Questionnaire for use in the monitoring of auditory training results

Utilização de questionário no monitoramento dos resultados do treinamento Auditivo

Cuestionario para el uso en el seguimiento de los resultados del entrenamiento auditivo

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Abstract

Introduction. During the auditory training of an individual, it is important information about the auditory behavior of their daily lives. Objective. Monitor the auditory behavior through the use of Fisher's auditory problems checklist in individuals diagnosed with auditory processing disorder, who underwent auditory training. Methods. Participated 19 individuals, aged 12 to 15 years. These individuals were submitted individually to dichotic hearing auditory training, based on Dichotic Interaural Intensity Difference, proposed by Frank Musiek and organized into eight sessions, lasting 50 minutes each. Participants were divided into groups according to the functional changes in selective attention; in temporal processing; or evaluated in both hearing processes. Half of each group received intervention once a week and the other half, twice a week. The questionnaire used to monitor the auditory training presents 24 questions that provide data on the auditory behavior of the individual. The parent or guardian was asked to answer each question read by the examiner, marking an "X" in the complaints perceived in three stages: pre, mid and post-intervention. Results. There was statistical difference in the total score in all groups, reducing the score on complaints in the middle of training and at the end. Regarding the frequency of sessions, there was no difference

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between the groups, with complaints decreased, with similar scores. Conclusion. The questionnaire can be used to monitor the auditory behavior during a procedure.

Keywords: Speech Language Pathology and Audiology; hearing; hearing disorders; auditory perception

Resumo

Introdução:Durante o treinamento auditivo de um indivíduo, é importante obter informações sobre o comportamento auditivo de seu cotidiano. Objetivo. Monitorar o comportamento auditivo por meio do uso do Fisher's auditory problems checklist em indivíduos diagnosticados com distúrbio do processamento auditivo, que realizaram treinamento auditivo. Métodos. Participaram 19 indivíduos, com idade entre 12 a 15 anos. Estes indivíduos foram submetidos individualmente a treinamento auditivo de escuta dicótica, baseado no Dichotic Interaural Intensity Difference, proposto por Frank Musiek e organizado em oito sessões, com duração de 50 minutos cada. Os participantes foram distribuídos em grupos de acordo com as alterações funcionais em atenção seletiva; em processamento temporal; ou em ambos os processos auditivos avaliados. Metade de cada grupo recebeu intervenção de uma vez por semana e a outra metade, duas vezes por semana. O questionário utilizado para monitorar o treinamento auditivo apresenta 24 questões, que fornecem dados sobre o comportamento auditivo do indivíduo. O pai ou o responsável foi orientado a responder cada questão lida pela avaliadora, marcando com um "X" nas queixas percebidas em três momentos: pré, metade e pós-intervenção. Resultados. Houve diferença estatística no escore total em todos os grupos, diminuindo a pontuação sobre as queixas na metade do treino e também no final. Com relação à frequência das sessões, não houve diferença entre os subgrupos, tendo as queixas diminuído, com pontuação similar. Conclusão. O questionário pode ser usado para monitorar o comportamento auditivo durante uma intervenção.

Palavras-chave: *Fonoaudiologia; audição; transtornos da audição; percepção auditiva.*

