THERAPEUTIC PROGRESS ON SUBJECTS SUBMITTED TO PHONOLOGICAL THERAPY USING THE MULTIPLE OPPOSITIONS APPROACH

Progresso terapêutico de sujeitos submetidos a terapia fonológica pelo modelo de oposições múltiplas: comparação do progresso terapêutico

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ABSTRACT

This work aims to analyze and compare the therapeutic progress shown in children submitted to the Multiple Oppositions Approach, stimulated in therapy with the same target sounds. Two children with phonological disorder participated in this case report, being a boy (S1) and a girl (S2), aged 4:2 and 4:11, respectively. The speech data were collected through phonological evaluation. As treatment, we used the Multiple Oppositions Approach during 25 sessions with the same target sounds, all belonging to fricatives classes. The substitutions and omissions of each child's phonological inventory were analyzed, as well as the occurrence of pre and post-therapy phonological processes. It was observed that the subject with more substitutions (S1) was the one with phonemes major acquisitions in the phonological inventory. S1 showed the highest occurrence of cases in his speech, both pre and post-therapy, which made the speech intelligible to the listener. The processes involving the class of liquids showed a higher percentage of occurrences, even after therapy. The Multiple Oppositions Approach showed an adequate progress of the treatment of these children with phonological disorder, providing a phonological inventory expansion and a reduction of phonological processes occurrence, although with differences regarding the evolution presented by each one.

KEYWORDS: Speech Therapy; Articulation Disorders; Generalization; Speech Disorders; Speech

INTRODUCTION

The development of speech occurs with the integration of the motor, sensory and auditory systems[1]. The phonology acquisition is a complex function subject to changes throughout its process[2]. The greatest expansion of the phonological system occurs between 1 year and 6 months and 4 years[1]. Children who show substitutions and/or omissions of phonemes during spontaneous speech have what is called a "phonological disorder" and its complicate the speech intelligibility to the listener[3].

The phonological disorder is one of the speech sound disorders with a higher incidence in children[1,4-9] and can negatively impact the health and quality of life of children. Because of it early diagnosis and intervention become essential to prevent further improvement of the disorder and the appearance of other alterations[1].

Children with phonological disorder during the speech sounds acquisition have several repair strategies, which are named phonological processes. The phonological process are used because children need get along with the complexity of the segment and/or syllable structure which they do not know or control yet in the production[2].

These children need phonological intervention, which aims to the sounds system reorganization as early as possible. The intervention improvement in speech intelligibility[10-12] and communication with

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other children and/or adults[1,11], as well as reduce eventual difficulties in learning reading and writing of school-age children[11,13].

There are different treatment approaches (traditional and phonological) for the phonological disorder. The traditional approach makes the therapy longer, since all the sounds need to be taught separately in all positions in the syllable and the word. The phonological approaches are faster because they use one or few target sounds induces to the acquisition of many other sounds substitution in the child system which were not directly treated[14-23]. Sometimes the progress in the acquisition of a segment results in the regression of others, until the acquisition process is stabilized with the acquisition of this sounds[20].

The Multiple Oppositions Approach was developed to treat children with more severe disorders[14,24]. This treatment uses multiple sounds simultaneously considering the ability of children to generalize. The generalization refers to children ability to apply phonological knowledge on non-treated targets in therapy [11,14,17-23].

The first evaluation is used both to therapeutic planning and evolution monitoring. Periodic monitoring of each case adds important new information to the diagnosis and enables to strengthen the first evaluation regarding to the underlying difficulties[25].

Therefore, the objective of this case report was to analyze and compare the therapeutic progress presented by two children submitted to the multiple oppositions approach, stimulated in the therapy with the same target sounds.

CASE REPORT PRESENTATION

This case report was composed of two (2) children with phonological disorder, a boy (S1) and a girl (S2), aged 4:2 and 4:11, respectively, at the beginning of the evaluation process. The parents and/or responsible persons received information about the survey and authorized the participation of their children by the signature of Informed Consent which will explain about research study. The project was approved by the Research Ethics Committee Number 108/05 of a Universidade Federal de Santa Maria (UFSM).

