

Original articles

Speech development and infant feeding: possible implications

Desenvolvimento da fala e alimentação infantil: possíveis implicações

Victor Costa Alves Medeiros Vieira⁽¹⁾

Cláudia Marina Tavares de Araújo⁽¹⁾

Sílvia Regina Jamelli⁽¹⁾

⁽¹⁾ Universidade Federal de Pernambuco (UFPE), Recife, Pernambuco, Brasil.

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ABSTRACT

Purpose: to identify the association between dietary habits and speech development in preschool children.

Methods: case-control study, with sample constituted of 273 children enrolled in Municipal Daycare Centers in Recife. It was researched the association of outcome with the variables related to socioeconomic characteristics, nutritive and not nutritive sucking habits and development of the stomatognathic system. We used the software STATA/SE 9.0 and Excel 2007 to calculate the risk measure, Odds Ratio with a confidence interval of 95%, plus the value of $p \leq 0.05$. To verify the existence of association, it was adopted the chi-square test for categorical variables.

Results: concerning the speech disorders, it was verified significant association in males. Yet, sucking habits were not significantly associated with the outcome studied. Regarding the stomatognathic system, it was registered significant association on speech disorders, especially regarding the habitual posture of the lips and tongue, as well as the presence of malocclusion. There was no significant association between food consistency and the variable studied event.

Conclusion: the food consistency demonstrated a significant association with variables that impact on the proper physiology of the stomatognathic system, in terms of phono-articulatory organs and function performance, can be inferred that eating patterns and speech constitute a convergence point in child health.

Keywords: Speech; Feeding; Stomatognathic System; Speech Disorders; Child Development; Feeding Behavior

RESUMO

Objetivo: identificar a associação entre hábito alimentar e desenvolvimento da fala em crianças pré-escolares.

Métodos: estudo do tipo caso-controle, com amostra constituída por 273 crianças matriculadas nos Centros Municipais de Educação Infantil da cidade do Recife. Foi pesquisada a associação do desfecho com variáveis referentes a características socioeconômicas, hábitos de sucção nutritiva e não nutritiva e desenvolvimento do sistema estomatognático. Foram utilizados os softwares STATA/SE 9.0 e Excel 2007 para calcular a medida de risco, *OddsRatio*, o intervalo de confiança de 95% e o valor de $p \leq 0,05$. Para verificar a existência de associação, aplicou-se o teste qui-quadrado para variáveis categóricas.

Resultados: no que se refere às alterações de fala, verificou-se associação significativa no sexo masculino. Já os hábitos de sucção não se associaram significativamente com o desfecho estudado. Com relação ao sistema estomatognático, registra-se associação significativa às alterações de fala, principalmente no que concerne à postura habitual de lábios e língua, assim como com a presença de oclusopatias. Não houve associação significativa entre a variável de consistência alimentar e o evento estudado.

Conclusão: a consistência alimentar demonstrou associação significativa com variáveis que impactam na fisiologia adequada do sistema estomatognático, em termos de órgãos fonoarticulatórios e desempenho de funções, podendo-se inferir que padrão alimentar e fala constituem ponto de convergência na saúde infantil.

Descritores: Fala; Alimentação; Sistema Estomatognático; Distúrbios da Fala; Desenvolvimento Infantil; Comportamento Alimentar

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Mailing address:

Victor Costa Alves Medeiros Vieira
Rua Tertuliano Castro, nº 969, apto 503.
Bessa, João Pessoa, Paraíba, Brasil
CEP: 50035-170
E-mail: victorflacosta@yahoo.com.br

INTRODUCTION

Feeding the child requires special attention from birth, since this is the basis for growth, development and maintenance of the vital state of the human being. In this context, should be followed what the World Health Organization (WHO) recommends, exclusive breastfeeding during the first six months of life. From this age, onwards, other foods and liquids are gradually introduced into the child's diet, and this transition should be carefully followed up by a professional¹.

Early weaning or unexercised sucking may culminate in the establishment of deleterious oral habits such as pacifier use, digital suction and oral breathing. These frequently demonstrate a relation to occlusal disarrangement, besides being able to justify changes in swallowing, breathing and speech functions².

