



# Relationship between child development and cleft lip and palate

## Relação entre o desenvolvimento infantil e as fissuras labiopalatinas

## Relación entre desarrollo infantil y labio leporino y paladar hendido

Marina Silveira Schönardie\* 

Leticia Pacheco Ribas\* 

Gabriela Peretti Wagner\* 

Maria Cristina de Almeida Freitas Cardoso\* 

### Abstract

**Introduction:** Lip-palatine clefts are recurrent congenital malformations and cause speech, swallowing, hearing and socialization impairment. Child development comprises the evolution of motor, cognitive, social and emotional skills and is influenced by many factors. **Objective:** To investigate the child development of subjects with cleft lip and palate (CLP). **Method:** Cross-sectional observational study conducted by interview and Denver II assessment in a group of children with CLP without associated syndromes. We included 27 individuals between seven and 68 months, of both sexes, who perform speech therapy follow-up in the Unified Health System outpatient clinic in a pediatric hospital. **Results:** The median age of the 27 participants was 25 months, 15 female (55.6%). 13 participants presented incomplete incisive post-foramen cleft (48.1%) and most are the first child in the family (51.85%), having not started school activities (59.26%). The average maternal age was 4 years lower than the paternal, and the family income is about two minimum wages. One-sided transforamen cleft occurred more in boys (55.6%), while post-incomplete foramen cleft palate occurred more in girls (61.5%). In the applied test, the language area was the most affected, with 37% of individuals presenting item of caution or attention, with failure in a test. **Conclusion:** Normal development was observed in most of the studied population, possibly caused by the early care received. Results at risk for delay occurred more frequently in females, in the post-foramen clefts, in the firstborn and were related to the language area.

**Keywords:** Child Development; Congenital Abnormalities; Child Language; Cleft Lip; Cleft Palate.

\* Hospital da Criança Santo Antônio – Irmandade Santa Casa de Misericórdia de Porto Alegre, Porto Alegre, RS, Brazil.

### Authors' contributions:

MSS: realized the study design, data collection, analysis and interpretation; writing of the initial article.

LPR and GPW: realized the analysis and interpretation of the article data.

MCAFC: conceived and designed the study, realized the analysis and interpretation of data and approved the final version to be published.

**Correspondence e-mail:** Marina Silveira Schönardie - marinaschonardie@hotmail.com

**Received:** 06/05/2020

**Accepted:** 20/10/2020



## Resumo

**Introdução:** As fissuras labiopalatinas são malformações congênitas recorrentes e ocasionam prejuízos de fala, deglutição, audição e socialização. O desenvolvimento infantil compreende a evolução das habilidades motoras, cognitivas, sociais e emocionais, sendo influenciado por muitos fatores. **Objetivo:** investigar o desenvolvimento infantil de crianças com fissuras labiopalatinas (FLP). **Método:** Estudo observacional transversal realizado por análise de dados de entrevista e do resultado do teste de Denver II em um grupo de crianças com FLP, sem síndromes associadas. Foram incluídos 27 indivíduos entre sete e 68 meses, de ambos os sexos, que realizam acompanhamento fonoaudiológico em ambulatório do Sistema Único de Saúde de um hospital pediátrico. **Resultados:** A mediana de idade dos 27 participantes foi 25 meses, sendo 15 indivíduos do sexo feminino (55,6%); 13 com fissura pós-forame incisivo incompleta (48,1%); a maioria, o primogênito da família (51,85%); não tendo iniciado atividades escolares (59,26%). A média de idade materna foi quatro anos mais baixa que a paterna e a renda familiar é de cerca de dois salários mínimos. A FLP transforame unilateral ocorreu mais em meninos (55,6%), enquanto a fissura palatina pós-forame incompleta ocorreu mais em meninas (61,5%). No teste aplicado, a área da linguagem foi a mais acometida, tendo 37% dos indivíduos apresentando item de cautela ou atenção, com falha em uma prova. **Conclusão:** Observou-se desenvolvimento esperado na maioria da população estudada, possivelmente ocasionado pelo atendimento precoce recebido. Os resultados com risco para atraso ocorreram mais frequentemente no sexo feminino, nas fissuras pós-forame, no primogênito e relacionaram-se com a área de linguagem.