After the signature of Informed Consent, the children were submitted to the following language evaluations by the researcher: anamnesis, Phonological Assessment of Child[26], comprehensive and expressive language, oral motor assessment[27], articulation test (word repetition), auditory discrimination test[28], phonological awareness assessment[29]. The following additional evaluations were also carried out: inspection of the external acoustic meatus, audiological and neurological evaluations. These evaluations were performed to confirm the diagnosis of phonological disorder and exclude other alterations that may interfere with the speech acquisition.

The Phonological Assessment of Child[26] was performed through the spontaneous nomination of figures ("vehicles", "room", "kitchen", "bathroom" and "zoo"), which allowed the collection of a significant linguistic sample (all phonemes in all possible positions of the word and in different words). The speech data were recorded, phonetically transcribed and checked by two more specialists students in the last grade of under graduation course in Speech-Language and Hearing Pathology. Afterwards a contrastive analysis was applied. From this analysis it was determined the phonological inventory pre and post-therapy of each child, considering its acquisition level, which means: the phoneme was acquired when produced correctly in 80% of the times or more; partially acquired when the phoneme was produced correctly between 40% and 79%; and not acquired when the phoneme was produced correctly from 0% to 39% of the possibilities[30].

After, the Percentage of Consonants Correct – Revised (PCC-R)[31] was calculated from the contrastive analysis, considering like errors substitutions and omissions presented by children in the phonological system (Table 1). The percentage of occurrence of each phonological process pre and post-therapy was calculated too.

After these evaluations, both subjects were submitted to the Multiple Oppositions Approach, twice a week sessions, during 45 minutes each. In this research were analyzed the first 25 sessions of each children. The treatment applied is based on the contrast of several sounds simultaneously, contrasting the replaced sounds with the substitute. The target sounds were chosen according to the author's proposal[14] and with the phonological inventory presented by each subject.

Some modifications were made in order to adapt the Multiple Oppositions Approach to Brazilian Portuguese (BP) speakers. These changes were caused by the facts that in BP rarely find sounds replaced by a single one in different classes of sounds and with different syllable structure (e.g. in BP there is not onset replacement by consonantal cluster) and the difficulty in forming sets of contrastive words to be used in the treatment in which all have meanings.

Therefore, the modifications made to allow the implementation of this research were in the treatment of this children, in the absence of replaced sounds belonging to different classes of sounds was used

target sounds belonging to the same class sounds and preferably in words with meanings.

After the analysis of phonological inventories for both S1 and S2, it was chosen the same target sounds for the therapy (/s/, /z/ and /Z/ and its substitute /S/). All target sounds belonging to the fricatives class because these were the only sounds that could be selected according to the proposed Multiple Oppositions Approach. The selected words target (minimal pairs) for therapy for both subjects were ['kaSa], ['kasa], ['kaza] and ['kaZa]. For the target word ['kaZa] a "meaning/"nickname" was created with children to the image "staff" (in BP "[ka'Zado].

In the first session was applied the baseline, and calculated the percentage of the correct productions for the phonemes partially acquired and non-acquired in the phonological inventory of each child. Afterwards, the treatment with target sounds was made in five therapy sessions. In the sixth session the targets sounds was evaluated at the same way as the baseline. After 25 therapy sessions the totally results of the treatment were analyzed. These therapeutic procedures have also been used in another study[18].

The targets sounds were treated in the production practice across playful activities in the phonological therapy. Initially, the minimal pairs were treated by imitation of the production of the Speech-Language Pathologist (SLP). Children had to imitate the correct model of the SLP. The spontaneous speech production phase (words and sentences) began when children obtained a percentage of correct production of target sounds of 80% or more.

At the end of the 25 sessions (excluding the evaluation sessions), the subjects were re-evaluated with the use of Phonological Assessment of Child[26], in order to correlate with the initial evaluation. Therefore, were examined the pre and post-therapy phonological inventory, the acquisition level of phonemes in the phonological inventory, the occurrence of pre and post-therapy phonological processes, and the generalization types (compared to lexical items non used during treatment, to another position of the word, inside a sounds class and to other sounds class).

RESULTS

The subjects of this study differed per gender, age and severity level of the phonological disorder (Figure 1), nevertheless the differences of age and gravity were not extreme, which means, the results were next. Regarding to the severity level of the phonological disorder, S1 was classified as a severe phonological disorder and S2 as a moderate-severe phonological disorder.

