PHONOLOGICAL CHANGES OBTAINED BY TREATMENT BASED ON ABAB-WITHDRAWAL AND MULTIPLE-PROBES APPROACH IN DIFFERENT SEVERITY LEVELS OF PHONOLOGICAL DISORDERS

As mudanças fonológicas obtidas pelo tratamento com o modelo ABAB-Retirada e Provas Múltiplas em diferentes gravidades do desvio fonológico

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ABSTRACT

Purpose: to analyze the phonological changes obtained (phonological system, phonetic inventory and distinctive features alterations) pre and post-treatment by ABAB-Withdrawal and Multiple Probes Approach in different severity levels of phonological disorders. **Method:** the diagnosis was determined by the phonoaudiological evaluation in eight children with different severity level of phonological disorders, whose average age was 5:5 in the beginning of the treatment. All of them were treated by ABAB-Withdrawal and Multiple Probes Approach. It was analyzed the phonetic inventory, phonological system and distinctive features alterations. **Results:** all severity levels of phonological disorders demonstrated some improvement in the phonological system. **Conclusions:** the severe phonological disorders presented the highest improvement among the different levels.

KEYWORDS: Articulation Disorders; Speech, Language and Hearing Sciences; Speech Therapy

INTRODUCTION

In Brazil, clinical research presented some approaches to treat phonological disorders [1-12], contributing to establish analysis patterns and speech-language intervention. It determines higher speed and efficacy of therapy with children with phonological disorders through phonological models.

These models are widely used, producing important and varied generalizations. The generalization is the most important criteria to measure the success obtained with the treatment.

The ABAB-Withdrawal and Multiple Probes Approach [13], applied in Brazilian Portuguese and used in this study help the development of research about the phonological system pre- and post--treatment in different phonological disorder levels.

This model is based on the distinctive features implicational hierarchy to choose the target sounds used in the treatment.

The principles of the treatment based on the distinctive features implicational hierarchy confirm the hypothesis that the treatment of sounds which are considered more difficult, which represent the most complex distinctive features of the hierarchy, would be positive to wide changes in the children phonological systems.

Recent studies [1-3,8,9,11,12] which applied the ABAB-Withdrawal and Multiple Probes Approach verified their validity with children who present phonological disorders, because it promoted speech intelligibility improvements and it enabled the occurrence of generalizations in all phonological disorders degrees of severity.

Other therapy models with phonological basement such as Maximum Oppositions [4], Minimal Oppositions, Multiple Oppositions [5] and Modified

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Cycles [6,14] verified the efficacy of the treatment comparing different phonological disorders degrees of severity. However, there are no studies which present the efficacy of the treatment through the ABAB-Withdrawal and Multiple Probes Approach comparing the development in different phonological disorders degrees of severity.

The analysis of children development using therapy models with phonological basement in different phonological disorders severity degrees may help clinical practice and contribute to the creation of therapy models which are proper for each case.

The purpose of this study is to analyze the phonological changes obtained (phonological system, phonetic inventory and distinctive features alterations) pre and post-treatment using the ABAB-Withdrawal and Multiple Probes Approach in different phonological disorders degrees of severity.

METHOD

This research is cross-sectional, prospective in which the phonological disorder is dependent variable and the results of the phonetic inventory, phonological system and distinctive features alterations are the independent variables.

The sample of the study consists of speech data of eight subjects with phonological disorders, four male and four female. The average age in the beginning of the treatment was 5:5. All subjects presented altered phonological systems when compared with the adult pattern of Brazilian Portuguese in children. The phonetic representations of adults occur in the Brazilian Portuguese which is spoken in Rio Grande do Sul state, in a city called Santa Maria. All subjects were received in a school clinic of a university, for four months.

The subjects were submitted to phonological evaluation, including anamnesis, evaluations of receptive and expressive language, oral sensory--motor oral system, psychomotricity, hearing discrimination and phonology were carried out, in addition to audiological, otorhinolaryngological and neurological evaluations.