Resumen

Introducción: *Durante el entrenamiento auditivo de un individuo, es importante obtener información sobre su comportamiento auditivo en la vida cotidiana.* ***Objetivo:*** *Monitorear el comportamiento auditivo mediante el uso de delFisher'sauditoryproblemschecklist en individuos diagnosticados con trastorno de procesamiento auditivo, que se sometieron a entrenamiento auditivo.* ***Métodos:*** *Participaron 19 individuos con edades entrelos 12 a los 15 años. Estos individuos fueron sometidos individualmente aun entrenamiento de audición dicótica, basado enelDichoticInterauralIntensityDifference, propuesto por Frank Musiek y organizado en ocho sesiones, con una duración 50 minutos cada una. Los participantes fueron divididos en grupos de acuerdo a los cambios funcionales en la atención selectiva; en el procesamiento temporal; o en ambos procesos auditivosevaluados. La mitad de cada grupo recibió la intervención una vez por semana y el otro medio, dos veces a la semana. El cuestionario utilizado para monitorear el entrenamiento auditivo presenta 24 preguntas que proporcionan datos sobre el comportamiento auditivo del individuo. Se pidió al padre o tutor para responder cada pregunta leída por la examinadora, marcando con una "X" las quejas que se perciben en tres momentos: pre, medio y después de la intervención.* ***Resultados:*** *Hubo diferencia estadísticamente significativa en la puntuación total en todos los grupos, y reducción de la puntuación a respeto de las quejas en el medio y al final. En cuanto a la frecuencia de las sesiones, no hubo diferencia entre los grupos, y hubo reducción de las,quejas con puntuaciones similares.* ***Conclusión:*** *El cuestionario puede ser usado para monitorear del comportamiento auditivo..*

Palabras clave: *Fonoaudiología; audición; trastornos de la audición; percepción auditiva.*

Introduction

In order to improve the auditory abilities of an individual with auditory processing disorder, it is necessary auditory training to improve how the brain handles with acoustic signal. In addition to auditory training, it is important to get information about the auditory behavior in individual's daily life [1,2].

Fisher's auditory problems checklist, developed in 1976, provides a comprehensive assessment of the general characteristics associated with various categories of auditory processing, such as listening, attention, memory, language and school performance.One of the versions of the questionnaire contains 25 items; the observer is instructed to put an "X" next to each item that is characteristic of the child's auditory behavior.The scoring is done by counting the number of unmarked items and multiplied by four.Research found that a score equal to, or below 72% (total score of unmarked items by parents) is a risk indication for auditory processing disorder[3,4].

This study aimed to monitor complaints regarding the auditory behavior in individuals who underwent auditory training in a soundproof booth.

The objective of this study was to monitor the auditory behavior through Fisher's auditory problems checklist for individuals diagnosed with auditory processing disorder, who underwent auditory training, in three stages of intervention: pre, during and post-intervention in groups with processing disorders in physiological mechanisms of selective attention and/or altered temporal processing.

Methods

The project was approved under number 304 548 by the Ethics Committee (Brazil Platform). Parents of volunteers signed the Consent Form and volunteers signed the Consent Form.

Casuistry

We selected 19 individuals, volunteers, aged 12 to 15 years, treated at Neuroaudiology Clinic of the Department of Speech. The level of education ranged from the 7th grade of elementary school to the 1st year of high school.

Inclusion criteria

Have auditory processing disorder, specifically in the physiological mechanisms of selective attention and / or temporal processing..

Exclusion criteria

Subjects with hearing loss and individuals who had auditory processing disorder and had been submitted to auditory training.

The subjects were divided into groups according to the auditory processes altered in the assessment; selective attention (closing and figure-ground), or temporal processing (resolution and temporal ordering), or both: GSATP (Group selective attention and temporal processing):six individuals with the physiological mechanisms of selective attention and temporal processing altered; GSA (Group selective attention): Six individuals with the physiological mechanism of selective attention altered; GTP (Group temporal processing): seven individuals with the physiological mechanism of temporal processing altered.

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Questionário - Fisher's auditory problems checklist for auditory processing evaluation (QFISHER)

This questionnaire identifies the auditory behavior in the perception of parents and / or teachers. The auditory functioning scale consists of 24 questions that provide data of behavioral difficulties presented in the individual's daily life. With this application, it sought to establish some relevant evidence that might indicate signs of deficits in relation to auditory processing. The parent and / or teacher are instructed to read each item, by inserting "X" in complaints by a teenager[5].