The phonemes acquired and partially acquired in the pre and post-therapy phonological inventories for both subjects are presented in Table 1.

Subject	Gender	Age	Severity
S1	B	4:2	PCC-R= 39,78% - Severe
S2	G	4:11	PCC-R= 54,24% - Moderate-Severe

Legend: PCC-R: Percentage of Consonants Correct – Revised; B: boy; G: girl; S1: subject 1; S2: subject 2.

Figure 1 - Subjects description regarding gender, age and severity of the phonological disorder.

It was observed in the pre-therapy evaluation S1 had eight non-acquired phonemes in the phonological inventory: /g/, /s/, /z/, /Z/, /´/, /l/, /r/ and /R/. Nine phonemes were partially acquired and only three acquired (/p/, /t/ e /v/). While in the post-therapy evaluation only four phonemes were non-acquired: /s/, /z/, /´/ and /r/. S2 had more completely phonological inventory which presented only five non-acquired phonemes in the pre-therapy evaluation (/g/, /z/, /Z/, /´/ and /r/) and the others phonemes were all acquired. After the treatment, only three phonemes remained at this level of acquisition, the /g/, /´/ and /r/.

Table 1 - Phonemes acquired and partially acquired in the subjects phonological system.

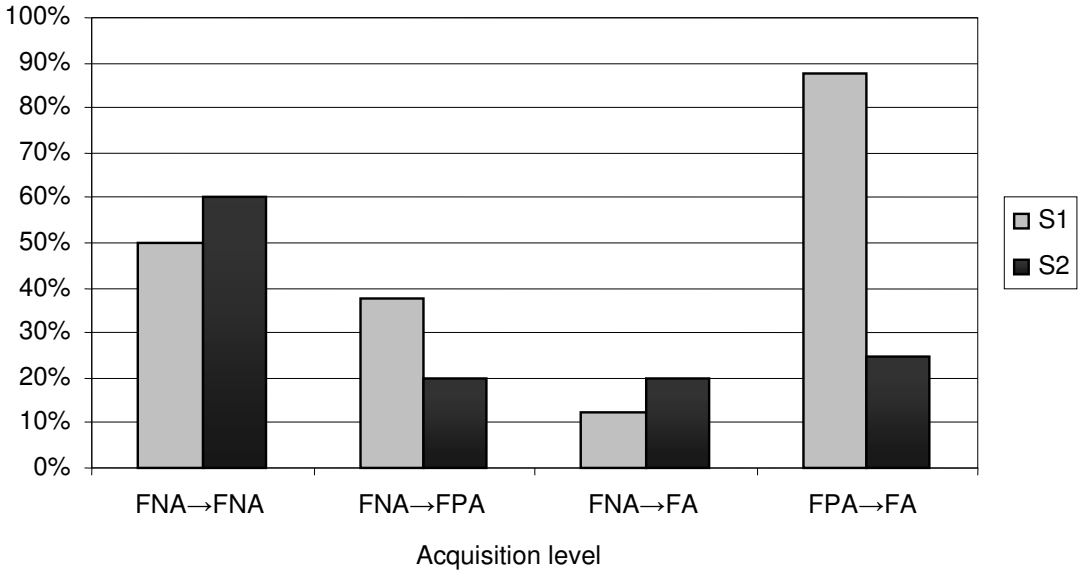
Subjects		Phonological System p, b, t, d, k, g, f, v, s, z, ʃ, ʒ, m, n, ɲ, l, r, ʎ, R	Nr. of FA
S1	Pre	p, (b)*, t, (d)*, (k)*, (f)*, v, (ʃ)*, (m)*, (n)*, (ɲ)*	3
	Post	p, **b**, t, **d**, (k)*, (g)*, **f**, v, **ʃ**, **ʒ**, **m**, **n**, **ɲ**, (l)*, (ʀ)*	11
S2	Pre	p, (b)*, t, (d)*, k, f, (v)*, s, ʃ, m, n, ɲ, (l)*, ʀ	10
	Post	p, (b)*, t, **d**, k, f, (v)*, s, (z)*, ʃ, **ʒ**, m, n, ɲ, (l)*, ʀ	12

Legend: *: Phoneme partially acquired; Bold: phonemes acquired through therapy; FA: phonemes acquired; S1: subject 1; S2: subject 2.

