Linguagem oral de crianças com cinco anos de uso do implante coclear*****

Oral language in children with a five years of use coclhear implant

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Abstract

Background: cochlear implant (CI) in children. Aim: 1) to delineate a profile of receptive and expressive verbal language of children who have been using cochlear implant for five years and five years and eleven months; 2) to verify the influence of time of auditory sensorial privation in the receptive and expressive verbal language of these children. Method: 19 children users of CI with auditory deficiency acquired before language development, who have been using CI for 5y - 5y11m and who have an average time of sensorial privation of 3y (standard deviation of 1 year). These children were assessed using the Reynell Developmental Scales (RDLS) (Reynell e Gruber, 1990) which is composed of: Comprehension Scale (C), Expression Scale (E) and its Structure Sub-Scales (Es), Vocabulary (Ev) and Content (Ec). Results: the median values and the values found for quartile 75 and quartile 25 were:.44, 57 and 54 for C; 48, 60 and 55 for E; 20, 21 and 20 for Es; 15, 19 and 17 for Ev; 15, 22 and 18 for Ec; 96, 116 and 108 for the total score. A statistical correlation between the time of sensorial privation and the score obtained for C (p= - 0.62; R= 0.0044) and Ec (p= - 0.48; R = 0.0348) was observed. Therefore the time of sensorial privation had an influence on the overall score (p= - 0.53; R = 0.0174). Conclusion: the language profile of children who use CI for five years is devious and similar to that of five year old hearing children regarding Expression and to that of four year old hearing regarding Comprehension; time of sensorial privation was statistically significant for the score obtained in C - receptive language - and for the score obtained in the E section (Ec) - expressive language, as well as in the overall score of RDLS.

Key Words: Cochlear Implant; Language; Hearing Loss; Child.

Resumo

Tema: implante coclear (IC) em crianças. Objetivo: traçar um perfil de linguagem oral receptiva e expressiva de crianças usuárias de implante coclear há cinco anos a cinco anos e onze meses; verificar a influência do tempo de privação sensorial na linguagem oral receptiva e expressiva dessas crianças. Método: 19 crianças deficientes auditivas usuárias de IC com deficiência auditiva pré-lingual, com tempo de uso do IC variando de 5a a 5a11m e média do tempo de privação sensorial de 3a (desvio padrão um ano) foram avaliadas por meio da Reynell Developmental Language Scales (RDLS) (Reynell e Gruber, 1990) que é composta pela Escala de Compreensão (C), Escala de Expressão (E) e suas Sub-Escalas Estrutura (Ee), Vocabulário (Ev) e Conteúdo (Ec). Resultados: a mediana e os valores do quartil 75 e quartil 25 encontrados foram: 44, 57 e 54 para C; 48, 60 e 55 para E; 20, 21 e 20 para Ee; 15, 19 e 17 para Ev; 15, 22 e 18 para Ec; 96, 116 e 108 para a pontuação total. Houve correlação estatística entre o tempo de privação sensorial e a pontuação de C (p = - 0,62; R = 0,0044) e Ec (p = - 0,48; R = 0,0348) tornando o tempo de privação influente na pontuação total (p = - 0,53; R = 0,0174). Conclusão: o perfil de linguagem das crianças usuárias de implante coclear há cinco anos é desviante e semelhante ao perfil das crianças ouvintes de cinco anos para a Expressão e ao das crianças ouvintes de quatro anos para a Compreensão; a influência do tempo de privação sensorial foi estatisticamente significante na pontuação da C - linguagem receptiva - e na pontuação de uma seção (Ec) da E - linguagem expressiva, sendo significante na pontuação total da RDLS.

Palavras-Chave: Implante Coclear; Linguagem; Deficiência Auditiva; Criança.

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Introduction

The oral language is the most effective mean of communication in our society.

The oral language is formed by aspects such as the oral comprehension and oral expression, having that the adequate development of the oral comprehension enables the development of the oral expression (Reynell and Gruber, 1990).

During the normal language development, the oral comprehension it is constituted since the child was born until the child is 5 years old, being that, after this period the language is going to be only preformatted. Mellon (2000) brings the consideration that children with no hearing impairment dominate almost all essential elements that are necessary for the children in order to be competent communicators in their idiom until the age of seven. This is called the critical period for the language development, which the duration is still being studied.