**Palavras-chave:** Desenvolvimento Infantil; Anormalidades Congênitas; Linguagem Infantil; Fenda Labial; Fissura Palatina.

## Resumen

**Introducción:** Las fisuras del paladar y labio leporino son malformaciones congénitas recurrentes. Causan alteraciones del habla, deglución, audición y socialización. El desarrollo infantil comprende la evolución de las habilidades motoras, cognitivas, sociales, emocionales y está influenciado por muchos factores. **Objetivo:** investigar el desarrollo infantil de niños con labio leporino y paladar hendido (CLP). **Método:** estudio observacional transversal realizado por entrevista y análisis de resultados de Denver II en un grupo de niños con fisura del paladar sin síndromes asociados. Se incluyeron 27 individuos entre siete y 68 meses, ambos sexos, que realizan seguimiento de terapia del habla en la clínica ambulatoria del Sistema Único de Salud en un hospital pediátrico. **Resultados:** La mediana de edad de los 27 participantes fue de 25 meses, 15 mujeres (55,6%). 13 presentaron hendidura incisiva post-foramen incompleta (48.1%). La mayoría son el primer hijo (51.85%), que no han comenzado las actividades escolares (59.26%). La edad materna promedio fue 4 años menor que la paterna y el ingreso familiar es de aproximadamente dos salarios mínimos. La fisura transforamen unilateral ocurrió más en niños (55.6%), mientras que el paladar hendido post-incompleto ocurrió más en niñas (61.5%). En la prueba aplicada, el área de lenguaje fue la más afectada, con el 37% de las personas presentando un elemento de precaución o atención, con fracaso en una prueba. **Conclusión:** Se observó desarrollo normal en la mayoría de la población estudiada, posiblemente debido a la atención temprana recibida. Los resultados con riesgo de retraso ocurrieron con mayor frecuencia en las mujeres, en las hendiduras posteriores al foramen, en el primogénito y se relacionaron con área de lenguaje.

**Palabras clave:** Desarrollo Infantil; Anomalías Congénitas; Lenguaje Infantil; Fisura del Paladar; Labio Leporino.

## Introduction

Cleft lip and palate (CLP) are congenital malformations with a multifactorial origin that includes genetic and environmental factors. Cleft lip and/or palate is the most common congenital anomaly of the face<sup>1</sup> and it is due to a failure in fusion of the embryonic craniofacial processes that originate the primary and secondary palate, which should happen between the fourth and twelfth gestation week<sup>2</sup>.

According to the World Health Organization (WHO)<sup>3</sup>, the mean incidence of incisive transforamen CLP in the western population is 1:1000 births, while the incidence of cleft palate alone is 1:2000 births. It should be highlighted that these ratios vary with ethnic and geographic factors, and the variation in ethnicity is more significant than the geographical variation for the incidence of clefts<sup>3</sup>.

The incidence of CLP in Brazil ranges from 0.47 to 1.54 per 1000 births and it has a multifactorial etiology, being associated, or not, with hereditary factors and clinical maternal aspects such as stress, infections, medications and/or irradiations<sup>4,5</sup>.

Epidemiological findings indicate that municipal economic factors, based on the 2000 census, are not related to the prevalence of orofacial clefts in the population. However, this result may have been impacted by a lack of records, thus underestimating the number of individuals with this malformation in underdeveloped municipalities<sup>6</sup>.

The CLP classification involves anatomical characteristics and the affected region. The incisive foramen is considered a morphological and embryonic reference, and according to that, CLP can be classified as pre-, post- or trans-incisive foramen. It can also be unilateral or bilateral and complete or incomplete<sup>7</sup>. CLP compromises, to varying degrees, oral language, speech and hearing, and can impair social interactions<sup>8</sup>.

Child growth and development are influenced by genetically determined factors and environmental factors, such as the social environment in which a child is inserted<sup>9</sup>. Therefore, development must be analyzed through an assessment that contemplates children's complex cognitive functions<sup>9</sup>.