Nowadays, compliance with minimum standards of diet quality is a challenge in many developing countries, especially in areas where family food security is restricted because it has not been given due importance³. The child in this situation runs the risk of not receiving the necessary food at the right age and not being fed frequently enough during the day or being exposed to food of inadequate quality.

In this way, there is concern not only with the nutritional aspect, but also regarding the way the food is offered, mainly in terms of consistency and texture. These are characteristics that will favor anatomical-functional changes of the infant, which, associated with neurological maturation, will allow the correct execution of neurovegetative functions, among them, the speech.

The use of the solid consistency during chewing stimulates the increase in the force that the orofacial muscles exerts on the teeth⁴. This will not only change the quality of mastication, but also the development of maxillary bones, dental arches and other hard structures (such as dental elements), minimizing the possibility of occlusion changes.

Oral health, also stimulated by masticatory action, has repercussions on speech production. Despite this, it can be affirmed that early dental losses may imply alterations in the articulatory pattern, as it allows the interposition of the tongue in the edentulous region, as a means of stabilizing the mandible. When loss occurs in the posterior region, there is no significant impairment in speech quality, whereas absence of anterior teeth favors omission and replacement of phonemes⁵.

Muscle activity per cycle is also relatively low for soft foods, which implies a lower total muscular activity required for the formation of food bolus⁶. Thus, the

predominant consumption of pasty or soft consistency as the basis in a diet, results in a decrease in the workload or load of the muscle tissue, which may lead to a narrowing of the maxillary arch, especially in the areas of masticatory muscle insertion.

Another study² showed that, in individuals who prefer humidified foods and soft consistency, the decrease in the participation of orofacial musculature is a probable etiological or contributing factor to the existence of dental crowding, alteration of the orofacial musculature tonicity, oral breathing, tongue interposition between dental arches during rest and in the performance of stomatognathic functions.

Not only the muscles that move the mandible have an increased activity in the presence of foods with a more rigid consistency, but also the tongue, because when it participates in the swallowing of hard foods, there is an increase in amplitude and variation in lingual activity, particularly in the Posterior region⁷.

The soft tissues and the mandible, which are required to perform the efficient masticatory function during administration of most solid consistency food, are basically the same structures that will modify the sound originated from the larynx by variations of the oral cavity spaces, produced by the speech. Failures in the biomechanics of this mechanism can affect the production of specific phonemes⁸. Therefore, inadequate stimulation resulting from the use of predominantly soft foods may lead to the hypofunctionality of the tongue, which will lead to a compromise in the production of sounds such as /r/, /s/, /z/, /t/, /d/, /n/, /l/, as well as lowering of the tonicity of the orbicularis muscles of the lips, which would justify the incorrect articulation of phonemes such as /p/, /b/ and /m/.

Within this context, it can be observed that infant feeding favors the adequate growth and development of the child, contributing to maturation of several functions, including speech. The aim of this study, therefore, is to identify the association between eating habits and speech development in pre-school children.

METHODS

The study complied with Resolution 196/96 of the National Health Council, being previously analyzed and approved by the Research Ethics Committee of the Federal University of Pernambuco - Opinion no. 12907 of 12/04/2012, CAAE no 00642012.3.0000.5208.

A case-control study was carried out in 15 children of public educational units in the city, from April to July 2012, with children between the ages of 3 and 5

and 11 months of age, of both sexes. Children with congenital malformations, hearing impairment, as well as those with a physical or mental disability that could compromise speech development were excluded. Thus, the final sample consisted of 273 individuals, of whom 173 were males and 100 were females.

For those who agreed to participate, the data collection was preceded by the science and signing of the Term of Free and Informed Consent (TCLE) by the parents or guardians. They then, responded to a structured interview, whose objective was to collect the most reliable information about socioeconomic characteristics, such as family income, maternal age and schooling, and eating habits of the research participants.

Soon after the interview, the collecting was started with the children, which were submitted to the speech-language evaluation, whose main objective was to detect speech changes. For that, we used the phonological evaluation protocol contained in the ABFW, Children's Language Test, indicated for children aged from two to 12 years, phonetically balanced for Brazilian Portuguese⁹.

