

# Measures of time to speech and language therapy for children with autism spectrum disorder

## Parâmetro de tempo para intervenção fonoaudiológica direcionada a crianças com distúrbios do espectro do autismo

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### ABSTRACT

**Purpose:** To identify a time parameter of speech and language therapy for children with Autistic Spectrum Disorders assisted by the association of both direct and indirect actions, as only by indirect shares. **Methods:** The design of this study is the Clinical Trial pilot. The sample was composed of 11 children with autism spectrum disorders, 4-10 years old. These children were randomly divided into two groups: six were receiving both direct (individual session) and indirect intervention (parent orientation session) (Therapy Group - TG), and five were receiving exclusively indirect intervention (Orientation Group - OG). We used the Autism Behavior Checklist (ABC) to interview the mothers; Interaction Assessment (IA) and Sample of Vocal Behavior (SVB) to assess and to measure the evolution of children on three occasions: at the beginning, six months later and 12 months later. **Results:** We observed there was greater evolution, in velocity and extension, in the first semester of TG in the Autism Behavior Checklist. In the Interaction Assessment and Sample of Vocal Behavior there were decreased values, specially between 0 and 1 time. **Conclusion:** The six month period is strong evidence for indirect action and for the association between indirect and direct actions. This measure of time can be a parameter for speech and language therapy for children with autism spectrum disorders.

**Keywords:** Language; Autistic disorder; Language therapy; Speech, language and hearing sciences; Communication

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### RESUMO

**Objetivo:** Identificar um parâmetro de tempo de intervenção fonoaudiológica para crianças com Transtorno do Espectro do Autismo, assistidas tanto pela associação de ações diretas e indiretas, quanto apenas por ações indiretas. **Métodos:** A amostra foi constituída por 11 meninos, de 4 a 10 anos de idade, pertencentes ao espectro do Autismo. As crianças foram divididas, aleatoriamente, em dois grupos: Grupo GT, formado por seis crianças assistidas em intervenção terapêutica fonoaudiológica direta (sessão individual com a criança) e indireta (sessão de orientação aos pais); Grupo GO, com cinco crianças assistidas apenas indiretamente. Utilizamos o *Autism Behavior Checklist* (ABC) para entrevistar as mães e as avaliações de Interação e do Comportamento Vocal para avaliar e mensurar o tempo de evolução da criança, em três momentos: tempo zero, após seis meses (tempo 1) e após 12 meses (tempo 2). **Resultados:** Nos primeiros seis meses, a extensão e a velocidade do processo evolutivo tornaram-se evidentes, especialmente no Grupo GT, tanto nos valores totais do ABC, quanto nas áreas que o compõem. Nos itens da Avaliação da Interação e do Comportamento Vocal também identificamos decréscimo das médias, em ambos os grupos, especialmente entre os tempos 0 e 1. **Conclusão:** O intervalo de tempo de seis meses tornou-se uma base de evidência confiável, tanto para ações indiretas, quanto para a associação de ações diretas e indiretas. Portanto, pode servir de parâmetro para intervenção terapêutica fonoaudiológica direcionada aos Transtornos do Espectro do Autismo.

**Descritores:** Linguagem; Transtorno autístico; Terapia da linguagem; Fonoaudiologia; Comunicação

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**Conflict of interests:** No

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## INTRODUCTION

The search for clinical evidence that speech therapists can use to plan and direct clinical evaluations has received worldwide emphasis<sup>(1)</sup>.

In recent decades, therapeutic language interventions, in particular direct interventions, which are characterized by directing attention to the abilities, or lack thereof, for each child, have been advocated as a form of building social adequacy in the communicative behaviors of individuals with autism spectrum disorders<sup>(1)</sup>.

It is also known that, when direct intervention is accompanied by an indirect intervention - i.e., when the therapeutic context and scenario are extended through family and school guidance - the evolutionary path is even more favorable<sup>(2-7)</sup>.

