

## Prevalence of malocclusion in 4-6 year old Brazilian children

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*The prevalence of malocclusion and the relationship with oral habits in Brazilian children from two public primary schools was evaluated. The sample was composed of 112 children with mean age of  $61 \pm 6.67$  months. The results demonstrated the presence of malocclusions in 75.8% ( $n=85$ ). The oral habits was related by 34.8% ( $n=39$ ). The open bite was the most prevalent malocclusion in the studied population and the oral habits was the decisive etiological factor.*

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### INTRODUCTION

The term malocclusion defines any teeth or dental arches anomalies that can cause esthetic discomfort or functional incapacities.<sup>1</sup> Malocclusion is frequent in the populations, despite geographical area, ethnic group, gender, age or social class<sup>2,3</sup> being thought as a human morphological variation and not a pathological condition.<sup>3</sup>

The knowledge about the etiology of malocclusion is essential for the success of the orthodontic treatment, because the correction first requires the elimination of these causes.<sup>4</sup> Different authors<sup>2,5-7</sup> attempted to categorize the etiological factors in order to make easy the diagnosis and therapeutic process. In all classifications, the oral habits are mentioned as potential agents for

the development of malocclusions, being listed as determining causes,<sup>6</sup> environmental or acquired local factors,<sup>5</sup> neural factors<sup>2</sup> and only habits.<sup>7</sup>

Habits come from repetition of an act with determined purpose.<sup>8</sup> All habits are learned pattern of muscle contraction of a very complex nature. Deleterious patterns of muscle behavior often are associated with perverted or impeded osseous growth, tooth malpositions, disturbed breathing habits, difficulties in speech, upset balance in the facial musculature and psychological problems.<sup>7</sup> The effects on the occlusion depend on the three factors: duration, frequency, intensity.<sup>2</sup> The oral habits contains a strong psychological aspect when it represents a catharsis of the emotional, physics or psychic pressures.<sup>9</sup>

Once the habits are usually practiced by children, the aim of this study was to verify the prevalence of different malocclusions in preschool children and the relationship with these habits.

### MATERIALS AND METHODS

The sample was composed by 112 students (60 girls and 52 boys), with ages between 4 and 6 years (mean age of  $61 \pm 6.67$  months), of two public schools in Rio de Janeiro (RJ) - Brazil. The children were examined after permission was given by the parents. Those, who presented any erupted permanent tooth, were excluded. This research was reviewed and approved by the appropriate institutional committee.

Previous to the intra-oral exam, the plaque was disclosed and the oral hygiene instructions as well as a toothbrushing supervision were performed in all children. The examination was accomplished by a dentist under natural light. Each child lay on a table with the head aided by cushion, so that the whole oral cavity was visualized. Gauze to dry the teeth and gums and disposable millimetric rulers to measure the vertical and horizontal overlaps of the incisors were used.

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**Table 1.** Prevalence of occlusal patterns in relation to gender and age.

GENDER AGES	NORMAL OCCLUSION				MALOCCLUSION				TOTAL	
	Male		Female		Male		Female		N	%
	N	%	N	%	N	%	N	%		
4	5.0	4.5	5.0	4.5	16.0	14.3	25.0	22.3	51.0	45.6
5	11.0	9.8								
5	4.5	13.0	11.6	24.0	21.4	53.0	47.3			
6	1.0	0.9	-	-	6.0	5.3	1.0	0.9	8.0	7.1
<b>TOTAL</b> 100.00	17.0	15.2	10.0	9.0	35.0	31.2	50.0	44.6	112.00	

**Table 2.** Prevalence of habits in relation to occlusal patterns.

HABITS	Feeding bottle		SUCTION Dummy		Finger		MOUTH BREATHING		NAIL BITTING	
	N	%	N	%	N	%	N	%	N	%
MALOCCLUSION										
Open bite	-	8.0	7.1	17.0	15.2•	11.0	9.8 †	3.0	2.7 ‡	-
Anterior crossbite	-	-	1.0	0.9	1.0	0.9	-	-	-	-
Posterior crossbite	4	3.6	5.0	4.5*	3.0	2.7	2.0	1.8 ‡	-	-
Deep bite	2	1.8	-	-	1.0	0.9	-	-	1.0	0.9
NORMAL OCCLUSION	2	1.8	-	-	1.0	0.9	-	-	-	-