While growth is related to physical aspects, such as body weight and height, development includes, in addition to physiological aspects, the maturation process of organs and systems. Thus, child development enables greater efficiency in the

execution of functions and acquisition of increasingly elaborated skills over time<sup>9</sup>.

At the beginning of life, a baby perceives sensations and replicates them through actions, and exploration of the environment is a fundamental aspect for the development of the body scheme. Perception and cognition develop and are expressed through motor activity. In addition to sensory and motor aspects, there is also an affective factor, a basic element to motivate actions. The result of the interaction of these factors defines how each child's development process takes place, based on their possibilities and the environment in which they are inserted<sup>10</sup>.

Social interaction is fundamental for child development and the lack thereof can impair the social relationships of children with CLP, due to scarcity of adequate stimuli.<sup>11</sup> This deficiency may be associated with language and hearing deficits,<sup>12</sup> which interfere in the neuropsychological development process,<sup>13</sup> since there is a predisposition to hearing loss in CLP, which may be a risk indicator for the development of language skills.<sup>14</sup> Therefore, there is possible relationship between changes in child development, language skills and the presence of CLP.<sup>8</sup>

Findings from a meta-analysis, carried out with young children with CLP, suggest that in this population the process of speech and language development is delayed when compared to children in the same age group, but without the malformation. It was also observed that this delay tends to decrease with increasing age.<sup>15</sup>

Several factors can trigger some type of alteration in child development, and there is recent evidence in the literature indicating that CLP can compromise neuropsychological aspects, in addition to affecting known areas such as speech, language, and hearing.<sup>8,13</sup> However, there are studies that do not find any association between risk for language alteration or significant differences in the performance of this skill in children with malformation.<sup>16</sup>

There are different protocols described in the literature dedicated to assessing child development, among them the Denver II Test, which performs developmental screening. This instrument can be applied to children from zero to six years old and includes 125 items to evaluate four major areas: personal-social, fine-adaptive motor, language and gross motor. Its interpretation is divided into

normal, questionable, and not applicable developmental risk and depends on the items performed or not by the child, according to their age.<sup>17</sup> It is quick to apply, taking around 30 minutes and is recommended by the Brazilian Society of Pediatrics and the American Academy of Pediatrics.<sup>18</sup> The Denver II test was translated and cross-culturally adapted for use in Brazil.<sup>19</sup>

Considering the possibility of developmental changes in children with CLP and the need for early monitoring of these children, the present study aimed at investigating the development of children with cleft lip and palate, through the application of the Denver II Test.

## Methods

This is an observational and cross-sectional study, of quantitative and exploratory character, which investigated the population of children with CLP seen in an extension project of a Federal University, which takes place weekly in the outpatient clinics of the Brazilian Unified Health System - SUS, in a pediatric hospital in Porto Alegre/RS.

This study was approved by the Research Ethics Committee of the health institution, in co-participation with the University, under opinion number 3,398,845. All guardians of the children participating in the study signed the Free and Informed Consent Form (ICF).

The participants in this study are part of the extension project "Lip and Palate Clefts", which has a database consisting of telephone number, identification and type of cleft in 68 children in clinical care or management in the period from 2015 to 2019. Children with CLP are referred to the speech therapy service group through inter-consultations with the professionals who comprise the clinical staff of the SUS specialty outpatient clinics at the health institution. In general, inter-consultations are requested by professionals from the areas of plastic surgery, pediatric otolaryngology and oral and maxillofacial surgery.

The sample included data from individuals of both sexes, aged between seven and 68 months, diagnosed with the malformation and who is part of this project. Those with genetic syndromes and who did not attend or did not agree to participate in this study were excluded.

