

Children's Listening with Cleft Lip and Palate in the School

Escuta de Crianças com Fissura Labiopalatina na Escola

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SUMMARY

- Introduction:** A great similarity between the patients with cleft lip and palate' behavior and those with auditory processing disorder are related by parents and professors.
- Objective:** To verify the listening in children with cleft lip and palate in six conditions of listening.
- Method:** Professors of 224 students (7 to 11 years old) with cleft completed a questionnaire aiming to judge the student listening in the noise, ideal condition, with multiple stimulus, in the silence, when it is solicited to remember the listened information and during a lengthy period of listening, comparing it to the other of the same age and listening condition, without cleft. A Prospective Study.
- Results:** The mean of the trial (-0,08, standard deviation of 0,27) of the students with cleft, performed by professor was about the "same difficulty" (zero), when compared with the student without cleft. It was not found statistical significance to anyone conditions, neither to the total value of the questionnaire, considering the gender nor the school year level.
- Conclusion:** The listening characteristics of the students with cleft lip and palate were similar to the other without this craniofacial deformity of the same age and similar listening condition. In the noise, the conditions more difficult occurred when the memory and the auditory attention were required.
- Keywords:** child, cleft palate, hearing, auditory perception.

RESUMO

- Introdução:** Grande similaridade entre o comportamento de pacientes com fissura labiopalatina e aqueles com transtorno de processamento auditivo são relatadas por pais e professores.
- Objetivo:** Verificar a escuta de crianças com fissura labiopalatina em seis condições de escuta.
- Método:** Professores de 224 escolares (7 a 11 anos) com fissura completaram um questionário, visando julgar a escuta do escolar no ruído, condição ideal, com múltiplos estímulos, no silêncio, quando solicitado recordar a informação ouvida e durante longo período de escuta, comparando-o ao de outro sem fissura de mesma idade e condição de escuta. Estudo Prospectivo.
- Resultados:** A média do julgamento (-0,08, desvio padrão de 0,27) dos alunos com fissura, realizado pelo professor, foi aproximadamente ao de "mesma dificuldade" (zero), quando comparado com o escolar sem fissura. Não foi encontrada significância estatística para qualquer uma das condições, nem para o valor total do questionário considerando os gêneros e as séries escolares.
- Conclusão:** As características de escuta dos escolares com fissura labiopalatina foram similares ao de outro sem esta malformação craniofacial de mesma idade e condição de escuta semelhante. No ruído, quando a memória e a atenção auditiva são requeridas foram as condições mais difíceis.
- Palavras-chave:** criança, fissura palatina, audição, percepção auditiva.

INTRODUCTION

Great similarity between the behavior of patients with cleft lip and palate and those with auditory processing disorders have been reported by researchers investigating the hearing abilities through the application of a questionnaire (1) and behavioral tests (2).

Auditory processing disorder refers to difficulties in perceptual processing of auditory information in the central nervous system. The problem may be exacerbated in unfavorable acoustic environments (3,4). Thus, children with this disorder are described by their parents and teachers as having difficulty listening in noise background, to follow oral instructions, as well as having difficulty understanding the distorted speech, speech in the presence of two speakers, for example, in situations of group discussion (3). This disorder is cited as a factor of 50% of Brazilian children, according to the Ministry of Education (MEC), which reach the end of high school with serious reading and writing (5). Thus, currently, the association between learning difficulties and changes in the development of listening skills has been emphasized in studies of auditory processing tests (6). Researchers (7) reported that children with dyslexia show changes of central neurological processing that can be detected by specific tests of auditory processing, as in functional imaging exam, such as SPECT (*Single Photon Emission Computed Tomography*).

A variety of behavioral informal procedures, designed for parents or teachers, has been developed to systematically investigate conduct that may be useful in determining whether a child should be referred for an evaluation of auditory processing (3,8).

Literature (9) has shown that much information from parents and / or teachers to help identify changes found in their children.

This study aims to determine the hearing of children with cleft lip and palate, through the trial of the teacher observing the characteristics of their students with this type of craniofacial malformation in silence, in ideal listening situation, in the presence of multiple stimuli, noise when asked to recall information and heard in a long period of listening.