The critical periods are limited periods of the cerebral maturation, phases that must coincide with the exposition to certain sensory experiences; this will result in a fast acquisition of new abilities that are impossible or very hard of being acquired during other phases (Klein and Rapin, 2002). The auditory experiences combined with information from other senses promote the construction of oral language and concepts formation, in a way that the child begins to explore his/her environment more actively (Law et al., 2001). Reyner and Gruber (1990) present that is by mean of the hearing that the individual can comprehend the oral language, formulate concepts, relate them and at a later time, express them via speech, since he/she presents the articulatory capability.

In this way, it becomes evident the importance of the hearing for the development of oral language, then, any hearing loss interferes on the oral communication as a whole.

Regarding children with sensorioneural hearing loss acquired before language acquisition, the acquisition of oral language becomes hard. The cochlear implant (CI) represents a powerful tool for people with sensorioneural hearing loss (Mesquita et al., 2002; Banhara et al., 2004) and for these children becomes fundamental in the construction of oral communication. This occurs because, when electric stimulation is presented to the auditory nerve, the CI enables that the child with profound hearing loss acquired before language acquisition have access to the sounds which he/she was private before. According to Dowell and Cowan (1997), the most important contribution of the CI for the oral language acquisition is the fact that this dispositive enables access to the speech sounds and, this way, the development of the hearing abilities gradual phases.

Bevilacqua and Formigoni (2005), based on Boothroyd (1982), relate the gradual sequence of the hearing abilities: the auditory detection is the ability to perceive the presence and absence of sound; the auditory discrimination consists in the discrimination between two or more stimulus; the auditory recognition consists in classifying and naming what was heard, repeating or pointing; and finally, the auditory comprehension, which is the ability to answer questions, to retell stories and to follow instructions.

The CI, despite of being a powerful toll as treatment options for children with sensorioneural hearing impairment acquired before language acquisition, it is not simply a surgical procedure after which the child can be conducted, exclusively by his/her own electronic dispositive (Dowell and Cowan, 1997; O'Neill et al., 2002). Moret (2002) says that although the CI in children constitutes a multifactor process that occurs basically in three distinct phases: during pre surgical evaluation, at the surgical act and during the follow-up, being this last one included on the dispositive monitoring - that is, the verification of its functions and adequate programming - and the continuous re(habilitation). These phases are consisted by interacted facts: age of the child during activation, duration time of deaf, child's cognition and using time of the dispositive. Furthermore, participation of the family, specialized speech-language therapy and cognitive potential of the child for learning have also to be detached (Robbins et al., 2000; Geers, 2002; Bevilacqua et al., 2005). In this context, Santana (2005) highlights that the quality of social interactions has an important role at the construction of the child as a subject of language.

During the post surgical phase it is highlighted the importance of hearing and language monitoring of the children regarding different contexts, verifying whether the results are beyond expectance and, this way, identify the reasons and the solutions for the possible presented problems (Moret, 2002).

In order to verify whether the results of the CI during development are below expectance, comparison parameters are necessary, in order words, we must know the auditory and language

profile of the children, during their different development levels.

At the cochlear implant programs, the clinical routine for language and hearing investigation of the child with cochlear implant is composed by the people that takes care of the child and by the Speech-Language evaluation. Robins et al. (2000) relate that it is necessary that the evaluations include tests that are similar to real communication and not only tests that investigates the perception of isolated words because the language and the hearing of the child might be limited to an unique evaluated aspect. Furthermore, the objective of the cochlear implant and of the whole process of re (habilitation) of children presenting hearing impairment before language acquisition is the development of efficient oral language (Young and Killen, 2002). It is known that, according to theses authors, the language acquisition process seems to be deviant and not simply delayed regarding normality, however, there is still a lot to be researched on the development of oral language of child with cochlear implant. Santana (2005) points that although innumerous studies regarding the hearing of children with cochlear implant exist, just a few refer to language of these children.

Nowadays, the cochlear implants programs from around the world have been caring about the evaluation of the development of oral language of children with cochlear implants. In Brazil, oral language evaluation materials have been adapted to the Brazilian Portuguese: Macarthur Communicative Development Inventories (CDI'S) (Padovani and Teixeira, 2004); Reynell Developmental Language Scales (RDLS) (Fortunato, 2003). The RDLS is being frequently used because the fact of being an including evaluation of comprehensive and expressive language (Ritcher et al., 2002; Miyamoto et al., 2003).