•p= 0.001 †p=0.01 (Chi-Square test) ‡p=0.02 \* p=0.05 (Fisher's Exact test)

The data were registered by an assistant in dental records especially elaborated for this research. The inspection of dental arches took place in two stages. Initially each child was requested to open the mouth allowing the exam of the teeth (number, form, arrangement and integrity) and dental arches (shape). After that, each child was evaluated in habitual occlusion to regard occlusal plane, overjet and overbite.

It has been considered as normal occlusion when the buccal surfaces of the upper teeth were located outside on the buccal surfaces of the lower teeth and the overjet and overbite were 0 to 3mm. The inverted buccal-lingual relationships in the anterior (anterior crossbite) or posterior (posterior crossbite) areas, as well as the overbite over 3mm (deep bite) or absent (open bite) were considered as malocclusions.

At the end, the child was questioned about the practice of the sucking, pacifier, digital or feeding bottle), bite (nails, objects) and breathing habits.

The data were analyzed through the EPI-INFO 6.04 program, using the Chi-square and Fisher's Exact tests with a level of significance of 5%.

## RESULTS

The Table 1 presents the sample distribution according to age, gender and occlusal characteristics. The majority of the sample was composed by children with 4 and 5

years old. The malocclusion was more prevalent in girls than boys, in those ages.

Table 2 demonstrates a significant association between the practice of pressure habits and malocclusion. The open bite and posterior crossbite showed high frequencies and strong relation with deleterious oral habits. The anterior crossbite and deep bite, less prevalent, demonstrated weak association to these habits and probably have another etiologies.

Table 3 shows the sample distribution according to age, gender and malocclusion. In girls, the malocclusions more frequent were open bite (18.7%), posterior crossbite (6.3%) and anterior crossbite (4.5%), while in boys was the deep bite (7.2%).

## DISCUSSION

The prevalence of malocclusion in the primary dentition has been studied (Figure 1). Different malocclusions were observed in the several populations with variable frequency (Figure 2).

The correlation between habits and malocclusion has been reported.<sup>15,16</sup> Tomita, Sheiham, Bijella and Franco<sup>1</sup> observed that 51.3% of the boys and 56.9% of the girls had malocclusion. There was a relation of 5:1 for the pacifier users and 1.5:1 for digital suckers. The present investigation observed that 31.2% of boys and 44.6% of girls developed malocclusions (Table 1). There was a proportion of 1.3:1 for those with pacifier

**Table 3.** Prevalence of different malocclusions in relation to gender, age and malocclusion.

GENDER AGES	Open bite				Anterior Crossbite			
	Male		Female		Male		Female	
	N	%	N	%	N	%	N	%
4	8	7.1	11	9.8	2	1.8	1	0.9
5	6	5.3	9	8.0	-	-	4	3.6
6	-	-	1	0.9	1	0.9	-	-
<b>TOTAL</b>	14	12.4	21	18.7	3	2.7	5	4.5

  

GENDER AGES	Posterior Crossbite				Deep bite			
	Male		Female		Male		Female	
	N	%	N	%	N	%	N	%
4	2	1.8	2	1.8	2	1.8	1	0.9
5	2	1.8	4	3.6	3	2.7	3	2.7
6	1	0.9	1	0.9	3	2.7	-	-
<b>TOTAL</b>	5	4.5	7	6.3	8	7.2	4	3.6

sucking habits comparing to the digital suckers and of 2:1 when compared to feeding bottle users (Table 2). In girls, the malocclusions more frequent were open bite (18.7%), posterior crossbite (6.3%) and anterior crossbite (4.5%) while in boys was the deep bite (7.2%) (Table 3).