The Figure 2 shows the development percentages in the phonological inventories as per the acquisition level, i.e. non-acquired phonemes, phonemes partially acquired and acquired phonemes.

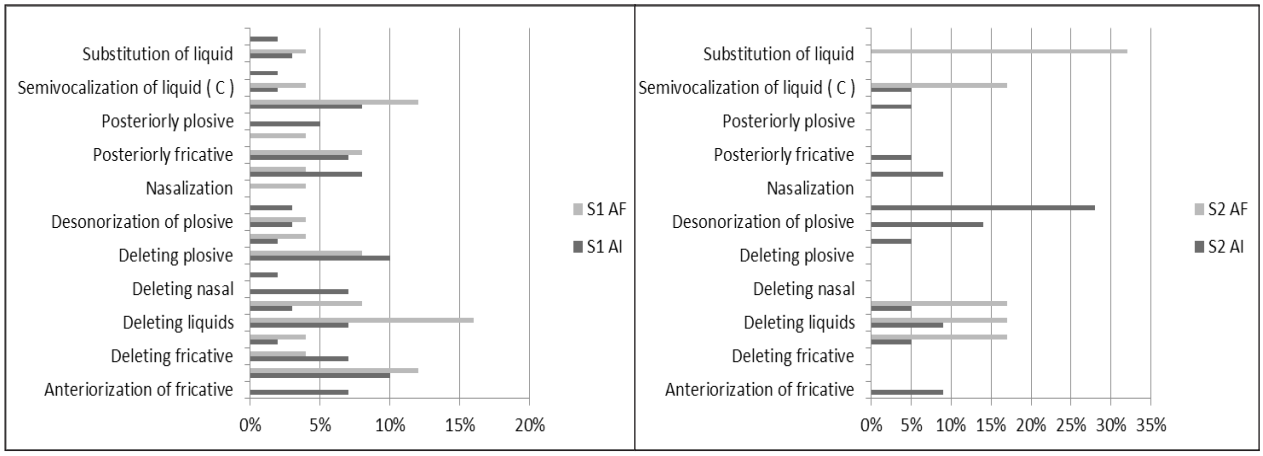
It was observed to both subjects that more than 50% of the non-acquired phonemes remained at this level. However, in relation to the non-acquired phonemes that evolved with the therapy, for S1 the highest percentage was partly acquired, while for S2 acquired. As for the phonemes partially acquired that were acquired, S1 presented a great evolution, when compared to S2.

The phonological processes carried out by the subjects pre and post-therapy are presented in Figure 3.



Legend: FNA → FNA: phoneme non acquired pre and post-therapy; FNA → FPA: phoneme non acquired pre-therapy and partially acquired post-therapy; FNA → FA: phoneme non acquired pre-therapy and acquired post-therapy; FPA → FA: phoneme partially acquired pre-therapy and acquired post-therapy; S1: subject 1; S2: subject 2.

Figure 2 - Evolution percentages in the phonological inventory of each subject according to the acquisition level.



Legend: AI: Initial evaluation; AF: Final evaluation; C: Coda; S1: subject 1; S2: subject 2.

Figure 3 - Phonological processes occurrence performed by S1 and S2 pre and post-therapy.

It was observed that the processes involving the class of liquids were those who persisted and even evolved, showing a higher percentage of occurrence, even after the therapy. Among these, the liquid deletion in onset and coda had an increase in its occurrence percentage for both subjects, as well as the semivocalization process in onset position for S1 and in coda position for S2, as well as the substitution process.

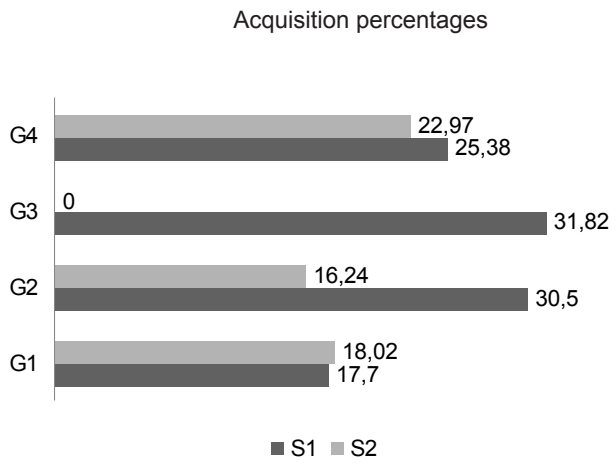
In Table 2 is presented the generalization types. It was observed that both subjects showed favorable evolution, i.e. the percentage increased in all types examined, except for S2 towards the generalization inside a sounds class, which showed a greater occurrence in pre-therapy evaluation than in post-therapy evaluation.