Phonemic production was recorded using a digital voice recorder (Sony ICD-PX312) for later analysis of speech and allocation of the children in case or control situations. Were denominated cases, children of both sexes who presented, in the naming and imitation tests⁹, omissions, substitutions, additions or distortions of phonemes related to functionality and associated with the motor aspect of speech production, therefore the alteration should be identified by both tests for the speech pattern to be considered incorrect. The control group were constituted by children of the same age group, of both sexes, who did not present such speech alterations. It should be noted that phonemic productions associated with regionalism, socioeconomic status and chronology of acquisition of children's phonemes, were not considered pathological.

It was also observed aspects of the phono-articulatory structures (tonus, posture and mobility) of lips, tongue and cheeks, of the stomatognathic functions of mastication and swallowing, besides the examination of the elements and dental occlusion, based on the MBGR¹⁰ protocol.

To define the type of feeding as to consistency, questions were asked regarding the eating habits of the children in the interview applied to parents or guardians. The elaboration of the questionnaire used in the interview was based on previous studies^{11,12} which presented classification of the type of feeding. In this way, questions and answer options were defined regarding the type of food consistency and later characterization.

The analysis of data collected with the parents or guardians and children was performed on the statistical program STATA / SE 9.0 and Microsoft Excel 2007 software. For this, protocol and questionnaire data were pre-coded and transported to a pre-established database with double entry and the application of Validate - verification of typing reliability.

To investigate the measure of association between speech and eating habits, odds ratios were calculated as well as the 95% confidence interval and p value.

To enable data tabulation and statistical treatment of aspects related to eating habits, the subjects' diet was classified as hard (solid), soft (solid-soft, pasty or liquid) and balanced (balanced in terms of consistency offered). The analysis of the menu of the collection sites qualified as balanced the food consistency offered by them.

RESULTS

The study had a final sample composed of 273 individuals (136 cases and 137 controls) of both sexes, whose age ranged from 3 years to 5 years and 11 months.

Table 1 shows characteristics of the sample and data concerning the female genitor. In general, the sample presented unfavorable socioeconomic level, represented by the short time of maternal schooling and family income equal to or slightly above a minimum wage. It can be seen that most of the individuals belong to the male sex and have an age range varying from 3 years to 4 years and 11 months. Only the gender variable presented a statistically significant association with speech disorders (OR = 1.79; IC 95% = 1,03-3,10; p = 0,038).

Table 1. Relationship between speech alteration, sample characterization and mother data. Recife, 2012

Variables	SPEECH IMPAIRMENT						p * value
	YES		NO		OR	IC	
	N	%	N	%			
Age							
3 years old	51	47,2	59	35,8	1,64	0,92 – 2,93	0,166
4 years old	38	35,2	72	43,6	0,94	0,45 – 1,98	
5 years old	19	17,6	34	20,6	1,00	–	
Gender							
Male	77	71,3	96	58,2	1,00	–	0,038
Female	31	28,7	69	41,8	1,79	1,03 – 3,10	
Shift in the educational unit							
One shift	46	42,6	85	51,5	0,70	0,42 – 1,17	0,187
Full time	62	57,4	80	48,5	1,00	–	
Family Income							
< 1 minimum wage	38	35,2	43	26,2	1,53	0,87 – 2,67	0,148
≥ 1 minimum wage	70	64,8	121	73,8	1,00	–	
Maternal age							
≤ 20 years old	2	1,9	11	6,8	0,30	0,04 – 1,56	0,208
21 to 24 years old	20	18,7	28	17,3	0,88	0,41 – 1,88	
25 to 29 years old	43	40,2	53	32,7	1,35	0,75 – 2,45	
≥ 30 years old	42	39,3	70	43,2	1,00	–	
Maternal schooling							
≤ 8 years of study	66	62,3	96	60,0	1,10	0,64 – 1,88	0,809
> 8 years of study	40	37,7	64	40,0	1,00	–	
Family with speech impairment							
Yes	23	21,3	22	13,6	1,72	0,86 – 3,44	0,134
No	85	78,7	140	86,4	1,00	–	