The research protocol was carried out between June and August 2019 and included the following procedures:

Personal or phone contact with the children's guardians listed in the database of the University extension project, presentation of this research project, consent and signature of the ICF;

Brief initial interview to get the participants' personal identification data: name, sex, date of birth, maternal and paternal age at birth, birth order of the research subject, characteristics of the CLP (affected areas and extent), child's education, family income and review of the telephone number for contact;

Application of the Denver II Test<sup>17</sup> carried out by the assistant researcher, who verifies the intersection items by the participant's age group. The test is a screening tool of the children's development conditions, including 125 items, distributed in four areas/categories: gross motor, fine-adaptive motor, language and personal-social. Its interpretation considers the development as "normal" when no item is observed, "caution or risk", when a single item is observed and "questionable" when two or more items are present. "Caution or risk" is considered to be those areas in which the individual has failed a test (or item), which more than 75% to 90% of the children have already performed, as recommended by the test. These results were entered into the electronic medical records of each participant, who are still under management or clinical speech therapy at the same location;

The data were entered into an Excel® table for later statistical analysis.

The quantitative variables analyzed were the mean, median and standard deviation and for the qualitative variables (type of fissure, sex, test interpretation, specific areas analyzed in the test), absolute and relative frequencies were calculated. The association between the variables investigated was verified with the Chi-square test or the Mann-Whitney test, depending on the absolute number of the variable. For data analysis, the Statistical Package for the Social Sciences (SPSS) version 23.0 for Windows was used. The level of significance adopted for the statistical tests was 5%.

## Results

Of the 68 individuals seen in the extension project period, 33 over the age of six were excluded. Of the 35 individuals contacted who were up to six years old, three were excluded with whom it was not possible to make telephone contact; two who had genetic syndromes that could influence the test results; two who denied service when contacted and one due to death, totaling a sample of 27 participants. Of the participants included in

the sample, 25 were undergoing speech therapy at the SUS specialty outpatient clinic of the health institution where the study was carried out, one was accessing this service in the city where he/she lives, and another had been discharged.

The minimum age of the participants was seven months, the maximum age was 68 months, and the median age was 25 months. The sex with the highest incidence was female (55.6%;  $n = 15$ ) and the most frequent cleft type was incomplete post-incisive foramen (48.1%;  $n = 13$ ). The sample characterization is shown in Table 1.

**Table 1.** Sample characterization

Variables		n (%)	md/m
Age	Minimum	7 months	md = 25 months
	Maximum	68 months	
Sex	Male	12 (44.4)	
	Female	15 (55.6)	
Cleft type	Unilateral transforamen	9 (33.3)	
	Bilateral transforamen	2 (7.4)	
	Incomplete post-foramen	13 (48.1)	
	Pre-foramen	3 (11.2)	

Legend: n = number of subjects; % = percentage; md = median

As for the birth order, 51.85% ( $n = 14$ ) of the study participants are first born; 25.92% ( $n = 7$ ) are second born; 14.81% ( $n = 4$ ) are third born; 3.70% ( $n = 1$ ) is fourth born and another 3.70% ( $n = 1$ ) is a fifth born child. Mean maternal age at birth averaged 26.85 years and the mean paternal age 31.22 years. Most children (59.26%;  $n = 16$ ) had not started school activities and, among those who started (40.74%;  $n = 11$ ), females had a higher incidence (63.63%  $n = 7$ ). The mean age of children who started school was 35 months, and the mean age at school start for girls was 33.57 months and

37.5 months for boys. The mean family income of the children evaluated is approximately two minimum wages (BRL 1951.85).

Incomplete post-foramen cleft palate had a higher incidence in girls (61.5%  $n = 8$ ) and unilateral transforamen CLP had a higher incidence in boys (55.6%  $n = 5$ ). Bilateral transforamen CLP and unilateral pre-foramen clefts had a similar incidence in boys and girls. No statistical difference was found between the type of cleft and sex ( $p = 0.82$ ). The comparative data are shown in Table 2.

**Table 2.** Cleft type and sex

Cleft Type	Sex		Total n (%)	p*
	M n (%)	F n (%)		
Unilateral transforamen CLP	5 (55.6)	4 (44.4)	9 (100)	0.82
Bilateral transforamen CLP	1 (50.0)	1 (50.0)	2(100)	
Incomplete post-foramen cleft palate	5 (38.5)	8 (61.5)	13 (100)	
Unilateral pre-foramen cleft	1(33.3)	2(66.7)	3(100)	
Total	12(44.4)	15(55.6)	27(100)	

Legend: CLP = cleft lip and palate; M = male; F = female; n = absolute number; % = relative number; p\* = Chi-square test

Regarding the interpretation of the Denver II Test results, 18 children had normal results (66.7%), while nine had questionable results (33.3%), whose association with sex did not show

statistical difference ( $p = 0.68$ ). Detailed data on the association between the Denver II test result and sex are shown in Table 3.