METHOD

In order to compose the sample size of this cohort study with cross-section was selected patients with cleft type most frequently found in a hospital specializing in this

Table 1. Distribution of children according to age and gender.

| Gender | Age (years) | | | | | Total |
|--------|-------------|----|----|----|----|-------|
| | 7 | 8 | 9 | 10 | 11 | |
| Male | 17 | 29 | 46 | 38 | 11 | 141 |
| Female | 18 | 17 | 27 | 16 | 5 | 83 |
| Total | 35 | 46 | 73 | 54 | 16 | 224 |

craniofacial malformation. Therefore, to the universe of 800 children with cleft lip and palate involving the left, operated, of both genders, who were aged 7-11 years, regularly enrolled in the Hospital, and, attending class regularly, level from 1st to 4th grade was sent by mail a questionnaire to be delivered to her teachers, aiming at the objective proposed in this study. The same teacher may have worked with more than one child in different classrooms.

Guidelines for the purpose of the study, the completion of the questionnaire was provided in writing to teachers. Responded to 224 questionnaires returned, along with the completion of informed consent signed. Thus, teachers participated in this prospective study of 141 children was male and 83 female mean age of 9 years.

Table 1 shows the distribution of children according to age and gender.

The questionnaire was answered and the *CHAPPS - Children's Auditory Processing Performance Scale* (8) (Figure 1a and 1b) that was developed to systematically collect and quantify the characteristics of listening to children. It is a type questionnaire scale characteristics of listening to children. Its objective is to verify the trial of the characteristics of the teacher listens to students in six conditions / functions listening is in a quiet environment, noise, when the information is required remember hearing (auditory memory / sequence), and long periods of listening (auditory attention).

This instrument was chosen for these listening conditions are the most frequent complaints cited in the literature (8-10), parents and teachers of students who have auditory processing disorder.

Each of these six conditions / functions listening has different numbers of items, comprising 36 items in total.

Each item was asked to judge a teacher by degree of difficulty experienced only school with cleft lip and palate, comparing this child with the knowledge that the teacher has other children from school, the same age and similar condition, but without this craniofacial malformation.

CHAPPS-Children's Auditory Processing Performance Scale
Smoski et al. 1992

Child's Name:
 Birth date
 Schooling (grade):
 Informant:

Date:
 Current age:

PLEASE READ THE INSTRUCTIONS CAREFULLY

Answer all questions by comparing this to other children of similar age and education. Do not answer the questions based only on the difficulty of hearing condition. By example, all children 8 years old, to some extent, cannot hear and understand when they are in a noisy classroom. This would be a difficult condition to listen to all children. However, some children may have more difficulty in the viewing situation than others. You must judge whether or not this child has more difficulty than others in each listening condition cited. Please indicate with an X on each item in his trial, using the following responses:

LESS DIFFICULTY
SAME DIFFICULTY
MORE DIFFICULTY

Hearing condition - **NOISE**

If this child is listening in a room where there is background noise, such as TV, music, other people talking, children playing, etc.. This child has difficulty of hearing and understanding (compared to other children of similar age and education)

| | Degree of Difficulty | | |
|---|----------------------|------|------|
| | Less | Same | More |
| 1. If this child is paying attention he/she will have | () | () | () |
| 2. If you asked a question to this child he/she will have | () | () | () |
| 3. If given a simple instruction for this child he/she will have | () | () | () |
| 4. If given instructions complex and varied that child will have | () | () | () |
| 5. If this child is not paying attention he/she will have | () | () | () |
| 6. If this child is developing another activity like reading, coloring, etc.. he/she will have | () | () | () |
| 7. If this child is in a group with other children, he/she will have | () | () | () |

Hearing condition - **SILENT**:

If this child is listening in a quiet room (others may be present but are quiet), this child has difficulty hearing and understanding (compared to another child).

| | Degree of Difficulty | | |
|--|----------------------|------|------|
| | Less | Same | More |
| 8. If this child is watching it will have | () | () | () |
| 9. If you asked a question to this child he/she will have | () | () | () |
| 10. If given a simple instruction for this child he/she will have | () | () | () |
| 11. If given instructions complex and varied that child will have | () | () | () |
| 12. If this child is not paying attention he/she will have | () | () | () |
| 13. If this child is developing another activity like reading, coloring, etc.. he/she will have | () | () | () |
| 14. If this child is in a group with other children, he/she will have | () | () | () |

Figure 1a. CHAPPS Questionnaire - Children's Auditory Processing Performance Scale (8).

