranging from 11-39 per cent for white children.[7] Estimates of Class III molar relation have varied from 1-7 per cent in children of white, black and Indian ancestry.[5,6,10,12] Class II molar relation is usually reported to be more prevalent in white children, while mesioclusion appears to be more frequent in black and Indian children. In a study of racial variation in the occlusion of Hawaiian children, ages 12-20, distoclusion was more prevalent in Caucasian children, whereas mesioclusion was more common to children of Pacific parentage.[1] In studies of white preschool children of Birmingham, England, the prevalences of disto- and mesioclusion were 26 and one per cent, respectively.[4,8] Epidemiologic data for preschool children of the United States and particularly for black and Indian children are not readily available. Therefore, a study of occlusal relations in the preschool child seemed appropriate. Such a study involving white, black and Indian children was carried out with a quasi-random sample in the years 1969 and 1970.

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MATERIALS AND METHODS

A survey of nutritional status of preschool children in the United States was conducted in 1969 and 1970. Seventy-four sample areas were chosen.[9] These areas were further subdivided into sampling units. Dental examinations were conducted in 60 to 80 per cent of these sampling units. Detailed methods of the random selection procedures for the national sample[9] and for the Apache Indian study[11] have been described previously. The sample included children from about 36 states, the District of Columbia, and the White Mountain Apache Indian Reservation in Arizona. A total of 1251 children, ages 1-6 years, representing three racial groups were examined by the writer. For this report occlusal assessments are based only on children who had completed the deciduous dentition. Thus, 735 children, 2.5 to 6 years of age, remained for analyses.

The children were examined with the aid of a mouth mirror and portable dental light. Occlusion was assessed while each child was biting on his back teeth with the jaws in centric relation. For some children, especially in the younger age groups, the jaw had to be guided into this position. The cheek was retracted on each side so observations could be made with a mirror while looking at right angles to the buccal surfaces on each side. Race and sex comparisons were based on measurements of anteroposterior molar relation and anterior and posterior crossbite. Molar relation was defined as follows: Class I, the distal surfaces of the maxillary and mandibular second deciduous molars were in the same vertical plane and/or the mesiobuccal cusp

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TABLE I

Percentage distribution of children, ages 2-5 years, by race and molar relation (boys and girls combined), United States, 1969-70

Total N	*Class I*	*%*	*Class II (bilateral)*	*%*	*Class III (bilateral)*	*%*
			White Children			
680	543	79.9	130	19.1	7	1.0
			Black Children			
141	125	88.7	6	4.3	10	7.1
			Indian Children			
75	67	89.3	2	2.7	6	8.0

of the maxillary second molar was in contact with the mesiobuccal groove of the mandibular second molar; Class II, the distal surface of the mandibular second molar was posterior to the distal surface of the maxillary second molar; Class III, the mesiobuccal cusp of the maxillary second molar occluded with the distobuccal cusp of the mandibular second molar. Canine occlusion was used as a second reference for occlusal status using criteria similar to that of Foster and Hamilton.[4] If there was a disparity in occlusal classification between canine and molar relation, the molar relation was re-assessed and the final decision was made on the basis of molar relation. Children were classified as Class II or Class III on the basis of bilateral occurrence only. If, for example, a child was Class II on one side and Class I on the opposite side of the arch, for the purposes of prevalence calculations he was considered Class I. Few children, however, had such rotation. Teeth were considered in crossbite when the maxillary teeth occluded in lingual relation to the mandibular teeth.

Results

The data in Table I show the prevalences of molar relation in the three racial groups with boys and girls combined. For Class II molar relation, white children had the highest prevalence, 19.1 per cent, followed by 4.3 for black and 2.7 for Indian children. By chi-square test, the differences in Class II molar relation for white children as compared with black ($\chi^2 = 18.7$, df = 1) and Indian children ($\chi^2 = 12.7$) separately were highly significant, $p < 0.001$. The observed differences between black and Indian children were not significant. For Class III molar relation, the trend was reversed. White children had the lowest prevalence, 1.0 per cent, compared with 7.1 per cent for black and 8.0 for Indian children. The prevalence was significantly lower in white as compared with black ($p < 0.01$) and Indian ($p < 0.05$) children. Only slight differences were observed between black and Indian children. Thus, white children had a much greater prevalence of distoclusion compared with black and Indian children, whereas, the opposite was observed for Class III molar relation.