The RDLS was elaborated by Reynell, around 1965, with the objective of evaluating the verbal comprehension and expression and investigate the different areas of the integration process of language. This scale considers the language evaluation of children between one year and six years and eleven months and it may be used on the language investigation of children presenting hearing impairment. The results are pointed and converted in mental ages, having as normality standard the language development in children with no hearing impairment. The aim of the evaluation with RDLS is to characterize the language of the children in order to direct the clinical-educational intervention of the child presenting language alterations.

Robins et al. (2000) based on Ross (1982) presented that one of the different ways of comparison that might be done in order to evaluate the language of implanted child is to compare her with a child with no hearing impairment of the same chronological age. The disadvantage of this type of comparison is based on the fact that the majority of the children with cochlear implant already present a significant language delay at the implantation and, although they benefit from the cochlear implant, these children will be always behind children with no hearing impairment.

Researches affirm that in the case of congenital deafness, after three years old, the sensorial privation time will probably impossibility the development of normal language (Bevilacqua et al., 2005). This way, the fact of the child with cochlear implant already presents a delay at age of implantation may be consequence of the time which she/he was private of the auditory sensorial stimulation.

Nowadays, thanks to the expansion of the selection criteria of the candidates to the surgery of the cochlear implant, more younger children are implanted (Ferrari et. Al.,). This comparison brings the fact that maybe no children is implanted in disadvantage: researches show that one child that is implanted precociously, before two years old, that is, with a smaller time of sensorial privation, may have the language performance of a child with no hearing impairments (James and Papsin, 2004; Schauwers et al., 2004; Manrique et al., 2004; Colletti et al., 2005. Padovani and Teixeira (2005) point that the importance of the intervention during the first years of life is on the fact that there is an important relation between the auditory perception of the initial linguistic activities and the development of speech.

Although these results may liven up, the researches cannot be concentrated only on the younger children and on more technologically advanced dispositive because, by innumerous reasons, children with hearing impairment are still being diagnosed late and not so advanced models are still used. Furthermore, there is the necessity to investigate the performance of the children through other aspects in order to obtain parameters to the clinical evaluation and a posterior direction on the (re) habilitation of the children implanted after a longer period of social privation.

One of these aspects to be investigated would be the time of CI use. It is known that the

performance of the implanted child still develops during many years of the activation of the dispositive (O'Neill et al., 2002).

Which would be the oral language profile of this group of children users of cochlear implant for a determined period whom were private of the auditory stimulation during a period longer than two years?

With the objective of answering these and other questions, it is necessary a study for description of the language of the children using cochlear implant by the mean of a large language protocol that is closer from real language, with the objective of knowing the oral language profile after a long period using the dispositive, in order that the programs of cochlear implant might have subsidy to redirect the speech-language pathology intervention and to the stimulation orientation to the parents regarding oral language.

The objectives of this research were:

1. To trace a receptive and expressive oral language profile of children with bilateral profound sensorioneural hearing loss acquired before language acquisition, users of cochlear implant from five years to five years and eleven months;
2. To verify the influence of the sensorial privation time on the receptive and expressive oral language of children users of cochlear implant from five years to five years and eleven months.

Method

This research was carried through the Centro de Pesquisas Audiológicas (CPA) - Center of Audiology Research of the Hospital de Reabilitação de Anomalias Craniofaciais (HRAC) - Hospital of Cranio-facial Abnormalities Rehabilitation of University of São Paulo (USP), campus of Bauru. The research had prior approval from the Ethical Committee of the HRAC/USP, as the protocol number 085/2004-UEP-CEP. All people responsible for the subjects of this research assented the accomplishment and the spreading of the results

Description of the subjects

Nineteen children with hearing impairment users of cochlear implants followed by the Cochlear Implant Program of the CPA-HRAC/USP Bauru were evaluated. All children presented hearing impairment before language acquisition. The duration of time of the use of cochlear implant at the time of evaluation varied between five years and five years and eleven months and the children were systematic users of the dispositive since the electrodes activation.