It is known that sucking is practiced by the newborn infant and represents the main channel of communication with the outside world.<sup>2,17</sup> Firstly used for nutrition, sucking creates positive emotions (euphoria, well being, security) associated to the presence of the mother.<sup>2,7</sup> Frequently, the habit is outgrown by 3 or 4 years old,<sup>7,18</sup> but some children continue with the sucking habits until the eruption of the permanent incisors.<sup>18</sup>

The association between habits and socioeconomic status has also been questioned. It is speculated that children of working mothers keep the deleterious habits beyond 3 years old to compensate the insecurity fillings caused by the absence of the mother.<sup>1</sup> This theory may explain our results. All the children with malocclusion that were older than 3 years, practiced habits. Probably this infantile behavior is related to insecurity due to the full time presence of the child at school, as well as because of the complacency of the parents in relation to the use of pacifiers resources.

The effects of the dummy suction compared to digital suction are contradictory. In agreement with Cerny,<sup>15</sup> the pacifier suction produces less deleterious effects than the digital suction and the abandonment of this habit is easier. On the other hand, Tomita, Sheiham, Bijella and Franco<sup>19</sup> say that the pacifier can be a risk factor to the malocclusion of more intensity than the digital suction.

The most deleterious effects of the pacifier probably occur because it is purposely introduced in the newborn routine and used for long time, compared to the finger/thumb, which is sucked without knowledge or permission of the parents. In societies where the pacifier is not available smaller malocclusion rates are found than those who use it.<sup>16</sup> Antagonically to these concepts, Larsson and Rönnerman<sup>20</sup> affirmed that the pacifier or finger suction do not cause open bite. In this investigation, three children (2.7%) that practiced vicious habits showed normal occlusion (Table 2). These data confirm the importance of the intensity-frequency-duration of the habit for the development and maintenance of the malocclusion.

Sucking habits tend to produce some constriction of the upper arch, with more constriction across canines than molars, and occlusal interferences may then lead to a functional shift of the jaw anteriorly and laterally.<sup>21</sup> Some children with posterior or anterior crossbite did not mention pressure habits. Two other etiologies were noted. These malocclusions were due to premature contacts leading to a jaw functional adaptation especially in the area of the deciduous canine teeth<sup>21</sup> or can indicate a skeletal pattern of Class III.<sup>22</sup>

Epidemiological studies of malocclusions in the primary dentition are important because they show the need for interceptive and corrective orthodontic treatments. Among malocclusions studied, the crossbites are the only ones that demand the immediate treatment because it does not self-correct and creates skeletal alterations that make difficult for later correction.<sup>21,22</sup> The vertical problems (open bite and deep bite) should be registered and the parents should receive orientations regarding the evolution and time for orthodontic treat-

Author(s)	Year	Country	Sample	Age	Malocclusion (%)
KÖHLER & HOLST	1973	Sweden	1736	4	66.4
MOODER et al.	1982	Sweden	668	4	22
JONES et al.	1993	USA	493	3-4	13
ØGAARD et al.	1994	Sweden	445	3	90
TROTTMAN & ELSBACH	1996	USA	238	2-5	49.8
CHEVITARESE et al.	2001	Brazil	112	4-6	59.8%

Figure 1. Prevalence of malocclusions in different ethnic groups.

Author(s)	Year	Open bite	MALOCCLUSIONS		Deep bite
			Posterior	Anterior	
KÖHLER & HOLST	1973	15.3%	3.3%	-	15.7%
MOODER et al.	1982	-	22.0%	-	-
JONES et al.	1993	-	8.0%	5.0%	-
ØGAARD et al.	1994	-	90.0%	-	-
TROTTMAN & ELSBACH	1996	38.1%	-	20.0%	29.1%
CHEVITARESE et al.	2001	31.1%	10.8%	7.2%	10.8%

Figure 2. Prevalence of malocclusions in the deciduous dentition.

ments. Usually, open bite arising from sucking habits may be self-corrected by removing the habit.<sup>7,18,21,23,24</sup>

### CONCLUSIONS

1. The prevalence of malocclusion in the primary dentition was 75.8%. The open bite was the most prevalent malocclusion (31.1%), followed by posterior crossbite (10.8%); deep bite (10.8%); anterior crossbite (7.2%).
2. The habits (suction and mouth breathing) were considered as decisive etiological factors for the establishment of the open bite and posterior crossbite. These should be identified and removed to avoid dental alterations that cause or perpetuate skeletal alterations.

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