In the choice of subjects, it was used as fundamental criteria that the individuals did not present significant alterations in the performed evaluations, except in the phonological evaluation. This last evaluation revealed disorders in the phonological level and reduced phonetic inventory

For the data analysis, it was performed the contrastive analysis and the analysis through distinctive features. The contrastive analysis, in this case, is the comparison between the child's phonological system and the pattern adult system. The subjects' phonetic inventory or their articulatory skills was delimited. To determine the presence of the sound in the phonetic inventory, it was considered at least two occurrences of it.

The contrastive analysis has the register of occurrences and possibilities of substitutions and omissions of the sounds produced by the child, calculating the percentages. With this register, it was determined the children phonological system, considering the following criteria [15]: 80% or more of the sound occurrences produced correctly by the child – the segment is considered as established; between 40% – 79% of the sound occurrences produced correctly – the segment is considered as partially established; between 0% – 39% of sound occurrences produced correctly by the child – the sound is considered as non-established.

The substitutions of sounds allowed the identification of distinctive features whose alterations would imply the difference between the subjects' system and the adult pattern system. The present study is based on the Feature Geometry proposed by Clements & Hume (1995).

So, the occurrence of altered distinctive features higher than 15% was registered. The percentage of 85% of sound correct production was considered as feature acquisition criteria. According to these criteria, it was determined which features and segments were present and absent in the children inventories.

The severity of the phonological disorder was determined after the data obtained through the contrastive analysis, identified through the Percentage of Consonants Correct (PCC) [16]. The sample was divided in four groups with different degrees of phonological disorder severity, according to the PCC. Each group consisted of two subjects with the same severity degree. The groups were: severe disorder (SD), moderate severe disorder (MS), mild-moderate disorder (MM) and mild disorder (MD), organized regarding sex and age.

The ABAB-Withdrawal and Multiple Probes Approach [13], used in this research, consisted of speech data collection (A1), performed through spontaneous speech recording and spontaneous naming. For these procedures, the instrument Phonological Assessment of Child was used [17]. Then, the altered distinctive features were identified and, after that, the therapy target sound was delimited.

The therapeutic intervention started in the first cycle of the treatment (B1). It lasted about five weeks (nine sessions), with two speech-language therapy sessions a week (45 minutes each). Next, there was the Period of Withdrawal (A2) – a period without any therapy which lasts around three weeks. This period

has the purpose of observing the obtained generalizations. During this period, the Generalization Tests (G.T.) were applied and the samples of the subjects' spontaneous speech were collected. So, successively, the treatment continued with the new cycle (B2), which lasted five weeks, as previously explained, followed by another Period of Withdrawal (A3), which had two weeks of duration.

The performance of the subjects was evaluated during the Period of Withdrawal through the G.T. The test was managed before the beginning of the therapy. It corresponded to the initial speech data collection. It was applied again after the end of each therapy cycle and in the end of this period, that is before the beginning of the next cycle of therapy.

All subjects agreed in participating in this research and in showing their results according to the resolution 196/96 (BRASIL. Resolution MS/CNS/CNEP n. 196/96 on October, 10, 1996). The Project was approved by the institutional Ethics Committee of the Health Sciences Center, n. 059/2002.

Comparing the findings pre- and post-therapy among the different disorder severity levels, the Fischer's Exact Test was used. In the analysis of the findings pre- and post-treatment for all subjects, regardless their disorder severity level, the Wilcoxon Test was used. It was considered $p<0.05$.

RESULTS

Figure 1 presents the sound substitutions which characterize the number of distinctive features alterations, the sounds which are absent in the phonetic inventory of the studied subjects, regardless the level of severity of the phonological disorder.

GROUP	SUBJECT	Phonetic Inventory Absent Sounds		Phonetic Inventory Absent Sounds		Phonological System Present Sounds	
		Pré	Pós	Pré	Pós	Pré	Pós
SEVERE	S1	45	17	8	3	9	20
	S2	76	1	6	0	3	37
MODERATE SEVERE	S3	15	16	2	0	18	21
	S4	25	9	2	0	19	28
MILD MODERATE	S5	25	7	4	0	20	31
	S6	17	1	4	0	23	36
MILD	S7	13	3	0	0	30	34
	S8	11	2	0	0	31	39
AVERAGE		28.375	7	3.25	0.375	19.125	30.75
STANDARD DEVIATION		22.08385	6.524678	2.815772	1.06066	9.553421	7.206148
MEDIAN		21	5	3	0	19,5	32,5