At the time of the surgical indication, the following indication criteria were adopted for children with hearing impairment before language acquisition: age between two and four years; auditory threshold without any device of sonorous amplification of 80 dB or higher at the frequencies of 500 e 1000 Hz, higher than 90 at the frequencies of 500, 1000, 2000 e 4000 Hz; adaptation of device of sonorous amplification with auditory threshold higher than 60 dB at the speech frequencies; incapacity of recognition of words in closed sets; auditory rehabilitation during the period of six months; adequate and motivation of the family for the use of cochlear implant and rehabilitation at the home town (Costa et al., 1996)

Among the 19 children that were evaluated, 2 were users of the IC Nucleus 24 RST from Cochlear Corporation with speech processor from Sprint and codification strategy ACE. Seventeen were users of the IC Combi 40+ from Medical Electronics with speech processor from CIS-PRO+ and codification strategy CIS. There was total insertion of the electrodes of all the children.

Regarding the etiology of hearing impairment, three children presented congenital rubles, three presented meningitis, three presented genetic etiology, two presented neonatal hypoxy, one has the Wanderburg Syndrome and the seven left presented unknown etiology.

Regarding social and economic levels of the families, seven were classified as level medium; four were classified as lower medium and eight as superior low.

In relation to the children's education (type and grade), all children were students of private schools, excepting five children whose families belong to a lower social and economic level. Regarding grade, all children until the moment of the evaluation were frequenting the respective grade for their age.

All children were inserted, at the moment of evaluation, in speech-language therapy of oralism type, that is, the one that empathizes the auditory stimulation in order to reach the acquisition and development of the oral language and the speech.

Table 1 contains the characterization of the children users of cochlear implants regarding age at implantation, sensorial privation time (period between the acquisition of the hearing impairment and the activation of the cochlear implant); current

Material

For the application of the scale Reynell Developmental Language Scales (RDLS) - American version (Reynell, 1990) adapted to the Brazilian Portuguese by Fortunato (2003) - it were used objects, miniatures and figures selected according to the objective of each evaluation section and the specific form for registration in which the answers of the child were written.

The RDLS is composed by the Comprehension Scale A and B and by the Expression Scale. In this research, the Comprehension Scale A was used. This scale is indicated for evaluation of children with motor deficit and/or the ones that present verbal answers.

The Comprehension Scale A is composed by 67 items, divided among 10 sections that evolve according to complexity. Each section evaluates one of the following aspects: prior verbal behaviors; two sections evaluate the capacity to relates the verbal denomination with the appropriate object; capacity to distinguish the male and the female as of people and animals; ability to assimilate and relates two verbal concepts; function of the objects and recognition of its use; capacity to perceive the "attribute" of the presented objects; comprehension of colors, sizes, quantities and space relation; ability to assimilate a great variety of concepts like names, verbs, adjectives and other speech "parts", together in a sentence; comprehension of questions that go beyond of the concrete evidence, that is, evaluation of the use of language as a vehicle to thinking, of the verbal reasoning.

The scale of Expressive Language is composed by 67 items that group themselves into three sections and each one evaluates one of the aspects of expressive language:

1. Structure- evaluates the structure since the first vocalizations until the appropriate use of the syntactic structure and verbs.
2. Vocabulary - composed by three subdivisions with crescent difficulties that evaluate the vocabulary of the child. The subdivision "objects" evaluates the nomination of objects; the subdivision "figures" evaluates the nomination of elements and actions of figures; the subdivision "words" evaluates the description of the internal concepts (what is an apple?).
3. Contents- evaluates the creative use of language to describe elements and actions presented in the figures.

The total score of RDLS is 134 points, that is, the sum of the 67 points of the Comprehension Scale plus the 67 points of the Expression Scale.

The procedure was done following instructions contained in the study conducted by Fortunato (2003) of the RDLS. In the Comprehension Scale, each item of each section correspond to a verbal order that was given to the child and the attention of the child, at that moment, was turned to that activity. When the answer was wrong or partially wrong, the order was not repeated and the result was considered negative. When there was no answer, the question was repeated only once and if no answer was given, the result was considered negative.

The Expression Scale was applied in different ways, following the aspect evaluated in each section. The section Structure was evaluated by mean of observation and spontaneous speech, each observed item corresponded to a point, in a total of 21 points. When it was not possible to complete all of the items of this section with the spontaneous speech of the child, it was proposed a play to elucidate conditional responses.

At the Vocabulary section, the children were asked to nominate specific items described on the material. Each observed item corresponded to a point, in a total of 22 points.