**Table 3.** Association between the Denver II Test result and sex

Denver II Test Result	Sex		Total n (%)	p*
	Girls n (%)	Boys n (%)		
Normal	9 (60)	9 (75)	18(66.7)	0.68
Questionable	6 (40)	3 (25)	9 (33.3)	
Total n (%)	15(100)	12(100)	27(100)	

Legend: n = absolute number; % = relative number; p\* = Fisher's test

The association between the Denver II test results and the age of the study participants proved to be independent of the child's age (24 months for those with normal results and 25 months for those with questionable results), and no significant association was found between these two variables, which was verified through the Mann-Whitney test ( $p = 1.0$ ).

Items indicating "caution or risk" were found

in the four areas investigated by the Denver II Test. In the area that evaluates language, 10 (37%) participants presented items indicating caution; six (22.2%) in the area corresponding to fine-adaptive motor skills, four (14.8%) in the personal-social field; and four (14.8%) in the gross motor skills area. Comparative data and association between the Denver II test results and sex are shown in Table 4.

**Table 4.** Association between the areas analyzed by the Denver II Test, sex and the number of "caution" items

Language	Sex	Caution Number n (%)				Total n (%)	p
		Fine-adaptive motor	2(%)	3(%)	4(%)		
Personal-social	girls	4(57.1)	2(28.6)	1 (14.3)	0(0)	7(100)	0.28*
	boys	1(33.3)	0(0)	1 (33.3)	1(33.4)	3(100)	
	general	5(50)	2(20)	2 (20)	1(10)	10(100)	
Gross motor	girls	3(100)	0 (0)	0 (0)	0 (0)	3(100)	**
	boys	3(100)	0 (0)	0 (0)	0 (0)	3(100)	
	general	6(100)	0 (0)	0 (0)	0 (0)	6(100)	
Pessoal-social	girls	3(100)	0 (0)	0 (0)	0 (0)	3(100)	0.25***
	boys	0 (0)	0 (0)	1 (100)	0 (0)	1 (100)	
	general	3(75)	0 (0)	1 (25)	0 (0)	4(100)	
Motor grosso	girls	2 (100)	0 (0)	0 (0)	0 (0)	2 (100)	0.33***
	boys	0 (0)	2(100)	0 (0)	0 (0)	2 (100)	
	general	2 (50)	2(50)	0 (0)	0 (0)	4 (100)	

Legend: n = absolute number; % = relative number; p\* = Chi-square test; p\*\* = constant; p\*\*\* = Fisher's test; 1 = one failure; 2 = two failures; 3 = three failures; 4 = four failures.



## Discussion

CLP are malformations that require multidisciplinary care from birth, due to the impairment of facial structures that cause oral dysfunctions, which can lead to changes in the child's global development and interfere with quality of life.<sup>8,13</sup>

The influence of birth order in the occurrence of CLP has been studied. A meta-analysis carried out in the United States revealed a positive association between variables, the results of which point to an increase in the occurrence of cases of CLP in the family, linked to an increase in the birth order of the children.<sup>20</sup> In the present study, the individuals affected by the malformation are, in the majority, the first or the second child, according to this meta-analysis,<sup>20</sup> and by another study, in which a proportion similar to that of the present study was found, in which 74% of the sample studied was born in the first or second pregnancy.<sup>21</sup>

Regarding the age of the parents at the birth of the child with CLP, the mean paternal age was 29.5 years and the mean maternal age 25.7 years, in addition to an increase in the incidence of CLP with increasing age of the parents.<sup>22</sup> Some studies indicate that the paternal age is higher than the maternal age in individuals with CLP.<sup>22</sup> This study found a mean age close to that found in the literature, and a tendency for the paternal age being 4 years greater than the maternal age, also in line with the literature.