Hearing condition - IDEAL:

If this child is listening in a quiet room with no distractions, face to face with good eye contact, this child has difficulty hearing and understanding (compared to other children).

| | Degree of Difficulty | | |
|---|----------------------|------|------|
| | Less | Same | More |
| 15. If you asked a question for this child he/she will have. | () | () | () |
| 16. If given a simple instruction for this child he/she will have. | () | () | () |
| 17. If given a complex investigation, multiple this child will have . | () | () | () |

Hearing condition - MULTIPLE INFORMATION:

While many stimuli (e.g. visual, tactile, etc..) are present at the same time, this child has difficulty hearing and understanding (compared with one child).

| | Degree of Difficulty | | |
|--|----------------------|------|------|
| | Less | Same | More |
| 18. If this child is seeing the face of the speaker he/she will have | () | () | () |
| 19. If this child is listening to some stuff that's being read in loud voice by another child, he/ she will. | () | () | () |
| 20. If this child is hearing or seeing someone show a illustration as a drawing, information on the blackboard, he/she will have | () | () | () |

Hearing condition - MEMORY / FOLLOWING HEARING:

If this child is asked to remember spoken information, compared to other children this child:

| | Degree of Difficulty | | |
|---|----------------------|------|------|
| | Less | Same | More |
| 21. Immediately recalls information as a word, spell words numbers. | () | () | () |
| 22. Just remember simple instructions. | () | () | () |
| 23. Just remember complex instructions. | () | () | () |
| 24. Not only remember the information but also the orders and puts in the correct sequence. | () | () | () |
| 25. Can you remember the words spoken for an hour or more. | () | () | () |
| 26. Can you remember simple instructions spoken for an hour or more. | () | () | () |
| 27. Can you remember complex instructions spoken for an hour or more. | () | () | () |
| 28. Can you remember information said there are 24 hours or more. | () | () | () |

Hearing condition - AUDITORY ATTENTION:

If this child needs to pay attention for a long period, in what is being said, compared with other children, he/ she will:

| | Degree of Difficulty | | |
|---|----------------------|------|------|
| | Less | Same | More |
| 29. If you are listening for a period less than five minutes he/she will have. | () | () | () |
| 30. If you are listening for longer than 10 minutes he/she will have. | () | () | () |
| 31. If you can hear in a quiet room he/she will have. | () | () | () |
| 32. If you can hear in a noisy room he/she will have. | () | () | () |
| 33. If you can hear the information in the morning he/she will have. | () | () | () |
| 34. If you can hear in the evening he/she will. | () | () | () |
| 35. If you are listening in a room where success also visual distractions he/she will have. | () | () | () |

Figure 1b. CHAPPS Questionnaire - Children's Auditory Processing Performance Scale (8).

For each degree of difficulty was given a score corresponding to: (+1) less difficulty (0) same difficulty, and (-1) more difficulty, in which the teacher should mark the answer chosen.

To analyze the characteristics of listening in *CHAPPS*, considered the value obtained in each of the six listening conditions (mean values scored there), and the value obtained in its total *CHAPPS* total (sum of all items marked divided by 36). The results were analyzed by checking the responses separately for gender or grade, in the six listening conditions: noise, silence, in an ideal situation, the presence of multiple information when required to recall the information heard (memory / Following hearing) and long periods of listening (auditory attention).

This study was submitted to the Research Ethics Committee and obtained assent under the Protocol No 041/2003UEPCEP.