This questionnaire was translated and separated by sub-areas by the authors of this work, because it is a newer version of QFISHER[6,7]. In literature, in most studies found, it was used the old version of Fisher's auditory problems checklist for auditory processing evaluation version, which is composed of 25 questions, but the two versions of the questionnaire contained in the literature, titled "Fisher's auditory problems, checklist for auditory processing evaluation"[4,7].

The versions of the questionnaire differ in the order of presentation and in only two questions; in the old version, the first two questions were about hearing loss history and ear infection history; in the most current version, these two issues were replaced by a question about the difficulty of reading comprehension.

The total score (QFISHER-T) of the questionnaire was 24 points, one point for each marked item. In subareas, the score for aspects of hearing (QFISHER-hearing) was 9 points, attention (QFISHER- attention) was 5 points, memory (QFISHER-memory) was 3 points, language (QFISHER- language) was 4 points and school performance (QFISHER-performance school) was 3 points.

It must be emphasized that the scores in percentages analyzed in this work were marked with complaints by parents / guardians, unlike other studies in the literature, that measure the score through unobserved complaints[6,7.]

Behavioral hearing tests

Routine behavioral tests [8]were used for the evaluation of auditory processing in three stages: pre-auditory training period (T0), at half the auditory training, ie, after 4 sessions (T1), and after finishing the eight training sessions (T2).

The behavioral tests used for assessment and reassessment were: speech in noise (SIN); Staggered Spondaic Word (SSW), Random Gap Detection test (RGDT) and Duration Pattern Test (DPT). The tests used were those provided by CD recording [8,9,10]and applied in a soundproof booth with the use of a two-channel audiometer

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Therapeutic intervention

The auditory training proposed in this study was an adaptation of DIID training (Dichotic Interaural Intensity Difference) organized in eight sessions11. Each session was 50 minutes[12]. Dichotic tests were selected because of the approach chosen. The tests used in training were the digit Dichotic, nonverbal dichotic, synthetic sentences with competitive message (PSI / SSI), dichotic consonant-vowel and the Portuguese Sentence List (with contralateral message)[8,13.]

The frequency of the regularity of the sessions was also found, half of the subjects in each group received two sessions per week and the other half received a weekly session.

Statistical method

The tests used were the Mann-Whitney test, Friedman test and Wilcoxon test. A significance level of 0.12 (12%) was adopted because it is a low sample (less than 30 individuals). Confidence intervals were built with 95%..

Results

The descriptive statistics for the score QFISHER by group GSATP, GSA and GTP, and p value calculated for comparison are shown in Table 1 QFISHER-T,Table 2 for QFISHER-hearing, Table 3 for QFISHER-attention, Table 4 to the maximum of attention, Table 5 for QFISHER-memory, Table 6 for QFISHER- language, and Table 7 for the QFISHER- school performance.

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TABLE 1.COMPARISON OF QFISHER-T SCORE IN PERIODS OF PRE-TRAINING, HALF OF TRAINING SESSIONS AND POST-TRAINING BY GROUP

QFISHER-T		Mean	Median	Standard Deviation	N	IC	P-value
GASPT	T0	14,33 (59,71%)	14,0	2,42	6	1,94	0,002*
	T1	10,00 (41,66%)	10,5	2,10	6	1,68	
	T2	5,33 (22,20%)	5,0	1,37	6	1,09	

GAS	T0	15,33 (63,87%)	15,5	3,08	6	2,46	
	T1	10,50 (43,65%)	10,0	2,66	6	2,13	0,002*
	T2	6,17 (25,71%)	6,0	2,56	6	2,05	
GPT	T0	15,29 (63,70%)	16,0	2,50	7	1,85	
	T1	10,86 (45,25%)	11,0	1,95	7	1,45	0,001*
	T2	7,57 (31,54%)	7,0	1,27	7	0,94	