Another predisposing factor for CLP is family income. In Brazil, the stratification of socioeconomic classes uses the average household income as reference, being divided into A, B1, B2, C1, C2 and D-E, from the highest to the lowest. In the present study, the average family income corresponds to the inclusion of individuals in the C2 socioeconomic class (average income), which does not correspond to the findings of other articles, which found a higher incidence of CLP in lower income individuals.<sup>2</sup>

Socioeconomic income is also considered to be one of the factors for impaired child development.<sup>23</sup> Results of a study on development that evaluated Brazilian children in the southern region of the country, based on the influence of environmental variables, using the Denver II Test, show a relationship between low income, and low education and impaired language development, due to the lack of stimulation and stress situations experienced.<sup>24</sup>

Language impairment in children with this malformation is associated with a lack of adequate stimulation and their speech disorders, which mainly affect vocal resonance and the articulation of words, involving both phonetic and phonological aspects.<sup>11</sup>

CLP is more frequent in men, while isolated cleft palates affect more women.<sup>1,3</sup> The present study shows a higher prevalence of females and incomplete post-incisive foramen cleft, data that are in agreement with what is found in the literature, since a higher incidence of isolated cleft palate in females and CLP in males is described.

The term development found in the literature varies according to the authors, being referred to as child development, neuropsychological and/or neuropsychomotor.<sup>23-25</sup> Child development has critical points that must be observed. Some of them are more vulnerable to environmental factors, which can lead to developmental disorders due to deprivation of stimuli.<sup>25</sup> The term neuropsychological development (NPD) involves different domains (language, motor, social, among others). The expression NPD does not favor one aspect over the other, it does not separate neurological from motor aspects, referring also to perceptual processes and complex cognitive skills such as social, motivational and language skills, contemplating the sensory aspect.<sup>25</sup> NPD is believed to be an expression more in line with this study, due to the different areas assessed by the Denver Test.

Regarding the association of CLP and changes in NPD, some studies have found an associative relationship between the variables.<sup>8,26,27</sup> This study found a higher incidence of results with a normal score in the Denver II Test, different from what was found in the studies of Cavalheiro<sup>8</sup> and Jurado.<sup>27</sup> Questionable results occurred in the female sex in greater number. In the literature, no data were found related to sex using the same test in the same population, however, in individuals without CLP, literature findings differ from those found in this study, since the data suggest a predominance of males in cases of changes in the NPD process.<sup>28</sup>

Regarding the relationship between number of children, and birth order and child development, the literature shows that cleft children with more than three siblings are more likely to suffer developmental changes.<sup>23</sup> This association can be verified among the participants of this study, since the children evaluated presented normal NPD

results in greater number, and most of them have none or a single sibling.

Regarding the association between family income and NPD, it was verified by the data on the participants in this study, that this was not a risk factor for questionable NPD, since most individuals obtained a normal result in the Denver II Test, different from what is found in the literature.<sup>23</sup>

When performing the Denver II Test, the area assessed that had the highest incidence of individuals with caution items, indicating worse performance of the function, was language, followed by the fine-adaptive motor area, social-personal and gross motor, the latter two being equal. Similar data, indicating a greater change in the language area, were found in a study conducted in the state of São Paulo (BR), which evaluated the NPD of children with CLP using the same test.<sup>8</sup>

The use of the Denver Test in the studied population proved to be adequate, quick to apply and easy to interpret. Regarding the relevance of its application, it is believed that, through the results obtained and the development milestones established by the instrument, more efficient therapeutic interventions can be performed. It is considered important to identify changes related to the child development process early, since from the detection of the risk of delay, intervention strategies can be established from the first years of life, thus preventing possible disorders.<sup>29</sup>

As for early speech therapy specific for children with CLP, it is understood that it should start from the neonatal period, going through the pre-surgical and continuing after the corrective surgeries of the lip and palate. Early care should be provided and the family members instructed on the treatment, aspects of oral hygiene, massages, food and speech and language stimulation, increasing understanding of the malformation.<sup>30</sup>

Early identification and treatment of language problems in this population is considered important, since it can prevent difficulties in the learning and socialization process, compromising the NPD.<sup>8</sup> This study, however, found a normal NPD in the developmental assessment applied to this population, which could be explained by the periodic and specialized follow-up provided to the participants from the first days of life, occurring weekly, biweekly or monthly, in which appropriate stimulation and instructions are provided.