At the section Contents, the children were asked to speak about specific figures. Three aspects were pointed: base pointing, connected ideas and additional sentences, in a total of 24 points.

For Brazilian children with no hearing impairment, it is known until the present moment, the scores for children with four and five years old in the Expression Scale, obtained by the RDLS by Fortunato (2003) and Fortunato-Queiroz (2004). This way, greater and smaller scores for children of four years old in the Comprehension and Expression Scale are: 51-61 and 45-58 and for children with five years old, following the same order: 60-65 e 55-61.

It were used a Panasonic? VHS-C X300 video recorder and video tapes in order to registry the evaluation sections.

In order to obtain the audiology measures, a Midimate 622 from Madsen Electronics were used connected to an amplifier of open fields FF 70 and two acoustic boxes, calibrated in dB NPS. All procedure was done in an acoustic cabin measuring 2 meters by 2 meters.

Procedure

At the moment of application of the RDLS, the answers and /or scores to each item were written in a register form of RDLS. All children were video recorded for posterior analysis if necessary.

The appraiser was positioned beside the children, allowing oral-facial reading. Each child was evaluated separated, during one unique therapy and the duration time of the application of the scale was between 35 to 40 minutes.

In order to characterize the hearing threshold of the children using cochlear implants, the tonal audiometric in open space, researching the frequencies from 500 to 2000 Hz. The speech detection threshold was also evaluated.

The description of the receptive and expressive oral language profile of children with bilateral profound sensorioneural hearing loss acquired before language acquisition, users of cochlear implant for five years was done by mean of a quantitative analysis descriptive of the partial scores (items, sections and scales of RDLS) and total score on the RDLS Scale.

For the study of the influence of the sensorial privation time and the score in the evaluation scale of language RDLS of children users of cochlear implants it was used the Correlation Coefficient of Spearman, being considered a significance level of 5%.

Results

The mean of threshold in the frequencies of 500, 1000, 2000 and 4000 Hz and the speech detection threshold of children with cochlear implants were respectively 28 dBNA (standard deviation of 4,82) and 25 dBNA (standard deviation of 5,5).

In Table 2 there are the results of the RDLS scores of children with cochlear implants for five years.

In Table 3 there are the results of the statistical correlation between the sensorial privation time and the partial scores and total scores of the RDLS obtained with the children users of cochlear implants.

TABLE 1. Mean, standard deviation, quartile 25 and quartile 75 of the sensorial privation time, age of the children at electrodes activation, current age and period of time using the cochlear implant of the children

	Age at implantation	Sensorial Privation Time	Current age	Period of time of the CI use
Mean	3 years and 2 months	3 years	8 years and 9 months	5 years and 5 months
Standard deviation	9 months	1 year	11 months	3 months
Value of Q25	2 years and 7 months	2 years and 6 months	8 years and 1 months	5 years
Value of Q75	4 years	3 years and 11 months	9 years and 5 months	5 years and 9 months

TABLE 2. Medium, quartile 25 and quartile 75 of scores of children users of cochlear implants at the comprehension, expression, sub-scales of Expression Scale and total at RDLS.

	Mean	**Quartile 25**	**Quartile 75**	**Medium**	**Minimum**	**Maximum**
Comprehension Scale	51,36	44	57	54	37	61
Expression Scale	53,63	48	60	55	37	66
Sub-scale Structure	20,05	20	21	20	20	21
Sub-scale Vocabulary	16,10	14	18	17	13	21
Sub-scale Contents	17,47	14	21	18	4	24
Total Score	104,99	92	117	109	74	127

TABLE 3. Statistical Correlation between the score on RDLS and the sensorial privation time.

RDLS	**Statistical correlation with the sensorial privation time**	**R**
	P	
Comprehension Scale	-0,62	0,0044*
Expression Scale	-0,53	0,0854
Sub-scale Structure	-0,32	0,1766
Sub-scale Vocabulary	-0,32	0,1701
Sub-scale Contents	-0,55	0,0348*
Total Score	-0,53	0,0174*

R: correlation coefficient; P: significance level
*p ?0,05 statistically significant

Discussion

The mean of the audiometric threshold of the children with cochlear implant was 28 dBNA (SD=4,28) and the mean of the speech detection threshold was 25 dB (SD=5,5), allowing the hearing of the speech sounds and consequently the development of oral language. However, the results regarding the audiometric tests do not explain the variety of the results, that is, seems to exist or exist other factors that influence these developments as Young and Killen (2002) point.