QFISHER-T		**T0**	**T1**
GASPT	T1	0,026*	
	T2	0,028*	0,026*
GAS	T1	0,027*	
	T2	0,028*	0,023*
GPT	T1	0,017*	
	T2	0,018*	0,017*

Friedman Test and Wilcoxon Test

Legend: QFISHER-T = Fisher questionnaire Total Score, GSATP = group selective attention and temporal processing; GSA = group selective attention; GTP = group temporal processing; T0 = pre-intervention period; T1 = period after intervention of four sessions; T2 = post-intervention period of eight sessions; n = number of individuals; CI = confidence interval; *= statistically significant

There was statistical difference in the total score in all groups when comparing all periods between each other, T0, T1 and T2. Therefore, those responsible for the volunteers noticed an improvement in the auditory behavior decreasing the difficulties already after 4 sessions of auditory training and further improving after eight sessions of auditory training

TABLE 2. COMPARISON OF QFISHER-HEARING SCORE IN PERIODS OF PRE-TRAINING, HALF OF TRAINING SESSIONS AND POST-TRAINING BY GROUP

QFISHER-HEARING		**Mean**	**Median**	**Standard Deviation**	**N**	**IC**	**P-value**
GASPT	T0	5,33 (59,22%)	5,5	1,63	6	1,31	
	T1	3,83 (42,55%)	4,5	2,32	6	1,85	0,004*
	T2	1,33 (14,77%)	1,5	0,82	6	0,65	
GAS	T0	5,33 (59,22%)	5,5	1,21	6	0,97	
	T1	3,67 (40,77%)	4,0	1,51	6	1,20	0,003*
	T2	1,17 (13,00%)	1,0	1,17	6	0,94	

GPT	T0	5,57 (61,88%)	5,0	1,72	7	1,27	
	T1	3,29 (36,55%)	3,0	1,38	7	1,02	0,001*
	T2	1,71 (19,00%)	2,0	0,95	7	0,70	

QFISHER-HEARING		**T0**	**T1**
GASPT	T1	0,039*	
	T2	0,023*	0,039*
GAS	T1	0,041*	
	T2	0,024*	0,024*
GPT	T1	0,017*	
	T2	0,017*	0,039*

Friedman Test and Wilcoxon Test
Legend: QFISHER-hearing =Fisher questionnaire hearing aspect; GSATP = group selective attention and temporal processing; GSA = group selective attention; GTP = group temporal processing; T0 = pre-intervention period; T1 = period after intervention of four sessions; T2 = post-intervention period of eight sessions; n = number of individuals; CI = confidence interval; *= statistically significant

The difficulties reported by parents in the auditory behavior in QFISHER-hearing decreased significantly as the auditory training sessions were being held in each group GSATP, GSA and GTP.

TABLE 3.COMPARISON OF QFISHER-ATTENTION SCORE IN PERIODS OF PRE-TRAINING, HALF OF TRAINING SESSIONS AND POST-TRAINING BY GROUP

QFISHER-ATTENTION		**Mean**	**Median**	**Standard Deviation**	**N**	**IC**	**P-value**
GASPT	T0	3,33 (66,60%)	3,5	0,82	6	0,65	
	T1	2,50 (50,00%)	2,5	1,05	6	0,84	0,005*
	T2	1,50 (30,00%)	1,0	0,84	6	0,67	
GAS	T0	3,83 (76,60%)	4,0	0,75	6	0,60	
	T1	3,00 (60,00%)	3,0	0,89	6	0,72	0,018*
	T2	2,50 (50,00%)	2,5	0,55	6	0,44	
GPT	T0	3,57 (71,40%)	4,0	0,79	7	0,58	
	T1	2,86 (57,20%)	3,0	0,90	7	0,67	0,003*
	T2	2,14 (42,80%)	2,0	0,69	7	0,51	