(*) Chi-square Test

Table 2. Relationship between speech alteration and habits of nutritive and non-nutritive sucking among the participant children. Recife, 2012

Variables	CHANGES IN THE SPEECH						p * value
	YES		NO		OR	IC	
	N	%	N	%			
Breast-feeding							
No	11	10,3	20	12,2	0,82	0,35 – 1,91	0,773
Yes	96	89,7	144	87,8	1,00	–	
Breastfeeding period							
0-3 months	33	34,4	44	30,8	1,25	0,67 – 2,32	0,660
4-6 months	15	15,6	19	13,3	1,32	0,57 – 3,02	
> 6 months	48	50,0	80	55,9	1,00	–	
Baby bottle							
Yes	79	73,8	119	72,1	1,16	0,65 – 2,08	0,865
No	28	26,2	49	27,9	1,00	–	
Bottle feeding period							
Currently	39	50,0	59	50,0	2,64	0,63 – 12,69	0,235
≥ 6 months	36	46,2	47	39,8	3,06	0,72 – 14,87	
< 6 months	3	3,8	12	10,2	1,00	–	
Digital suction							
Yes	11	10,2	13	7,9	1,33	0,53 – 3,31	0,660
No	97	89,8	152	92,1	1,00	–	
Pacifier suction							
Yes	62	57,9	79	47,9	1,50	0,89 – 2,52	0,134
No	45	42,1	86	52,1	1,00	–	

(*) Chi-square Test

The data in Table 2 expose the sample characteristics associated with nutritive and non-nutritive sucking habits. Most of the children in the two study groups did breastfeed and used artifacts such as baby bottle and pacifier at some point in their lives, but none of the variables studied showed a statistically significant association with speech changes.

Table 3 presents data referring to the oromiofunctional disorders of the children participating in the research. It was observed that both, the usual posture alterations of the phono-articulatory organs and the performance of other stomatognathic functions

demonstrated a statistically significant association with the outcome studied. Thus, for example, the resting lip position (OR = 2,82; IC 95% = 1,57-5,07; $p < 0,001$) and the performance of the masticatory function (OR = 2,22; IC95% = 1,05-4,76; $p = 0,045$) presented a significant relation with the presence of speech alterations.

Table 4 shows the food consistency data used by the research subjects. It was observed that the hard consistency was the most used for both groups, but it did not show a statistically significant association with the speech changes (OR = 1,31; IC95% = 0,55-3,14; $p = 0,257$).

Table 3. Relationship between speech disorder and orofunctional characteristics of the participating children. Recife, 2012

Variables	CHANGES IN THE SPEECH						p * value
	YES		NO		OR	IC	
	N	%	n	%			
Posture of lips in mastication							
Usually open	23	21,5	22	13,6	2,23	1,05 – 4,76	0,045
Open at times	46	43,0	59	36,4	1,66	0,93 – 2,98	
Sealed	38	35,5	81	50,0	1,00	–	
Oral escape of food in chewing							
Present	31	29,2	28	17,3	1,98	1,06 – 3,70	0,031
Absent	75	70,8	134	82,7	1,00	–	
Lip position on swallowing							
Usually open	20	18,7	19	12,0	2,21	1,00 – 4,90	0,035
Open at times	47	43,9	55	34,8	1,79	1,01 – 3,20	
Sealed	40	37,4	84	53,2	1,00	–	
Tongue interposition in swallowing							
Present	39	36,4	11	6,9	7,72	3,55 – 17,11	< 0,001
Absent	68	63,6	148	93,1	1,00	–	
Resting lip posture							
Half open	44	40,7	31	19,6	2,82	1,57 – 5,07	< 0,001
Sealed	64	59,3	127	80,4	1,00	–	
Tongue Functionality							
Reduced	57	52,8	44	27,8	2,90	1,68 – 5,01	< 0,001
Adequate	51	47,2	114	72,2	1,00	–	
Resting tongue posture							
Interposed	23	21,3	3	1,9	20,67	5,52 – 91,08	< 0,001
Adequate	46	42,6	124	78,5	1,00	–	
In the mouth floor	39	36,1	31	19,6	3,39	1,82 – 6,32	
Cheek mobility							
Reduced	33	30,6	41	25,9	1,26	0,70 – 2,24	0,494
Adequate	75	69,4	117	74,1	1,00	–	
Change in occlusion							
Present	76	70,4	87	52,7	2,13	1,24 – 3,68	0,005
Absent	32	29,6	78	47,3	1,00	–	
Early loss of deciduous teeth							
Present	9	8,4	9	5,5	1,59	0,56 – 4,55	0,479
Absent	98	91,6	156	94,5	1,00	–	