The collected data were entered into a spreadsheet program Excel (*Microsoft Corporation*), and subsequently imported into the Statistical Programme / *Statistica for Window-Stat Soft version 5.1. Inc.* Besides descriptive statistics (mean and standard deviation) was used to analyze differences between gender, grade and condition of listening to analysis of variance the three criteria and the Tukey test, adopting a significance level of 5% ($p < 0.05$).

RESULTS

Based on the results obtained in *CHAPPS* questionnaire, drafted to Table 2 and 3 showing the distribution of mean values and standard deviations for the children sampled, according to each grade and gender, according to the hearing condition, respectively.

The analysis of variance the three criteria showed no statistically significant difference between genders ($p = 0.130$) or between sets ($p = 0.555$), although only among listening conditions ($p < 0.001$) (Table 4).

DISCUSSION

The analysis of data from this study suggested that the average characteristics of the trial listening of the students held by teachers (average value of -0.08, SD = 0.27) was very close to zero, indicating "same difficulty. Thus, through this instrument, the teacher did not identify differences between the characteristics of students with cleft lip and palate with the other without this craniofacial malformation, watching them in the listening conditions outlined in the questionnaire. This finding is in agreement with previous studies (11) in the trial held by parents of children with cleft lip and palate, using the questionnaire *CHAPPS*.

Table 2. Mean values (standard deviations) at each hearing condition, according to school grade.

| Series | Hearing condition | | | | | | Chapps total |
|--------|-------------------|------------|------------|------------------|----------------|-------------------|--------------|
| | Noise | Silent | Ideal | Multiple Stimuli | AuditoryMemory | AuditoryAttention | |
| 1a | -,16(0,32) | -,03(0,33) | 0,11(0,41) | 0,09(0,41) | -,14(0,42) | -,07(0,26) | -,06(0,26) |
| 2a | -,17(0,30) | -,03(0,29) | 0,00(0,30) | 0,06(0,34) | -,14(0,37) | -,09(0,25) | -,09(0,24) |
| 3a | -,17(0,37) | -,06(0,34) | 0,04(0,39) | -0,03(0,42) | -,21(0,39) | -,13(0,34) | -,12(0,30) |
| 4a | -,19(0,37) | -,00(0,29) | 0,07(0,34) | -0,00(0,35) | -,06(0,38) | -,04(0,32) | -,06(0,27) |
| Total | -,17(0,34) | -,03(0,31) | 0,05(0,36) | 0,03(0,38) | -,14(0,39) | -,09(0,29) | -,08(0,27) |

$p=0,555$

Table 3. Mean values and standard deviations at each hearing condition according to gender (G).

| G | Hearing condition | | | | | | Chapps total |
|--------|-------------------|-------------|------------|------------------|----------------|-------------------|--------------|
| | Noise | Silent | Ideal | Multiple Stimuli | Auditorymemory | AuditoryAttention | |
| Female | -0,13(0,36) | -0,00(0,34) | 0,08(0,39) | 0,06(0,39) | -0,13(0,38) | -0,06(0,30) | -0,05(0,27) |
| Male | -0,20(0,32) | -0,06(0,30) | 0,03(0,34) | 0,08(0,38) | -0,15(0,40) | -0,10(0,29) | -0,10(0,27) |
| Total | -0,17(0,34) | -0,03(0,31) | 0,05(0,36) | 0,03(0,38) | -0,14(0,39) | -0,09(0,29) | -0,08(0,27) |

$p=0,130$

Table 4. Comparison between the listening conditions (Tukey test).

| Hearing condition | Average | Standard deviation |
|--------------------|-------------|--------------------|
| Noise | -0,17 (a) | 0,34 |
| Silent | -0,03 (c) | 0,31 |
| Ideal | 0,05 (d) | 0,36 |
| Multiple Stimuli | 0,03 (d) | 0,38 |
| Auditory memory | -0,14 (a,b) | 0,39 |
| Auditory attention | -0,09 (b,c) | 0,29 |

(Condition with the same letter has no statistically significant difference between them)

$p < 0.001$

With regard to the outcome of this study, the comparison between the listening conditions observed, the characteristics of listening to the children sampled in the condition of listening in noise, was the most difficult.