QFISHER-ATTENTION		**T0**	**T1**
GASPT	T1	0,059*	
	T2	0,026*	0,034*

GAS	T1	0,102*	
	T2	0,039*	0,083*
GPT	T1	0,059*	
	T2	0,015*	0,025*

Friedman Test and Wilcoxon Test

Legend: QFISHER-attention = Fisher questionnaire attention aspect; GSATP = group selective attention and temporal processing; GSA = group selective attention; GTP = group temporal processing; T0 = pre-intervention period; T1 = period after intervention of four sessions; T2 = post-intervention period of eight sessions; n = number of individuals; CI = confidence interval; *= statistically significant

The difficulties reported by parents in the auditory behavior in QFISHER-attention decreased significantly as the auditory training sessions were being held in each group GSATP, GSA and GTP.

TABLE 4. COMPARISON OF MAXIMUM PERIOD OF ATTENTION ASPECT IN PERIODS OF PRE-TRAINING, HALF OF TRAINING SESSIONS AND POST-TRAINING BY GROUP

Maximum period of attention		**Mean**	**Median**	**Standard Deviation**	**N**	**IC**	**P-value**
GASPT	T0	5,00	5,0	0,00	6	- x -	
	T1	10,00	10,0	5,48	6	4,38	0,011*
	T2	17,50	15,0	6,12	6	4,90	
GAS	T0	7,83	5,0	5,67	6	4,54	
	T1	7,83	5,0	5,67	6	4,54	0,002*
	T2	18,33	15,0	9,83	6	7,87	
GPT	T0	3,71	5,0	1,60	7	1,19	
	T1	4,14	5,0	1,46	7	1,08	0,003*
	T2	10,71	15,0	5,35	7	3,96	
Maximum period of attention		**T0**	**T1**				
GASPT	T1	0,083*					
	T2	0,020*	0,102*				
GAS	T1	1,000					
	T2	0,026*	0,026*				
GPT	T1	0,317					
	T2	0,026*	0,023*				

Teste de Friedman e teste de Wilcoxon

Friedman Test and Wilcoxon TestLegend:GSATP = group selective attention and temporal processing; GSA = group selective attention; GTP = group temporal processing; T0 = pre-intervention period; T1 = period after intervention of four sessions; T2 = post-intervention period of eight sessions; n = number of individuals; CI = confidence interval; *= statistically significant

In each of the groups there was statistically significant difference in the comparative study of the time that the individual could be fixed in the same task according to the parents, and this was called the maximum time period of attention. The biggest change was observed in GSATP and significant after 4 sessions and also after 8 sessions. In the GSA and GTP groups significant change in the maximum attention span on the same task occurred after 8 sessions. The maximum time observed for changes reached triple after auditory training

TABLE 5.COMPARISON OF QFISHER-MEMORY SCORE IN PERIDOS OF PRE-TRAINING, HALF OF TRAINING SESSIONS AND POST-TRAININGS BY GROUP

QFISHER-MEMORY		Mean	Median	Standard Deviation	N	IC	P-value
GASPT	T0	2,00 (66,66%)	2,0	0,89	6	0,72	
	T1	1,17 (39,00%)	1,0	0,75	6	0,60	0,018*
	T2	0,50 (16,66%)	0,0	0,84	6	0,67	
GAS	T0	2,67 (89,00%)	3,0	0,52	6	0,41	
	T1	1,33 (44,33%)	1,5	0,82	6	0,65	0,005*
	T2	0,67 (22,33%)	1,0	0,52	6	0,41	
GPT	T0	2,29 (76,33%)	2,0	0,76	7	0,56	
	T1	2,00 (66,66%)	2,0	0,58	7	0,43	0,037*
	T2	1,43 (47,66%)	1,0	0,53	7	0,40	

QFISHER-MEMORY		T0	T1
GASPT	T1	0,102*	
	T2	0,041*	0,102*
GAS	T1	0,039*	
	T2	0,024*	0,046*
GPT	T1	0,157#	
	T2	0,063*	0,102*