(*) Chi-square Test

Table 4. Relationship between speech alteration and food consistency. Recife, 2012

Food consistency	CHANGES IN THE SPEECH						p * value
	YES		NO		OR	IC	
	N	%	N	%			
Predominantly soft	22	20,4	47	28,5	0,81	0,30 – 2,19	0,257
Predominantly hard	75	69,4	99	60,0	1,31	0,55 – 3,14	
Balanced	11	10,2	19	11,5	1,00	–	

(*) Chi-square Test

The same happened regarding food consistency, in which there was no statistically significant association between the consistency of the foods consumed and alteration in the stomatognathic system.

DISCUSSION

The results of this research revealed a statistically significant association between males and presence of speech disorders. This finding corroborates a study¹³ that estimated the prevalence of speech disorders in 7,881 students from primary schools, finding a higher prevalence of this manifestation in the male sex (16.7%), in comparison to the female (12.7%) in a significant way, but there was not justifications for such finding. In the present research, however, this result should be relativized due to the difference in the number of subjects for the sex variable, in which there were a number of male participants considerably superior to the female.

In a review study of articles related to the topic¹⁴, it was observed that the risk factors most frequently cited by the authors for the development of speech disorders include being male, without mentioning an apparent explanation.

A cross-sectional study¹⁵ developed with 1,810 students from the public school system in Rio Grande do Sul, which aimed to verify the prevalence of speech disorders in schoolchildren and associated factors, identified a similar proportion of speech disorders between the sexes.

The present study did not reveal a statistically significant association between age and speech alterations, but found that most individuals included in the group of cases belonged to the three-year age group. Some omissions, substitutions and phonemic distortions are typical of the acquisition of Brazilian Portuguese, and should not be considered as pathological emissions, depending on the age group. Therefore, it is necessary to verify what process is taking place and to observe if this linguistic behavior is still admissible for the age of the individual. However, when the child reaches five years old, the infant must be able to emit the entire phonetic repertoire of his vernacular language⁹.

The study¹⁵ found evidence of speech alterations in all subjects of the sample of their research with less than five years, justifying that the development of linguistic consciousness derives from the development and biological maturation acquired in the constant exchanges with the environment or context, thereby

the child is in continuous process of acquiring new knowledge of gradual complexity.

The socioeconomic conditions of the studied population were represented by social and demographic indicators, such as family income, age and maternal schooling, which referred to the less favored social class. These indicators did not show a significant association with the presence of speech alterations, since the sample studied was relatively homogeneous, respecting the selection conditions of the individuals for case-control studies. However, another study¹⁶ stated that the precarious conditions of life that several Brazilian families are exposed by, such as the ones that made up this sample, justify less constructive and stimulating environments for child development, which may compromise, along with the motivational aspects, the cognitive and linguistic developments of the child.

Speech alterations in the present study did not show a statistically significant association with maternal schooling, which differed from another study¹⁵ in which parents' schooling was an important factor associated with this type of disorder. However, in this study, there was a discrepancy regarding the parents' level of education, which was directly proportional to the children's best speech performance.

Length of stay in the educational unit was another variable that did not have a significant association with the dependent variable, nor was it possible to identify studies that analyzed the relationship between the two. When evaluating the menu that the institutions provided to the children, it was possible to detect variation in consistency, flavor, temperature and form of food administration, being classified as a balanced diet. Thus, even individuals enrolled in the one-shift regime were exposed to a balanced diet, but it should be considered that full-time individuals should demonstrate a greater daily exposure to such food variation, since as a low-income population, it is difficult to maintain the standard of feeding varied in the daily routine of the home meals.