The children that participated of this research had between eight and nine years old, carried through the cochlear implant surgery when they were between two and four years old. They were users of cochlear implants for five years and presented expressive and receptive oral language abilities (table 2) below expectance for children with no hearing impairments of the same age.

The value of the medium of the score (table 2) in the comprehension scale of RDLS for children with cochlear implants was 54 (between 37 to 61) similar to the performance of children with no hearing impairment of four years old of chronological age, whose scores varied between 51 and 61 in the study conducted by Fortunato (2003).

The medium value of the expression scale of the RDLS score for children with cochlear implant was 55 (between 37 and 66) similar to the performance of children with no hearing impairment with five years old of chronological age whose scores varied between 55 to 61 in the study conducted by Fortunato-Queiroz (2004)

It is important to highlight that there is only a few studies with homogeny groups of language regarding the amount of time of use of the cochlear implant at the literature. Among them, three studies investigate children with five years of cochlear implant use (Moog and Geers, 1999; Myamoto et al., 1999; Young and Killen, 2002). Young and Killen investigated language of a group of seven children users of cochlear implants for five years however, because of the small number of children it was no possible to make the statistical analysis and the generalization of the results to other groups of children users of cochlear implants.

Moret (2002) relates that maybe it would be possible, in the future, as this dispositive becomes a treatment alternative economically more accessible to the majority of the population, that studies with larger groups of implanted children with more homogeny characteristics less expensive would possibilities the visualization of all aspects relevant to the post surgical results.

The results of the present study agree with the ones founded by Young and Killen (2002). They evaluated a group of seven children with age ranging from eight and nine years old, users of cochlear implant for five years and related that they presented a significant language deficit in one or more areas of the language abilities regarding the children of same age with normal hearing. The semantic ability presented by these children was better than the syntactic and morphological abilities. The semantic ability was more evident on the expressive than on the receptive vocabulary.

The performance on the comprehension scale worst than the performance of the expression scale of RDLS (table 2) can be justified by the fact that the comprehension and execution of an order might be harmed if small parts of the message, as for example, connectives, could not be recognizable or identified (Reynell and Gruber, 1990). This difficulty of adequate perception of the linking elements happens with children with hearing impairment users of cochlear implant.

Reynell and Gruber (1990) relate that in prior studies in which there was the application of the RDLS scale in children with hearing impairment showed a different profile of language development for the children that presents hearing impairments regarding the children with normal hearing, To these children, the scores on the Comprehension Scale tend to be smaller than the scores on the Expressive Scale when these scales are compared using the normality to children with normal hearing.

When the performance on the expressive scale (table 2) is analyzed, we observe that the smaller score, that is, the bigger difficulties occurred on the sub-scale of vocabulary. Although the children are able to carry through the activities of objects and figure nomination, they present difficulty to describe the meaning of a word.

In this research, we observed that a great variety of the performance on the comprehension and expression scale among the evaluated subjects and a great variety among the performance of the same subject during different tasks; this data agrees with the studies of Robbins et al. (2000) and Young and Killen (2002).

For groups with the same period of time of cochlear implant use (5 years), Young and Kellen (2002) concluded that this variety among the

subjects suggests that the language abilities do not progress in an equal acquisition velocity for all subjects. This way, efforts must be expended in order to be possible to identify the causes of the performance of the children with lower scores, which, sometimes, becomes very hard since there is no way to determine when and what caused the language alterations.

The great variety among the children with cochlear implants for five years evaluated in this research regarding oral language abilities, was also found in other studies that evaluated children with no hearing impairment that presented language alterations (Robbins et al, 2000; Young and Killen, 2002).

It was not an objective of this research to verify the causes of the variety of the founded results, however, in the attempt of explain better this variety, it were canalized the relationships between the total score of RDLS and the social and economic level of the children. It was possible to verify that 3 of the 8 children of superior low social and economic level are on the Quartile 25. On the Quartile 75, are 3 of the 7 children with medium social and economic level. This way, it appears that for these children, a better social and economic level might be responsible for better scores. However, it was found no relationship between the social and economic= level and the total score on RDLS to the remaining children. This way, we cannot affirm that the social and economic level explains the variety of the results, maybe because of the small number of children evaluated to this type of research.