Friedman Test and Wilcoxon Test

Legend: QFISHER-memory = Fisher questionnaire memory aspect; GSATP = group selective attention and temporal processing; GSA = group selective attention; GTP = group temporal processing; T0 = pre-intervention period; T1 = period after intervention of four sessions; T2 = post-intervention period of eight sessions; n = number of individuals; CI = confidence interval; *= statistically significant; #= tendency to significance

Houve diferença estatística no QFISHER-memória em todos os grupos, no GASPT e GAS houve diferença estatística em todos os momentos comparados entre si; no GPT, houve diferença, quando comparamos o momento T0 com o T2 e comparando T1 com T2, o momento T0 ficou com a média próxima do T1.

As dificuldades de memória associadas ao comportamento auditivo diminuíram após o treinamento auditivo.

TABLE 6.COMPARISON OF QFISHER-LANGUAGE SCORE IN PERIDOS OF PRE-TRAINING, HALF OF TRAINING SESSIONS AND POST-TRAININGS BY GROUP

QFISHER-LANGUAGE		Mean	Median	Standard Deviation	N	IC	P-value
GASPT	T0	1,33 (33,25%)	1,0	0,52	6	0,41	
	T1	0,50 (12,50%)	0,5	0,55	6	0,44	0,009*
	T2	0,17 (4,25%)	0,0	0,41	6	0,33	
GAS	T0	1,50 (37,50%)	2,0	0,84	6	0,67	
	T1	0,83 (20,75%)	0,5	0,98	6	0,79	0,022*
	T2	0,50 (12,50%)	0,5	0,55	6	0,44	
GPT	T0	1,29 (32,25%)	1,0	0,95	7	0,70	
	T1	0,71 (17,75%)	1,0	0,49	7	0,36	0,082*
	T2	0,43 (10,75%)	0,0	0,53	7	0,40	
QFISHER-LANGUAGE		**T0**	**T1**				
GASP	T1	0,059*					
	T2	0,020*	0,157#				
GAS	T1	0,102*					
	T2	0,034*	0,157#				
GPT	T1	0,180					
	T2	0,109*	0,157#				

Teste de Friedman e teste de Wilcoxon
Legenda: QFISHER-linguagem = questionário Fisher aspecto linguagem; GASPT = grupo atenção seletiva e processamento temporal; GAS = grupo atenção seletiva; GPT = grupo processamento temporal; T0 = momento pré-intervenção; T1 = momento pós-intervenção de 4 sessões; T2 = momento pós intervenção de 8 sessões; N = número de indivíduos; IC = intervalo de confiança; *= estatisticamente significante; #= tendência a significância

There was statistical difference in memory aspect in all groups, in GSATP, there were differences when comparing T0 with T1 period, comparing the period T0 with T2 and a trend towards significance when compared with T1 and T2; in the GSA, there were differences when comparing the period T0 to T1 and T2 compared to T0 and a trend towards significance when compared with T1 and T2; in the GTP, there were differences when comparing the period T0 to T2 and a trend towards significance when compared with T1 and T2, the T0 period was next with mean to T1..

TABLE 7.COMPARISON OF QFISHER-SCHOOL PERFORMANCE SCORE IN PERIODS OF PRE-TRAINING, HALF OF TRAINING SESSIONS AND POST-TRAINING BY GROUP

QFISHER SCHOOL PERFORMANCE		Mean	Median	Standard Deviation	N	IC	P-value
GASPT	T0	2,33 (77,66%)	2,0	0,52	6	0,41	
	T1	2,00 (66,66%)	2,0	0,63	6	0,51	0,156#
	T2	1,83 (61,00%)	2,0	0,75	6	0,60	
GAS	T0	2,00 (66,66%)	2,0	0,63	6	0,51	
	T1	1,67 (55,66%)	2,0	0,52	6	0,41	0,082*
	T2	1,33 (44,33%)	1,5	0,82	6	0,65	
GPT	T0	2,57 (85,66%)	3,0	0,79	7	0,58	
	T1	2,00 (66,66%)	2,0	1,00	7	0,74	0,015*
	T2	1,86 (62,00%)	2,0	0,90	7	0,67	