Figure 1 – Phonological system, phonetic inventory and distinctive features alterations pre- and post-treatment of the eight studied subjects

Subject 1 (S1) presented alterations in the following distinctive features pre-treatment: [- sonant] → [+sonant] (1), [+approximant]→[-approximant] (4), [- vocoid] → [+vocoid] (6), [+voiced] → [-voiced] (1), [+ continuous] → [- continuous] (4), [- continuous] → [+ continuous] (6), point of consonant (PC) labial → coronal + anterior (3), PC labial → dorsal (4), PC coronal [-anterior] → [+anterior] (4), PC coronal → dorsal (6), PC coronal [+ anterior] → vowel point (VP) coronal [- anterior] (4), PC dorsal → VP coronal [+ anterior] (1), complex segment (CS) → ø PC coronal [+anterior] → VP coronal [- anterior] (1).

The substitutions which characterize these features alterations were preferably: /r/→[j], /l/→[j], /d/→[j], /n/→[j], /ʃ/→[k].

Subject 2 (S2) presented alterations in the following distinctive features pre-treatment: [- sonant] → [+ sonant] (6), [+ approximant] → [- approximant] (4); [- approximant]→ [+ approximant] (3), [- vocoid] → [+ vocoid] (9), [+voiced] → [-voiced] (5), [+ continuous] → [- continuous] (5), [- continuous] → [+ continuous] (8), PC coronal [-anterior] → [+anterior] (2), PC dorsal → coronal (1), PC labial → VP coronal [-anterior] (1), PC coronal [+ anterior] → VP coronal [- anterior] (5), PC dorsal → VP coronal [-anterior]

(1) , ø PC labial (4), ø PC coronal + anterior (3), ø PC coronal – anterior (3), ø PC dorsal (2), SC → ø PC coronal [+anterior] → VP coronal [- anterior] (2), – glottis constriction→ + glottis constriction (12).

The substitutions which characterized these features alterations were preferably: /b/→[j], /l/→[j], /d/→[j], /g/→[j], /n/→[j], /l/→[j], /r/→[j], /p/→ [ʔ], /b/→[ʔ], /t/→[ʔ], /d/→[ʔ], /k/→[ʔ], /g/→[ʔ], /f/→[ʔ], /v/→[ʔ], /s/→[ʔ], /ʃ/→ [ʔ], /ʒ/→[ʔ].

Subject 3 (S3) presented alterations in the following features pre-treatment: [+voiced] → [-voiced] (9), [+ continuous] → [- continuous] (1), PC coronal [+ anterior] → [-anterior] (3), [- glottis constriction] → [+ glottis constriction] (2).

The substitutions which characterized these alterations were preferably: /b/→[p], /d/→[t], /v/→[f], /z/→[ʃ], /z/→[s], /ʒ/→[ʃ], [dʒ]→[tʃ], /k/→[ʔ], /g/→[ʔ], /s/→[ʃ], /s/→[ʃ], /z/→[ʃ].

Subject 4 (S4) presented alterations in the following distinctive features pre-treatment: [+ approximant]→ [- approximant] (5), [- vocoid] → [+ vocoid] (5), [+voiced] → [-voiced] (4), [- continuous] → [+ continuous] (2) PC [coronal + anterior] → [-anterior] (2), PC [dorsal] → [labial] (1), PC [dorsal] → [coronal] (1), PC [coronal + anterior] → VP [coronal – anterior] (3), PC [dorsal] → VP [coronal –anterior] (1), SC → ø PC [coronal +anterior] → VP [coronal – anterior] (1).

The substitutions which characterized these alterations were preferably: /ʀ/→[j], /l/→[j], /ʎ/→[j], /r/→[j], /r/→[j], /z/→[ʃ], /ʒ/→[ʃ], [dʒ]→[tʃ].

Subject 5 (S5) presented alterations in the following distinctive features pre-treatment: [+ approximant]→ [- approximant] (2), [- vocoid] → [+ vocoid] (2), [+voiced] → [-voiced] (7), [+ continuous] → [- continuous] (7), [- continuous] → [+ continuous] (1), PC [coronal –anterior] → [+anterior] (3), PC [coronal + anterior] → VP [coronal – anterior] (1), CS → ø PC [coronal +anterior] → VP [coronal – anterior] (1), CS → ø VP [coronal – anterior] → PC [coronal + anterior] (1).