It is important to highlight that the quality and frequency of stimulation that the child receives from the environment might not be related to the social and economic level of the family. Moret (2002) points that the permeability of the family to the therapeutic process was a relevant factor on the hearing and language of the implanted children. However, the author did not investigate the relation among the permeability and the social and economic level of the families. It is necessary, this way, a study with a larger and more homogenous group of children in order to the environment regarding factors and its influences on the oral language can be better investigated.

Still trying to explain the variety of the results, the school aspects of the evaluated children were investigated (type and grade).

Regarding the type of the school, only 5 of the 19 children frequented public school at the moment of the evaluation. One of these children presented the third best score and the other two the fifth and the seventh score. Maybe because of the small number of children frequenting public schools it is not possible to observe a tendency of the type of school to explain the variety of the presented scores.

All of the children, until the evaluation moment, were frequenting the adequate grade to their age. This way, it is not possible to explain the variety of the results by this aspect. However, it seems that the oral language performance presented by the studied group, although similar to the performance of younger children, made possible their adjusted learning development. Which does not mean, however, that the children will not present future difficulties.

This way, the language development alteration of the hearing impaired children is much more than a simple language delay, and a lot of times, the alteration remains after a long period of using cochlear implant (Myamoto et al., 1999; Robbins et al., 2000; Yong and Killen, 2002). This language development alteration occurs including on children implanted before two years old. However, as time of using cochlear implant goes by, it might be possible that the children implanted at this age, reach the same language development as a child with no hearing impairment with the same chronological age (Manrique et al., 2004; Colletti et al., 2005).

The sensorial privation time (table 3) is one of the most important factors that interferes on the oral language development Geers, 2002; Bevilacqua et al., 2005) and may even be the main factor, considering the particularity of each case.

In this study, there was correlation statistically significant between the sensorial privation time and the total score of the RDLS Comprehension Scales and the Sub-Scale of Contents on the Expression Scale (table 3), which agrees with the literature: the negative statistical correlation between the sensorial privation time and the score on the RDLS indicates that smaller the sensorial privation time, better the performances of the children were (Myamoto et al. 1999; Robbins et al., 2000; Geers et al., 2002; Moret, 2002).

The hearing impaired children already present a significant language developmental delay regarding children with normal hearing when they receive the implantation; the neural structures might degenerate easily during the period of sensorial privation (Robbins et al., 2000; Moret, 2002). This way, children that receive implantation with a smaller sensorial privation time have better chances

of performance. As the age of the children advances, greater consideration has to be given to the complex combination of the aspects involved on the oral language development (Robbins et al., 2000; Moret, 2002).

The results of this study suggest that the language profile of children using cochlear implant for five years would seemed like the language profile of children with no hearing impairment with same chronological age of the use of the cochlear implant. However, in order to this data be generalized, it would be necessary the evaluation of a greater number of children using cochlear implant with this same characteristics and comparison with a greater control group of children with no hearing impairment.

As the language development is a continuum process and the children with cochlear implants continue to develop after several years of implantation (O'Neill et al., 2002; Moret, 2002), it would be necessary studies that would follow the oral language development of these children beyond this five years of using cochlear implant.

These studies maybe would indicate that as the years pass, these children reach the oral language profile of the same age children with no hearing impairment and that the sensorial privation time becomes to be less significant (Moog and Geers, 1999). These studies would also indicate other factor like specialized speech-language therapy, cognition style of the children, age of the children at implantation, sensorial privation

time, period of use of the dispositive, participation of the family that would favor the oral language development.

In the other hand, an investigation regarding younger implanted children with little time of sensorial privation is also necessary with the objective of studying the relation between the amount of time using the dispositive and the possible approximation to the oral language profile of these children to the oral language profile of the children with no hearing impairment. In these conditions, the harm of the severe/profound hearing loss would be considerably minimized.

Conclusion

. the oral language profile of children using cochlear implants for five years presented deviant and not simply delayed regarding normality. The comprehensive language was similar to the children with 4 years old with no hearing impairment; and the expressive language was similar to the children of 5 years old with no hearing impairment.

. the influence of the sensorial privation time was statistically significant on the score of the C - receptive language - and on the score of one section (Ec) of the expressive language being significant on the total score of the RDLS.

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