QFISHER-PERFORMANCE		T0	T1
GASPT	T1		
	T2		
GAS	T1	0,157#	
	T2	0,102*	0,157#
GPT	T1	0,046*	
	T2	0,025*	0,317

Friedman Test and Wilcoxon Test

Legend: QFISHER-school performance =Fisher questionnaire school performance aspect; GSATP = group selective attention and temporal processing; GSA = group selective attention; GTP = group temporal processing; T0 = pre-intervention period; T1 = period after intervention of four sessions; T2 = post-intervention period of eight sessions; n = number of individuals; CI = confidence interval; *= statistically significant; #= tendency to significance

There was statistical difference in school performance between GSA and GTP. In the GSA there was no difference when we compare the period T0 to T2 and a trend towards significance when compared with T1 and T2 compared T0 and T1; in the GTP, there were differences when comparing the period T0 to T2 and comparing T0 to T1, T1 period was next with mean to T2.

The auditory behavior reported by parents through a questionnaire showed decrease of the difficulties observed in several aspects: auditory, attention, memory and school performance after 8 sessions of auditory training.

Fisher questionnaire data (total score) were also obtained in three different periods of intervention, considering the variable one or two sessions per week.

Each group was divided into two subgroups according to the auditory training: once a week, have numbered "1", and two times per week, have numbered "2". Thus, it was six groups.

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TABLE 8. MEAN VALUES OF HITS IN TOTAL SCORE FOR INDIVIDUALS BY GSATP, GSA AND GTP GROUPS

Questionnaire	Groups	T0	T1	T2	p value	Difference (T2-T0)
QFISHER-T	GASPT2	14,00 (58,33%)	9,00 (37,50%)	5,30 (22,08%)	0,050*	8,70
	GASPT1	14,67 (61,12%)	11,00 (45,83%)	5,33 (22,20%)	0,050*	9,34
QFISHER-T	GAS2	17,67 (73,62%)	11,33 (47,20%)	6,67 (27,79%)	0,050*	11,00
	GAS1	13,00 (54,16%)	9,67 (40,29%)	5,67 (23,62%)	0,050*	7,33
QFISHER-T	GPT2	16,00 (66,66%)	12,00 (50,00%)	7,67 (31,95%)	0,050*	8,33
	GPT1	14,75 (61,45%)	10,00 (41,66%)	7,50 (31,25%)	0,018*	7,25

Friedman Test
Legend: GSATP = group selective attention and temporal processing; GSA = group selective attention; GTP = group temporal processing; T0 = pre-intervention period; T1 = period after intervention of four sessions; T2 = post-intervention period of eight sessions; QFISHER-T = Fisher questionnaire Total Score; % = percentage

TABLE 9. P VALUE CALCULATED TO COMPARE THE QUESTIONNARIE PERFORMANCE IN THREE PERIODS T0, T1, T2 BY GROUP

Tests	Groups	T0 X T1	T0 X T2 (p valor)	T1 X T2 (p valor)
QFISHER-T	GASPT2	(p value)	T0 X T2	0,102*
	GASPT1	(p value)	T1 X T2	0,109*
QFISHER-T	GAS2	(p value)	0,109*	0,102*
	GAS1	0,109*	0,109*	0,083*
QFISHER-T	GPT2	0,109*	0,109*	0,109*
	GPT1	0,109*	0,109*	0,063*

Wilcoxon Test
Legend: GSATP = group selective attention and temporal processing; GSA = group selective attention; GTP = group temporal processing; T0 = pre-intervention period; T1 = period after intervention of four sessions; T2 = post-intervention period of eight sessions; QFISHER-T = Fisher questionnaire Total Score

There was a statistically significant improvement in scores in GSATP, GSA and GTP groups, according to the presence of auditory training in two sessions per week or auditory training in one session per week obtained in QFISHER-T. This improvement has been observed in half the training (after 4 sessions) and at the end of training (after 8 sessions).