Interrace comparisons showed that both black children and children of Indian ancestry had greater proportions of children with Class III than with Class II molar relations. The opposite was true for white children.

Table II shows the percentage distribution for unilateral and bilateral anterior and posterior crossbite by race for the total group as well as for children with Class I molar relation only. For the total sample in the anterior segment, white children tended to have more unilateral than bilateral crossbites. The opposite was observed in black and Indian children (black: Uni. = 2.1%, Bi. = 5.7%; Indian: Uni. =

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TABLE II

Percentage distribution of anterior and posterior crossbite in total sample and in children with Class I molar relation by race, United States, 1969-70

Total Sample N	*Per cent Anterior*					*Per cent Posterior*				
	Unilateral	+	*Bilateral*	=	*Total*	*Unilateral*	+	*Bilateral*	=	*Total*
					White Children					
680	(20)	2.9	(8)	1.2	4.1	(40)	5.9	(8)	1.2	7.1
					Black Children					
141	(3)	2.1	(8)	5.7	7.8	(2)	1.4	(1)	0.7	2.1
					Indian Children					
75	(6)	8.0	(18)	24.0	32.0	(1)	1.3	(3)	4.0	5.3
Class I molar relation										
					White Children					
543	(16)	2.9	(3)	0.6	3.5	(34)	6.3	(6)	1.1	7.4
					Black Children					
125	(3)	2.4	(2)	1.6	4.0	(2)	1.6	(0)	0.0	1.6
					Indian Children					
67	(6)	9.0	(15)	22.4	31.3	(1)	1.5	(0)	0.0	1.5

Numbers in parentheses are actual observed values. Percentages are rounded off to nearest 0.1 per cent.

8.0%, Bi. = 24.0%. When anterior crossbite comparisons were based only on children who had Class I molar relations, relative observations in unilateral and bilateral crossbite remained the same in white and Indian children, whereas the relative differences in black children were diminished. For interrace comparisons of total anterior crossbites, Indian children had a greater prevalence compared with the other racial groups, whether observations were based on all children or on children with only Class I molar relation. By chi-square test the differences were highly significant ($p < 0.001$). The slight differences in the prevalence of anterior crossbite between all white and all black children were eliminated when calculations were based on children with Class I molar relation only. This was the result of eliminating black children with Class III molar relation who also had anterior bilateral crossbite. Also, comparisons are based on small numbers of black children.

For the total number of posterior crossbites the prevalence in white children, 7.1 per cent, was significantly greater than the prevalence in black children, 2.1 per cent. The differences in prevalence between all white (7.1%) and all Indian children (5.3%) were not significant. When comparisons were based on children with Class I molar relation only, white children had a significantly greater prevalence compared with both black and Indian children. Thus, Indian children had a much greater prevalence of anterior crossbite, most of which was bilateral, compared with the other racial groups, whereas white children tended to have a greater prevalence of posterior crossbite, most of which was unilateral.