Another aspect that should be taken into account is the importance of the permanence of the children in the Early Childhood Centers, where they have the opportunity to develop values related to social, psychological and biological aspects, contributing to the healthy growth and development of the individuals.

The family history of speech disorder was also referred to by another research¹⁴ as a factor frequently cited in the articles that composed its article review, due

to the probable genetic component of organic alterations, but this variable did not demonstrate a significant association with the outcome in the present research.

A systematic study of the literature¹⁷ found an association between these variables. In their reports, they stated that speech changes are common in a family group, suggesting that genetic factors are involved, but their etiology at the molecular level is not well understood. They also referred to studies in which mutations in the FOXP2 gene were discovered in members of the same family, who presented changes in the emission of speech sounds.

Bibliographical research¹⁸ related to Pediatric areas, Dentistry and Speech-Language Pathology, through Medline, found that natural breastfeeding favors the correct development of the stomatognathic system concerning mobility, strength and posture aspects of the structures that compose it, Therefore it should benefit the correct articulation of the phonemes, since such structures are directly involved in the process of speech sounds production, which was not perceptible in the casuistry of this research. It should be emphasized that the present research used only audio recording of children's speech and not video footage, which could provide more precise analysis regarding the possible compensations performed for phoneme production, through the compromise of some phono-articulatory organ.

The same study also reported that, on the contrary, early weaning, because it does not satisfy the instinctive sucking desire of children, may favor the establishment of habits such as bottle feeding, digital sucking and pacifiers, which compromise the healthy development of the stomatognathic system and may be, for example, the etiology of malocclusion, which negatively impacts the structures involved in the speech production process. In this research, the habits of nutritive and non-nutritive sucking did not present a significant association with speech alterations.

In a cross-sectional study¹⁹ conducted in southern Brazil with a random sample of 100 mothers with children up to 12 months of age, it was identified that 55% of the subjects did not breastfeed for the period determined by the WHO, at least one of the aforementioned habits.

The use of the bottle favors the work of a reduced group of orofacial muscles, favoring the activity of the buccinator muscles and the orbicularis of the mouth, compromising the correct development of the craniofacial complex and, thus, being associated with

alterations in the articulation of speech sounds¹⁸. But in the present study it did not demonstrate a significant association with the outcome evaluated.

The use of pacifiers and digital suction, considered non-nutritive sucking habits, can also be consequences of early weaning and also contribute to the appearance of alterations in phono-articulatory organs. In this context, a cross-sectional study²⁰ nested in a birth cohort in Pelotas, southern Brazil, with 359 children, found that these behaviors demonstrate a relationship with occlusal derangement. In the present study, there was no statistically significant association between these aspects and speech disorders.

On the other hand, the oromiofunctional alterations revealed a significant statistical association with the dependent variable, mainly in relation to the posture of the phono-articulatory organs. This finding agrees with a study² that, when performing a speech and language assessment in children of a municipal daycare center in Bauru, São Paulo, highlighted the impairment in muscle tone as the main factor associated with speech disorders. However, it is worth mentioning that the posture of structures with the lips can be influenced by aspects such as orbicularis muscle tone of the mouth, characterizing some dependence between the two aspects.

Another research⁸ of the control case type involving 40 individuals, whose objective was to investigate the effect of the decrease in saliva production on the mandibular movement during the execution of the chewing and speech functions, found that the habitual incorrect posture of the lips and tongue could compromise the adequate contact of the phono-articulatory organs during the execution of such functions, which can generate distortion of the produced sound, compromising the production of speech sounds.

In the present study, the usual tongue interposition between the dental arches demonstrated a statistically significant association with the outcome. However, it is verified that the confidence interval for the risk measure is beyond expectations, which may suggest insufficient sample size for the analysis of this relation. Therefore, it is possible to infer that if the sample consisted of a greater number of children, this association would be maintained, with a reduction in risk.