The substitutions which characterized these alterations were preferably: /b/→[p], /d/→[t], /g/→[k], /v/→[f], /z/→[t], /ʒ/→[t], [dʒ]→[tʃ], /s/→[t], /z/→ [t],/z/→[d], /ʃ/→[t], /ʃ/→[tʃ], /ʒ/→[t], /ʒ/→[d], /ʎ/→[l].

Subject 6 (S6) presented alterations in the following distinctive features pre-treatment: [+approximant] → [-approximant] (1), [-vocoid] → [+vocoid] (1), [+continuous] → [-continual] (7), PC [labial] → [dorsal] (1), PC [cor –anterior] →[+anterior] (5), PC [coronal +anterior]→VP [coronal –anterior] (1), CS→ ø VP [coronal –anterior]→PC [coronal + anterior] (1).

The substitutions which characterized these alterations were preferably: /f/→[p], /v/→[b], /v/→[g], /s/→[t], /z/→[d], /ʃ/→[t], /ʒ/→[d], /ʃ/→[s], /ʒ/→[z], /ʃ/→[t], /ʒ/→[d], /ʎ/→[l].

Subject 7 (S7) presented alterations in the following distinctive features pre-treatment: [- sonant] → [+ sonant] (1), [+ approximant]→ [- approximant] (2), [- vocoid] → [+ vocoid] (2), [+ continuous] → [- continuous] (1), [- continuous] → [+ continuous] (1), PC [coronal –anterior] → [+anterior] (3), PC [coronal + anterior] → VP [coronal – anterior] (1), CS → ø PC [coronal +anterior] → VP [coronal – anterior] (1), CS → ø VP [coronal – anterior] → PC [coronal + anterior] (1).

The substitutions which characterized these alterations were preferably: /ʎ/→[j], /r/→[j], /ʃ/→[s], /ʒ/→[z], /ʎ/→[l].

Subject 8 (S8) presented alterations in the following distinctive features pre-treatment: [+ approximant]→ [- approximant] (1), [- vocoid] → [+ vocoid] (1), [+voiced] → [-voiced] (2), [+ continuous] → [- continuous] (1), PC [coronal + anterior] → [-anterior] (1), PC [coronal –anterior] → [+anterior] (3), CS → ø VP [coronal –anterior] → PC [coronal + anterior] (1); PC [coronal + anterior] → VP [coronal – anterior] (1).

The substitutions which characterized these alterations were preferably: /r/→[j], /ʃ/→[s], /ʒ/→[z], /ʎ/→[l], [dʒ]→[tʃ], /g/→/k/.

In the phonetic inventory (Figure 1), the absent sounds pre-treatment were: S1 /t/,/d/, /ʃ/,/ʒ/,/ʀ/,/l/,/ʎ/,/r/, S2 /g/,/f/,/ʃ/,/ʒ/,/ʎ/,/r/, S3 and S4 /g/ and /r/, S5 /s/,/z/,/ʃ/,/ʒ/ and S6 /ʃ/,/ʒ/, /ʀ/,/r/. For S7 and S8 there were no absent sounds.

In Figure 1 it is possible to observe the number of sounds which are present in the phonological system of the eight studied subjects.

About S1, there were 9 present sounds pre-treatment (established /k/ and /g/ in initial onset (IO), /k/,/g/,/v/,/s/,/z/,/ɲ/ in medial onset (MO) and /s/ in final coda (FC)). S2 with 3 present sounds (established /ʀ/ (IO), /z/ (MO) and /s/ (FC)), S3 with 18 present sounds (established /p/, /t/,/f/,/ʃ/,/m/,/n/,/l/,/ʀ/ (IO) and /p/,/t/,/f/,/ʃ/,/m/, /n/,/ɲ/,/l/,/ʎ/,/ʀ/(MO)), S4 with 19 present sounds (established /p/,/b/,/d/,/f/,/v/,/z/,/m/,/n/ (IO) and /p/,/b/,/t/,/d/,/f/,/v/,/ʃ/,/m/,/n/,/ɲ/,/s/ (MO)). S5 with 20 present sounds (established /p/,/t/, /k/,/f/,/m/,/n/, /l/, /ʀ/ (IO) and /p/,/t/,/k/,/f/,/ v/,/m/, /n/,/ɲ/,/l/,/r/,/ʎ/,/ʀ/ (MO)).