Discussion

The questionnaire used in this study was Fisher's auditory problems checklist for auditory processing evaluation[4], his objective was to monitor complaints of auditory behavior related to auditory processing disorder.

This was translated by the authors of this work, as in the literature were found few studies with this questionnaire, and in most of the studies found it was used the old version of Fisher's auditory problems checklist for auditory processing evaluation version, which is composed of 25 questions. The version of the questionnaire in this study is a more recent one and has 24 questions. On account of the differences between the questionnaires, we decided to compare the data of this study with the literature.

As for the total score (QFISHER-T), it was observed a decrease in complaints as the number of sessions increased with statistical significance in all groups: GSATP, GSA and GTP.

In this study, at the period T0, all groups in QFISHER-T had a mean percentage that is considered a risk for auditory processing disorder (higher than 28% the total score of the items marked by parents) according to the literature[6,14]. In the period T2, there was a reduction in complaints and the percentages were close to the cutoff point. Given these results, we can say that the auditory training had a positive effect on the perception of parents and guardians when dealing with aspects of auditory behavior, either in their home environment or school environment, because many of the guardians reported improvement and reduction of complaints by the school.

As for QFISHER-hearing scores, QFISHER-attention and QFISHER-memory, it was observed a decrease in complaints as the number of sessions increased, with statistical significance in all groups: GSATP, GSA and GTP.

The improvement of hearing, memory and attention aspects are justified by the fact that they are interconnected, because attention is described as the ability of the individual to select a relevant stimulus and inhibit stimuli that do not seem important [15]and memory is involved in many aspects of daily life and the way it is used depends on the experiences of the individual[16]. These two aspects are essential for cognition and learning. For the hearing training itself and to conduct various activities, an individual needs to hear the requests, to pay special attention to information retention and rely on the information stored by the memory of how it should be done.

As for QFISHER-language score, it observed a decrease in complaints after the first four sessions of auditory training with statistical significance in all groups: GSATP, GSA and GTP.The hypothesis that the complaints are not reduced by the end of the eight training sessions, is that the language is very extensive, their complaints may be related to auditory processing, but may also be related to other factors, such as lack of stimulation, delay or some disorder[17,18]and this part of the questionnaire involved aspects that have not worked in the intervention and have not been investigated in a more profound way, for example, the difficulty in reading and writing.

In score of the QFISHER- school performance, it was found that in the GSATP there was no decrease in complaints during auditory training and in the GSA and GTP there was a decrease in complaints over the eight sessions of auditory training with statistical significance.The justification for not improving complaints in GSATP in the school performance aspect, can be understood by the fact that it is the only group with changes in two physiological mechanisms, so had higher learning difficulties; these difficulties were reported by the guardians, more intensely and frequent than in the other groups.

There is no data in the literature that relate the questionnaire of this study with some form of speech therapy.

There was a significant improvement in the QFISHER-T groups, regardless of whether sessions occurred once or twice a week. This improvement has been observed in half of the training and at the end of it.

Also, there is no data in the literature that depict the frequency of sessions. Further work should be done to check the limits of realization of one or two sessions per week, especially in the life history of individuals with auditory processing disorders.

Fisher's auditory problems checklist for auditory processing evaluation answered by parents about the difficulty of auditory behavior showed evidence of decreasing these difficulties in situations of daily life after the auditory training.

This evidence is very important because the use of this questionnaire can help speech language

therapists and teachers at a screening of auditory processing, increasing the possibility of early diagnosis and interventions.

Conclusion

Fisher's auditory problems checklist for auditory processing evaluation can be used to monitor the auditory behavior before, during and after auditory training.

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