One of the most common complaints of individuals with auditory processing disorder is a problem processing under difficult listening conditions. When evaluated, many of these will do very well in a favorable situation. However, when the signals are distorted or degraded, often demonstrate significant difficulties due to the withdrawal of some of the inherent redundancy of the speech signal (12).

One method of reducing the redundancy of a speech signal is introducing a background noise (noise) with this sign. Thus, a listener with auditory processing disorder has difficulty in recognizing speech in noise (10).

In this sense the school is under heavy impact of various noises, which become invisible opponents to learning, in a location where the viewing situation should be much preferred. Thus, in an unfavorable situation in which there is competition between the teacher's speech and other noises, school performance may suffer interference (13). Researchers (14) believe the noise level found in schools is above the recommended values, this being a situation unfavorable listening, taking the child in need of greater attention to retain the spoken message.

Auditory memory is the ability to store and retain the auditory stimulus. Process that allows you to archive the information to be able to retrieve them when needed (15). Some auditory processing tasks require the child to retain information to formulate a response. Thus, auditory memory is essential to enable listening skills (16). The condition of when asked to recall information heard (auditory memory) was the second most difficult in this study.

The student with auditory processing disorder may demonstrate problems with listening comprehension, auditory discrimination, and auditory memory, figure-background auditory and auditory attention, among others (16).

Auditory attention is defined as a cognitive process that allows the listener to focus selectively on the stimulus of interest, while ignoring a competitive stimulus not relevant, limiting the amount of processed information to the intention (17). Learning depends on the attention that is associated with what is important, the meaning will influence the degree of attention (18). The condition for long periods of listening (auditory attention), this investigation has been among the more difficulty presented by the student.

When analyzing this work, the significant difference between the results obtained from the reactive behaviors due to the conditions of listening in noise, when the information is required remember hearing (auditory memory) and long periods of listening (auditory attention), in relation to other conditions, studies (19) have shown that exposure to loud noise can cause damage, such as decreased attention, but children can adapt to noise interference during the activities for filtering the noisy stimulus undesirable. They can use this strategy even when there is no noise, leading to their poor ability to sustain attention in the classroom, which may over time continue to affect attention, even in the absence of exposure noisy (*Medical Research Council* 1997) (20) could justify the difficulty of the students also provided when listening in silence.

Several key points were recorded on data obtained using this instrument with respect to the condition that the student listens with cleft lip and palate, considering that when compared to other work, (1) was applied in specific tests, confirms auditory attention problems, verbal memory, history of recurrent ear infections, high rates of learning disabilities, repetition rate and low educational attainment in this population.

The data found in this study support those of researchers (21, 22) who concluded that children with cleft lip and palate had difficulties in the auditory figure-ground and selective attention by means of the tests, suggesting that the assessment of auditory processing in battery hearing clinic for routine subjects with this malformation.

The trial of the teachers regarding hearing conditions submitted by the student, as having more problems (noise, memory and auditory attention) suggests that the children studied have to undergo an expert evaluation of auditory processing, in order that the alterations are common in children or adults with auditory processing disorders, the

child may not be able to interpret the sound, since that interpretation depends on auditory skills organized and structured linked to brain functions like memory and attention.

Thus, the inclusion of procedures, such as questionnaires, *checklist* in the investigation of changes in processing of auditory information, the battery of audiological clinic for routine subjects with cleft lip and palate, seems justified for better orientation in the diagnostic process, treatment and family, aimed not only improvements in academic performance, but also a better quality of life. Such procedures may provide valuable information regarding the real impact of hearing loss, helping in the process of differential diagnosis, but should not be overestimated, nor used for diagnostic purposes.

CONCLUSION

In this study the hearing of children with cleft lip and palate, as judged by the teacher of another child of similar age and hearing condition similar and not as the bearer of this craniofacial malformation evaluates CHAPPS, was practically similar. However condition had more difficulty in noise, when asked to recall the information heard (auditory memory) and for a long period of listening (auditory attention), for any of the genres and for all grades attended.

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