About S6, there were 23 present sounds (established /p/,/b/,/t/,/d/,/k/,/g/,/m/,/n/,/l/ (IO), /p/,/b/,/t/,/ d/,/k/,/g/,/s/,/z/,/m/,/n/,/ɲ/,/l/,/ʎ/ (MO) and /s/ (FC)), S7 with 30 present sounds (established /p/, /b/,/t/,/d/,/k/,/g/,/f/,/v/,/s/,/ʀ/,/m/,/n/,/l/ (IO), /p/,

/b/,/t/,/d/,/k/,/g/,/f/,/v/,/s/,/z/,/m/,/n/,/ɲ/,/l/,/ʀ/, /r/ (MO) and /s/(FC)). S8 with 31 present sounds (established /p/,/b/,/t/,/d/,/k/,/f/,/v/,/z/,/ʃ/,/m/, /n/,/l/,/ʀ/ (IO), /p/,/b/,/t/,/d/,/k/,/g/,/f/,/v/,/s/,/z/, /m/,/n/,/ɲ/,/l/,/ʎ/ /ʀ/ (MO), /s/ in medial coda (MC) and /s/ (FC)).

Figures 1 and 2 present the average of sounds substitutions represented by the altered distinctive features, the sounds which are absent in the phonetic inventory and the sounds which are present in the phonological system of the groups: severe, moderate-severe, mild-moderate and mild.

In relation to altered distinctive features, represented by the substitution of the mentioned sounds, the severe group (SG) presented average of 61 occurrences of altered distinctive features pre-treatment and 9 occurrences post-treatment. The moderate severe group (MSG) presented average of 20 occurrences pre-treatment and 13 occurrences post-treatment. The mild moderate group (MMG) presented average of 21 occurrences pre-treatment and 4 occurrences post-treatment and the mild group (MG) presented average of 12 occurrences pre-treatment and 3 occurrences post-treatment.

About the average of absent sounds in the phonetic inventory pre-treatment, the SG presented 7 absent sounds, followed by the MMG with 2 absent sounds. Only the SG still presented the average of 2 absent sounds post-treatment. The MG did not present absent sounds neither pre- nor post-treatment.

The phonological system of the SG presented average of 6 present sounds pre-treatment and 29 present sounds post-treatment. The MSG presented average of 19 present sounds pre-treatment and 25 present sounds post-treatment. The MMG presented average of 22 present sounds pre-treatment and 34 present sounds post-treatment. The MG presented average of 31 present sounds pre-treatment and 37 present sounds post-treatment.

DISCUSSION

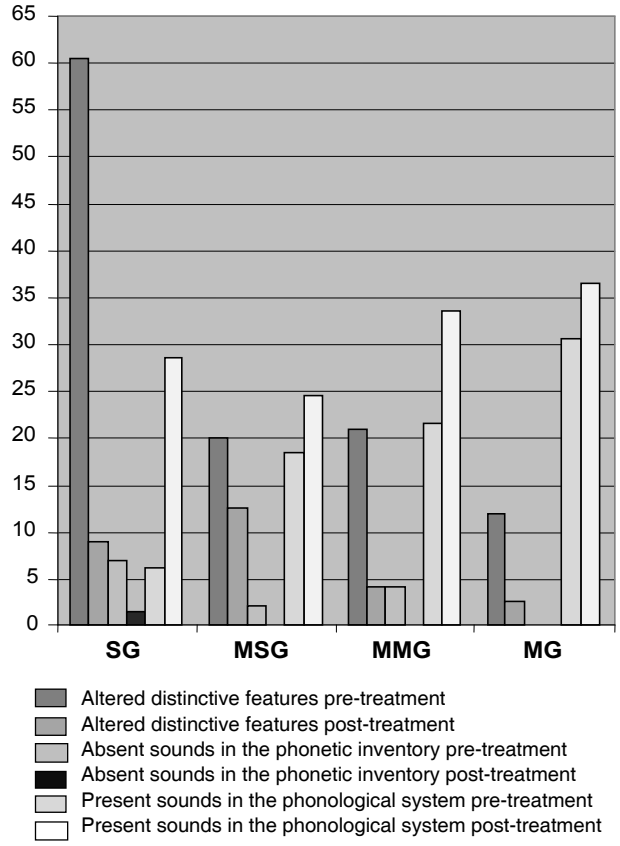
In Figure 1, it is possible to verify the number of distinctive features alterations pre- and post-treatment of the eight studied subjects. These alterations occurred mostly in the SG.