## Conclusion

The variables studied showed a normal development in greater incidence among the studied population, which can possibly be justified by the specialized speech therapy service provided early and periodically to this group of children. The services offered involve perceptual stimuli and complex cognitive skills, instructions and specific interventions that assist the NPD process.

Questionable results, i.e., developmental risk, were present in the female sex, in the post-foramen clefts and in first born individuals, affecting more often the language area.

This study has limitations in terms of sample size and the reduced time required to perform data collection, therefore, new studies with a larger number of participants are recommended so that the results can be generalized. In addition, this study used only the Denver II Test for the assessment of NPD, and further studies with children with CLP using other instruments/tests are necessary in order to obtain a more complete and broad assessment of the development of this population.

## References

- 1 Martelli DBR, Machado RA, Swerts MSO, Rodrigues LAM, Aquino SND, Martelli Júnior H. Non sindromic cleft lip and palate: relationship between sex and clinical extension. *Braz J Otorhinolaryngol.* 2012; 78(5): 116-20.
- 2 Kuhn VD, Miranda C, Dalpian DM, de Moraes CMB, Backes DS, Martins JS, dos Santos BZ. Fissuras labiopalatais: revisão da literatura. *Disciplinarum Scientia| Saúde.* 2016; 13(2): 237-45.
- 3 WHO: World Health Organization. Global strategies to reduce the health-care burden of craniofacial anomalies: Report of WHO meetings on international collaborative research on craniofacial anomalies. [cited 2002]. Disponível em: <http://www.who.int/ncd/hgn/publications>. Acesso em: 04 de maio de 2020.
- 4 Luiza A, Góis DN, Santos JASS, Oliveira RLB, Silva LCF. A Descriptive Epidemiology Study of Oral Cleft in Sergipe, Brazil. *Int Arch Otorhinolaryngol.* 2013; 17: 390-4.
- 5 Nunes LMN, Queluz DP, Pereira AC. Prevalência de fissuras labiopalatais no município de Campos dos Goytacazes-RJ. *Rev Bras Epidemiol.* 2007; 10: 109-16.
- 6 Rodrigues K, Sena MFD, Roncalli AG, Ferreira MAF. Prevalence of orofacial clefts and social factors in Brazil. *Braz. oral res.* 2009; 23(1): 38-42.
- 7 Spina V, Psillakis JM, Lapa FS, Ferreira MC. Classificação das fissuras lábio-palatinas: sugestão de modificação. *Rev Hosp Clin Fac Med São Paulo.* 1972; 27(1): 5-6.