Table 2 - Generalization Types obtained through multiple oppositions approach

	S1		S2	
	AI (%)	**AF (%)**	**AI (%)**	**AF (%)**
Lexical items non used in the treatment	40,08	57,78	15	33,07
Another positions of the word	30,21	60,71	33,76	50
Inside a sounds class	50	81,82	76,19	52,94
Other sounds classes	42,39	67,77	33,35	40,80

Legend: AI: Initial evaluation; AF: Final evaluation; S1: subject 1; S2: subject 2.

In the comparison of the percentages obtained regarding to the generalization types (Figure 4) it was observed S1 obtained the largest percentage of evolution in the generalization to another position of the word, inside a sound class and to other sound class. Similar percentages were obtained in the generalization to lexical items none used in the treatment.



Legend: G1: Generalization to lexical items non used in the treatment; G2: Generalization to another position in the word; G3: Generalization to inside a sounds class; G4 Generalization to other sounds class; S1: subject 1; S2: subject 2.

Figure 4 - Evolution percentages by comparing subjects regarding the generalization types obtained at post-therapy

DISCUSSION

The Multiple Oppositions Approach is a recent form of intervention, which began to be applied in the last years in studies with children who presented phonological disorder in Brazil[12,18,23]. This treatment is described in the international literature[12,24] as a treatment to be used on more severe phonological disorder due to a peculiarity in its application. It means that children has several phonemes absent from the phonological inventory which be replaced by a single sound. This feature takes place in the children inventories with severe disorders, as the example of these two subjects. Although S2 has moderate-severe disorder, the percentage was very close to severe disorder, reason why it has been possible to apply the Multiple Oppositions Approach in the treatment.

In relation to the phonological inventories, S1 presented it so restricted, showing only three phonemes acquired in pre-therapy. This subject acquired eight phonemes, which were mostly partially acquired. On the other hand, S2 showed a pre-therapy inventory with a larger number of phonemes, showing consequently less acquisitions. Therefore, it appears that the subject who showed more substitutions (S1) was the one with major phonemes acquisitions in the inventory. The author[14] when applying the Multiple Oppositions Approach found a visible phonological reorganization regarding the substituted phonemes in the pre-treatment. This same author reports the improvements are not only in trained phonemes in trained positions, but also in non-target phonemes in untrained positions. Other studies[12,15,18,23] using this treatment reported the acquisition of non treated phonemes during therapy in subject's phonological inventories. Therefore, the used therapeutic treatment seems to favor the generalizations on the treated subjects.

According to the acquisition levels it was observed that more than 50% of non-acquired phonemes remained at this level, which highlights the absence of phonemes and their distinctive features in the phonetic inventories of the subjects. In the non-acquired phonemes pre-therapy, the highest percentage was to partially acquired for S1 and was to acquire for S2. Regarding the phonemes partially acquired which were acquired post-therapy, S1 presented a great evolution when compared to S2. S1 showed in his phonological system fewer number of phonemes correctly produced than S2. S1 acquired more number of phonemes, from the non-acquired level to partially acquired and of the partially acquired to acquired. It shows S1 is in the acquisition phase of phonological characteristics and articulatory that compose the phonemes. On the other hand, S2 showed a faster evolution because her phonological system was closer to normality. It means S2 already had on her phonological system several distinctive features which compound the phonemes.

In relation to phonological processes, S1 with severe disorder was the one who showed the highest cases occurrence in his speech pre and post-therapy. It difficult the speech intelligibility to the listener. A similar result was described in a study[32] which observed that the greater the severity level of the phonological disorder was the largest the number of altered phonological process was used.

It is possible to observe the occurrence of various phonological processes, especially in S1. The phonological processes involving the class of liquids showing the higher occurrence percentage even after therapy. A study[33] reported that among the phonological processes most widely used in children with phonological disorder are the Reduction of Consonant Cluster (60.67%) and the Liquids Simplification and Omission (47.19%). Other studies[1,34,35] showed the difficulty of children in the liquids production and in more complex syllable structures.