In Figure 2 and Figure 3, the average of altered distinctive features pre- and post-treatment showed statistically significant difference between the groups SG and MSG (p=0.003).

GROUPS	Averages of distinctive features alterations	Phonetic inventory Average of absent sounds	Phonological system Average of present sounds			
DEGREE	Pre	Post	Pre	Post	Pre	Post
SEVERE	61	9	7	2	6	29
MODERATE-SEVERE	20	13	2	0	19	25
MILD-MODERATE	21	4	4	0	22	34
MILD	12	3	0	0	31	37
SEVERE X MODSEVERE	P = 0.0039		P = 1.0		P = 0.0160	
SEVERE X MILMOD	P = 0.7380		P = 1.0		P = 0.0354	
SEVERE X MILD	P = 0.4361				P = 0.0049	

MODSEVERE – Moderate-Severe; MILMOD – Mild-Moderate.

Figure 2 – Average of altered distinctive features, absent sounds in the phonetic inventory and presente soundds in the phonological system regarding the different severity degrees of phonological disorder



SG – Severe Group; MSG – Moderate-Severe Group; MMG – Mild-Moderate Group; MG – Mild Group

Figure 3 – Average of altered distinctive features, absent sounds in the phonetic inventory and absent sounds in the phonological system of different severity degrees of phonological disorders

In the subject 2 (Figure 1) it is clearly observed this development. This individual, in the initial evaluation, presented 76 occurrences of sounds substitutions that characterized the distinctive features alterations, and only one occurrence in the final evaluation.

In that subject, it was verified the process of substitution of many sounds by a glottal sound. The presence of the feature [+ constricted glottis] in the Laryngeal Node, in relation to the voiceless glottal plosive, emphasized the deletion of the plosive and fricative Point of Consonant, what characterized restricted phonetic inventory.

It was observed that, when the subject presented disorders with severe level, such as S2, the treatment seems to propitiate higher number of features distinction, because, in these cases, the phonetic inventory is restricted and the phonological system presents little distributional possibilities.

The wide changes in the phonological system of the severe group (SG) after the performed treatment reflected the lowest average of altered features pre-treatment.

S1 and S2, from the SG, presented the highest number of absent sounds in the phonetic inventory pre-treatment, with absent sounds post-treatment only in S1 (Figure 1).

Also about the phonetic inventory (Figure 1 and Figure 2), the SG, followed by the MMG and the MSG, presented the highest averages of absent sounds. However, it was not observed statistically significant difference among the different levels of severity regarding the sounds which are absent in the phonetic inventory. Only the SG still presented absent sounds post-treatment.

So, the analysis of the absent sounds in the phonetic inventory did not evidence differences among the degrees of severity of the phonological disorders. These results are presented by the PCC, which reveals differences in the system about the use of the presented sounds, expressed by the phonological systems analysis.

Nevertheless, although both subjects (S1 and S2) presented the same degree of severity, they responded to the treatment differently. Thus, it was not only considered the analysis based on PCC, performed in this study, other characteristics related to the children system seemed to influence the phonological disorder severity, such as the lack of communication and the speech unintelligibility.

In the phonological system (Figure 1), pre-treatment, S1 and S2 presented the lowest average of present sounds, followed by S3 and S4, S5 and S6, and, finally, S7 and S8. In the phonological system post-treatment, all subjects presented higher number of present sounds in their phonological systems.