- 8 Cavalheiro MG. Habilidades do desenvolvimento infantil e linguagem de crianças com fissura labiopalatina. [dissertação]. São Paulo (SP): Universidade de São Paulo; 2016.
- 9 Monteiro FPM, Araujo TLD, Cavalcante TF, Leandro TA, Sampaio Filho SPC. Crescimento infantil: análise do conceito. *Texto & contexto enfermagem / UFSC*. 2016; 25(2): e3300014. Disponível em: [https://www.scielo.br/pdf/tce/v25n2/pt\\_0104-0707-tce-25-02-3300014.pdf](https://www.scielo.br/pdf/tce/v25n2/pt_0104-0707-tce-25-02-3300014.pdf). Acesso em: 04 de maio de 2020.
- 10 Lopes SMB, LOPES JMA. *Follow-up do Recém-Nascido de Alto Risco*. Rio de Janeiro: Medsi; 1999.
- 11 Frederickson MS, Chapman KL, Hardin JM. Conversational skills of children with cleft lip and palate: a replication and extension. *Cleft Palate Craniofac J*. 2006; 43(2): 179-88.
- 12 Broen PA, Devers MC, Doyle SS, Prouty JM, Moller KT. Acquisition of linguistic and cognitive skills by children with cleft palate. *J Speech Lang Hear Res*. 1998; 41(3): 676-87.
- 13 Tabaquim MLM, Joaquim RM. Avaliação neuropsicológica de crianças com fissura labiopalatina. *Arch Health Invest*. 2013; 2(5): 59-67.
- 14 Da Ré AF, Ribas LP, Machado MS, Cardoso MCAF. Relação entre os achados audiológicos e de consciência fonológica em um grupo de crianças com fissura labial e/ou palatina. *Distúrb Comun, São Paulo*, 2020; 32(2): 196-204.
- 15 Lancaster HS, Lien KM, Chow JC, Frey JR, Scherer NJ, Kaiser AP. Early Speech and Language Development in Children with Nonsyndromic Cleft Lip and/or Palate: A Meta-Analysis. *J Speech Lang Hear Res*. 2020; 63(1): 14-31.
- 16 Collett BR, Leroux B, Speltz ML. Language and early reading among children with orofacial clefts. *Cleft Palate Craniofac J*. 2010; 47(3): 284-92.
- 17 Frankenburg WK, Dodds J, Archer P. *Denver II: screening manual*. Denver Developmental Materials. 1990.
- 18 Barros L, Mistro CR. *Denver II: revisão sistemática*. Revista ENIAC Pesquisa. 2017; 4(1): 38-47.
- 19 Sabatés AL. *Denver II - teste de triagem do desenvolvimento - manual técnico* Editora: HOGREFE, 2013.
- 20 Vieira AR, Orioli IM. Birth order and oral clefts: a meta-analysis. *Teratology*. 2002; 66(5): 209-16.
- 21 Martelli DRB, da Cruz KW, de Barros LM, Silveira MF, Swerts MSO, Júnior HM. Avaliação da idade materna, paterna, ordem de paridade e intervalo interpartal para fissura lábio-palatina. *Braz J Otorhinolaryngol*. 2010; 76(1): 107-12.
- 22 Baroneza JE, de Faria MJSS, Kuasne H, do Val Carneiro JL, de Oliveira JC. Dados epidemiológicos de portadores de fissuras labiopalatinas de uma instituição especializada de Londrina, Estado do Paraná. *Acta scientiarum. Health sciences*. 2005; 27(1): 31-5.
- 23 Halpern R, Giugliani ER, Victora CG, Barros FC, Horta BL. Fatores de risco para suspeita de atraso no desenvolvimento neuropsicomotor aos 12 meses de vida. *Revista chilena de pediatria*. 2002; 73(5): 529-39.
- 24 Cachapuz RF. A influência das variáveis ambientais no desenvolvimento da linguagem em uma amostra de crianças. *Rev Assoc Med Rio Grande Do Sul*. 2006; 50(4): 292-301.
- 25 Pedroso FS. *Desenvolvimento neuropsicológico*. In: Cardoso MCAF. *Fonoaudiologia na infância*. Rio de Janeiro: Revinter; 2015. p. 1-19.
- 26 Nopoulos P, Berg S, Canady J, Richman L, Van Demark D, Andreasen NC. Structural brain abnormalities in adult males with clefts of the lip and/or palate. *Genet Med*. 2002; 4(1):1-9.
- 27 Jurado MRB. Habilidades do desenvolvimento global e comunicativo de crianças com fissura labiopalatina [dissertação], São Paulo (SP): Universidade de São Paulo; 2018.
- 28 Brito CML, Vieira GO, Costa MDCO, Oliveira NFD. *Desenvolvimento neuropsicomotor: o teste de Denver na triagem dos atrasos cognitivos e neuromotores de pré-escolares*. *Cad Saude Publica*. 2011; 27: 1403-14.
- 29 De Moraes MW, Weber APR, Oliveira MCS. *Teste de Denver II: avaliação do desenvolvimento de crianças atendidas no ambulatório do Projeto Einstein na Comunidade de Paraisópolis*. *Einstein (São Paulo)*. 2010; 8: 149-53.
- 30 Leite ICG, Simões AG, Clemente MCK, Martins LS, Bittar SA, Bittar CL, Mattos VS. *Fonoaudiologia hospitalar*. *J Bras Fonoaudiol*. 2003; 4(17): 1-6.