Alterations in the liquid class occur due to the fact that these phonemes are part of more complex syllable structures of Brazilian Portuguese, i.e Consonant-Vowel-Consonant (CVC) and Consonant-Consonant-Vowel (CCV). Furthermore, the liquids are phonemes of late acquisition and

therefore may be involved in phonological processes showed by older children[34].

The generalization obtained by the children was favorable to both subjects (S1 e S2) because the percentage increase. However, S1 obtained evolution's greatest percentage in the generalization to another position of the word, inside a sounds class and to other sound class than the S2. Similar percentages were obtained in the generalization to lexical items none used during treatment to both subjects. A study[23] refers to the occurrence of greater generalization (another position of the word) in subjects with more restricted phonological inventories (less phonemes present), and the same can be observed in this study comparing the two children. Other studies[14-23] also reported the generalization occurrence after phonological therapy.

Fricatives phonemes were used in the treatment of both subjects, but S2 did not obtain generalization inside a sounds class (fricatives), showing a decrease in the percentage of correct productions post-therapy. It happens due to the phonological reorganization that occurs during the treatment which does not happen in a linear way. Therefore regression periods are observed during the treatment. This non-linearity in the acquisition process has also been observed in study[36] which showed the discontinuity mainly in class of liquids and coronal fricatives. The emergence of new segments or structures sometimes results in regression of other segments or structures learned[20].

The generalization occurrence in the treatment is expected by the clinician for it may reduce the time of therapy[14] making it quicker and more efficient which are the treatment goals.

Finally, it is important to mention two children showed several progresses in the therapy, but one more than the other. Despite the phonological systems and age being similar, there are other factors that influence on therapy, among them the family's participation in the therapeutic process. This differed among the children, one family was always present, questioned the therapy, performed activities at home, while the other children was absent in several sessions and did not performe tasks at home. This was an important factor on the different evolution in the therapy. The level of family support and the involvement may also make an important role in the treatment progress. In fact, the father being present in the therapy room may simply affect the treatment outcome[37]. The motivation, the involvement and the interest of family in the therapy may influence the evolution of the clinical situation of children with phonological disorder, since their speech may not be understood by an adult hindering the interaction between them[11].

CONCLUSION

The Multiple Oppositions Approach was efficient for these children's treatment because they presented several phonemes acquisitions in the phonological inventory and various types of generalizations and decreased occurrence of post-therapy phonological processes.

The children had the same approach of therapy and the same target phonemes, but there were different evolution among them, demonstrating that the family's participation, involvement and interest is an aspect to be considered for the fastest therapy progress.

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RESUMO

Este trabalho tem como objetivo analisar e comparar o progresso terapêutico apresentado por crianças submetidas ao Modelo de Oposições Múltiplas estimuladas na terapia com os mesmos sons-alvo. Participaram deste relato de caso duas crianças com desvio fonológico, sendo um menino (S1) e uma menina (S2), com idades de 4:2 e 4:11, respectivamente. Os dados da fala foram coletados por meio da avaliação fonológica. Para o tratamento, foi utilizado o Modelo de Oposições Múltiplas durante 25 sessões com os mesmos sons-alvo, todos pertencentes a classe das fricativas. As substituições e omissões no inventário fonológico de cada criança foram analisadas, assim como a ocorrência de processos fonológicos pré e pós-terapia. Observou-se que o sujeito que apresentava mais substituições (S1) foi o que apresentou maiores aquisições de fonemas no inventário fonológico. O S1 foi o que apresentou maior ocorrência de processos em sua fala, tanto pré quanto pós-terapia, o que dificultava a inteligibilidade de fala para o ouvinte. Os processos que envolveram a classe das líquidas foram os que apresentaram um maior percentual de ocorrência, mesmo após a terapia. O Modelo de Oposições Múltiplas possibilitou um adequado progresso no tratamento dessas crianças com desvio fonológico, proporcionando uma expansão no inventário fonológico e uma diminuição de ocorrência de processos fonológicos apesar de haver diferenças quanto a evolução apresentada por cada uma.

DESCRITORES: Fonoterapia; Transtorno da Articulação; Generalização; Distúrbios de Fala; Fala

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