Changes in the children phonological systems with varied phonological disorders severity degrees were observed [1] using three different models of therapy, such as ABAB-Withdrawal and Multiple Probes Approach. The studies concluded that these models were effective in the treatment of different phonological disorders severity degrees.

Recent studies using models with phonological basement [2,3] also observed that the development of the phonological systems of children with phonological disorders, verified through generalization, were proportionate to the number of sounds which were established in these systems.

Another study [5] verified wide changes in the phonological systems of children with phonological disorders in the levels: severe, moderate-severe and mild-moderate. These children were treated through phonological models with contrastive approach.

In the average of present sounds in the phonological systems pre- and post-treatment (Figure 1 and Figure 3), it was possible to observe statistically significant differences between SG and MSG (p=0.001), between SG and MMG (p=0.03) and between SG and MG (p=0.004).

In the phonological system, the PCC evidenced development in the different systems when comparing the different degrees of phonological disorders severity degrees. So, the SG presented higher development when submitted to treatment when compared with the other groups.

In cases of phonological disorders with mild degree, the treatment seems to cause more differences among the features, because the phonetic inventory is restricted and the phonological system presents a few distributional possibilities.

Expansions in phonological systems with different degrees of severity were observed in other studies [6,7] which used models with phonological basis. These models [7] favored higher number of sound acquisition in the phonetic inventory of subjects with severe and moderate-severe degree of phonological disorders, as well as better performance of sounds acquisition in their phonological system and reduction of altered distinctive features, also in the severe and moderate-severe degrees.

For all subjects, regardless the severity of the phonological disorder, comparing the altered distinctive features (p=0.001), absent sounds in the phonetic inventory (p=0.02) and present sounds in the phonological system (p=0.01) pre- and post-treatment, there was significant development after the performed treatment (Figure 1).

So, all subjects were benefited when submitted to the treatment which was proposed in this research, but the disorders with severe degrees presented statistically significant development when compared with the other severity degrees of phonological disorder.

Some authors [8] verified statistically significant differences between initial and final evaluations regarding the number of sounds which were established in the phonological system and altered distinctive features also using the ABAB-Withdrawal and Multiple Probes Approach.

Other studies [9-12] also observed that the patients presented gains in their phonological systems in models with phonological basement. Some of them also used the ABAB-Withdrawal and Multiple Probes Approach. The present research agrees with the findings mentioned in those studies.

CONCLUSION

The averages of substituted sounds represented by distinctive features alterations pre- and post-treatment, between severe degree and moderate-severe degree presented significant gradual development.

The average of present sounds in the phonological system (initial and final) was statistically significant when comparing the severe group with the other groups: moderate-severe, mild-moderate and mild.

The initial and final evaluations demonstrated significant development in all phonological disorders severity degrees, provided by the treatment, when comparing the initial and final evaluations of the phonological system, phonetic inventory and distinctive features of all subjects with phonological disorders.

The most outdated phonological systems, mainly the phonological disorders with severe degree, presented few distributional possibilities and restricted phonetic inventory. These characteristics cause more features distinction after the proposed treatment.

The ABAB-Withdrawal and Multiple Probes Approach were effective during the intervention of children with different phonological disorder severity degrees, considering that all studied groups presented development in their phonological system, distinctive features and phonetic inventories post-treatment when compared with pre-treatment.

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RESUMO

Objetivo: analisar as mudanças fonológicas obtidas (sistema fonológico, inventário fonético e alterações de traços distintivos) pré e pós-tratamento utilizando o Modelo ABAB-Retirada e Provas Múltiplas em diferentes gravidades do desvio fonológico. **Método:** foram realizadas avaliações fonoaudiológicas em oito crianças com diferentes gravidades do desvio fonológico, cuja média de idade no início do tratamento era de 5:5. Todos receberam tratamento fonológico pelo Modelo "ABAB-Retirada" e Provas Múltiplas. Foram analisadas as evoluções quanto ao inventário fonético, sistema fonológico e alterações nos traços distintivos. **Resultados:** todas as gravidades apresentaram evoluções no sistema fonológico. **Conclusões:** os desvios fonológicos graves apresentaram maiores evoluções.

DESCRITORES: Transtornos da Articulação; Fonoaudiologia; Fonoterapia

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