Table III shows the occlusal relations by sex and race separately. Although significant sex differences were not apparent, boys tended to have greater prevalences of both Class II and Class III molar relations, the only exception being that Indian girls had a greater tendency for Class II molar relation than did boys. Sex comparisons for crossbites showed that white girls had greater prevalences of anterior and posterior crossbites compared with white boys, while the opposite trend

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TABLE III

Prevalence of Class II and Class III molar relation and anterior and posterior crossbite by sex and race, 1969-70

	White				*Black*				*Indian*			
	336 Boys	Per cent	344 Girls	Per cent	85 Boys	Per cent	56 Girls	Per cent	39 Boys	Per cent	36 Girls	Per cent
Class II	(72)	21.4	(58)	16.9	(4)	4.7	(2)	3.6	(0)	0.0	(2)	5.6
Class III	(4)	1.2	(3)	0.9	(7)	8.2	(3)	5.4	(5)	12.8	(1)	2.8
Anterior Crossbite	(13)	3.9	(15)	4.4	(9)	10.6	(2)	3.6	(13)	33.3	(11)	30.6
Posterior Crossbite	(19)	5.6	(29)	8.4	(2)	2.4	(1)	1.8	(3)	7.7	(1)	2.8

Numbers in parentheses are actual observed values.

was observed for sex comparisons in black and Indian children. The differences, however, were not significant.

Discussion

Differences in criteria used in assessing the prevalence of malocclusion make comparisons between studies questionable. Because prevalences of mesio- and distoclusion in the children studied were based on bilateral occurrence, they may be slightly lower than those of other studies for children of similar ancestry. A comparison of trends between racial and sex groups of this study can be made, however, and relative comparisons with data from other studies will also be attempted. In this study white children had a significantly greater prevalence of Class II molar relation, whereas black and Apache Indian children had greater prevalences of Class III molar relations. These observations for white versus Indian children are consistent with those found in the permanent dentition.[4] Grewe et al.[6] reported more Class II malocclusions in Indian children with a greater percentage of Caucasian ancestry and a greater percentage of Class III malocclusion in children with a greater percentage of Indian ancestry. In comparisons of white with black children for permanent tooth molar relations, the data of previous reports[2,7] show that white children usually have a much greater prevalence of Class II malocclusion, whereas black children usually have a slightly greater tendency for Class III molar relation. Such findings are in a similar direction to those in Table I. Black children in this study, however, had a significantly greater prevalence of Class III molar relation in comparison with white children.

Although no significant sex differences in anteroposterior molar relations were observed, boys tended to have greater trends toward both Class II and Class III molar relations. The lone exception to this pattern was observed in the Apache children where a slightly greater prevalence of Class II molar relation existed in girls. These findings are compatible with those of several other investigations.[1,3,8]

Indian children had a significantly greater number of anterior crossbites compared with children of the other racial groups. This finding was not unexpected. Others[6] have observed that the greater the percentage of Indian ancestry, the greater the probability of anterior crossbite as well as Class III malocclusion. In this study the ranking for the prevalence of Class III molar relation followed the ranking for anterior crossbite for the three racial groups. Since this study was cross-sectional, the role of the anterior crossbite in the development of Class III malocclusion or vice versa could not be determined. The data in Table I and

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Table II show that bilateral anterior crossbite in the Indian children was three times more frequent than Class III malocclusion; in black and white children it was less. Such findings suggest that anterior crossbite may be an etiologic factor in the development of some cases of Class III molar relation in the Indian population, while anterior crossbite may be the result of factors associated with Class III molar relation in black and white children. Such hypotheses, however, could only be confirmed via longitudinal study.

With the exception of anterior crossbite, black and Indian children were not significantly different with regard to the occlusal assessments. In relation to black and Indian children, white children were significantly different with regard to anteroposterior molar relations and posterior crossbite. The prevalences of anterior crossbite in white and black children were not significantly different in this sample of children.

This investigation attempted to study some aspects of occlusal relations of preschool children representing three racial groups. Comparisons between racial and sex groups resulted in observations compatible with those of other investigations, most of which were based on occlusal relations of the permanent dentition.

Conclusions

From a study in occlusal measurements in 735 United States preschool children, it was concluded that:

1. The prevalence of Class II molar relation was significantly greater in white children as compared with black and Indian children.
2. The prevalence of Class III molar relation was significantly greater in black and Indian children.
3. The prevalence of anterior crossbite was significantly greater in Indian children.
4. The prevalence of posterior crossbite was significantly greater in white children.

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