The reduced tongue functionality also showed a significant relationship with the presence of speech disorders. This finding corroborates the research mentioned above, since they observed that such impairment impedes the correct emission of phonemes

that require greater amplitude and precision of tongue movements, such as /r/, /s/, /z/, /t/, /d/, /n/, /l/.

Another variable that demonstrated a significant association with the outcome was the change in dental occlusion, corroborating with the research²¹ that aimed to evaluate 152 children with signs and symptoms of disorder in the temporomandibular joint and observed that disorders in the relationship between maxilla and mandible can exert a direct influence on the posture of the organs recruited for speech production. In addition, in the same study, they evaluated the movement of phono-articulatory organs during the production of phonemes, detecting distortions and previous lisping in the emission of phonemes / s / and / z / and inappropriate position of the tongue in phonemes /t/, /d/, /n/, /l/.

Still in relation to hard structures, another study⁵, when conducting the dental and speech-language assessments of 50 adult individuals in the city of Bariri, São Paulo, stated that the integrity of teeth can affect the production of speech, since dental losses can imply in alterations in the articulatory pattern by permitting lingual interposition in the edentulous region as a means of stabilizing the mandible, going against the findings of this study. The posture assumed by the tongue, in situations like this, as previously mentioned, can negatively impact the production of the phonemes.

By directly verifying the relationship between the variables balanced food consistency and speech changes, no statistically significant association was identified. The difficulties in evaluating the food consistency, both for the information and memory bias of the subjects who answered the questionnaire, and for the lack of validation of the instrument of data collect, and speech, due to the age of the population group studied, could compromise the understanding of the interaction of the two variables.

However, understanding speech as a function that depends on the correct growth and development of the stomatognathic system, requiring harmonious relationship between the phono-articulatory organs, to make the specific modifications of the sound originating from the larynx, one can admit that the factors that collaborate for the adequate maturation of the orofacial structures, indirectly, favor correct phonemic production.

In this sense, a case-control study⁴ developed in the city of Rio de Janeiro, involving 60 children with and without dental crowding, pointed to a favoring of the stomatognathic system when solid consistency is used during mastication, since it promotes adequate

orofacial musculature tone and craniofacial complex growth, thus reducing the occurrence of malocclusions and, thus, of speech disorders. The mastication assumes, in evolutionary terms, the role of the suction in relation to the stimulation of the correct biodynamics of the stomatognathic system.

Also noteworthy is the study²² developed in Bangladesh, using data from 1,728 children whose ages ranged from six to 23 months, obtained from nationally representative data from the Bangladesh Demographic 2007 and Health Survey. The authors found that diversification of infant feeding, mainly in terms of consistency and texture, favored anatomofunctional changes inherent to craniofacial growth, which, together with neurological maturation, allow the correct execution of neurovegetative functions, among them, speech.

The influence of predominantly soft feeding on the development of the maxillary bones was tested in their study with rodents⁶, being observed a decrease of the work or load of the muscular tissue, being able to lead to a narrowing of the maxillary arch and hypotonia of the masticatory muscles. When considering such impacts on the stomatognathic system of a human, it is perceived that there may be compromise in the emission of speech sounds.

Therefore, specific characteristics associated with males, oromiofunctional alterations related to posture of the phono-articulatory organs and dental malocclusion had a greater influence on the speech changes in preschool children.

This finding is essential for the development of prevention/intervention strategies by health and education managers and professionals who directly or indirectly aid children of pre-school age, to minimize this aggravation impact on the region's health and economy.

Thus, the importance of correct nutrition, with variation of texture and consistency, must transpose the nutritional sphere and be understood as a facilitator of the development of the child in a global way, thus avoiding the installation of future disorders.

CONCLUSION

Food consistency showed a significant association with variables that influence the correct dynamics of the stomatognathic system, in terms of phono-articulatory organs and function performance. From this, it can be inferred that food and speech patterns constitute a point of intersection in children's health.

It is important to note the importance of feeding interference and oral habits in the appearance of malocclusion and its relation with speech disorders, making it possible to understand the interaction of factors that are indirectly related to the outcome studied.

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