One of the constantly addressed issues, both by families and the professionals involved in the care provided to autistic children, has been the need for recognition of a sufficient time parameter to allow for the demonstration of behavioral changes. Despite the various national and international studies documenting the effectiveness of speech-language therapy directed toward these individuals, it is still necessary to establish a time interval within which actual evidence for this clinical practice may be considered to occur.

We have considered the possibility that, after six months of speech-language intervention, it may be possible to identify the evolutionary pattern in children, especially if they are subjected to a combination of direct and indirect actions and if this pattern becomes even more evident over the course of 12 months.

Thus, the objective of this study was to identify a time parameter of speech-language therapeutic intervention that will provide evidence that the clinical practice directed toward children along the autism spectrum is helping, both in the case of direct and indirect interventions in combination and of indirect interventions alone.

## METHODS

This study was approved by the Research Ethics Committee of the Universidade Federal de São Paulo (UNIFESP), opinion no. 1570/05. All actors were aware of the methodological procedures and signed our Free and Informed Consent Form.

This is a pilot clinical trial (ICMJE: NCT00725556).

### Sample

The sample consisted of 11 boys, between the ages of four and ten, diagnosed by a multidisciplinary team as having Autism Spectrum Disorder<sup>(8,9)</sup>.

All showed Mental Retardation of a mild (5) to moderate (6) degree, according to the application of the Stanford-Binet Intelligence Scale<sup>(10,11)</sup>.

The neurological evaluation included clinical assessment

and analysis of tests, whose results were considered within the normal range by the neurologist, except for the behavioral change.

In the audiological evaluation the results of all boys were verified according to the parameters of normality.

Three children were considered non-verbal, for they showed vocalizations as the predominant means of communication in the initial period of the study, and eight were classified as verbal, for they produced verbal emissions which involved at least 75% of phonemes of the Portuguese<sup>(12)</sup>.

All the children were properly enrolled in public schools, six of which were in pre-school education and five in elementary school. Of the latter group, two children were in special classes.

The following were considered as criteria for inclusion in the sample: the multidisciplinary diagnosis, the child's link to educational institutions and the family's availability to participate in the guiding sessions and in the speech and language therapy sessions, for at least twelve months. This guaranteed the participation of at least 70% of parents and children in the study.

The criteria for exclusion from the sample were constituted by the presence of comorbidities involving deficiencies of motor, visual, auditory and/or physical nature.

### Procedures

The children were divided randomly into two groups: six children underwent direct and indirect therapeutic intervention (Therapy Group - TG) and five were assisted solely through indirect intervention (Orientation Group - OG).

The direct therapeutic intervention in TG consisted in the planning and execution of strategies focused on the abilities and inabilities of each child, as proposed by the speech and language therapist. Individual sessions were carried out (48), always with the participation of the parents, who sometimes observed and at other times acted together with the child and the therapist. The average duration of each session was of 45 minutes.

The objectives outlined have referred, in general, the adequacy of social interaction skills (maintaining eye contact, joint attention, engagement in interpersonal relationships), verbal and nonverbal communication and expansion of the repertoire of interest and activities. In all sessions we used toys, books and objects of interest of children and/or physical stimulation activities, such as tickling. For some children, we selected album with pictures of familiar people and objects, as an alternative strategy for communication. Every child was treated by the same therapist during the entire study, for the reliability of the execution of the therapeutic procedures and especially to guarantee an interpersonal bond, which is essential for children of the autistic spectrum.

The indirect therapeutic intervention, on the other hand, consisted of strategies planned by the speech and language therapist, but executed by the families. During 15 orientation

sessions, without the presence of the children, the parents of both groups were guided and encouraged to expose their doubts and carry out strategies for the resolution of routine problems. Families were also seen to by the same therapist, for the guarantee of attachment and reliability in the execution of the procedures. In order to identify a time and to measure the evolutionary process of the groups, and also with a diagnostic purpose, parts of the ASIEP-2<sup>(13)</sup> were used in three different moments: beginning of intervention (time 0), after six months (time 1) and at the end of 12 months (time 2).

Part 1: *Autism Behavior Checklist (ABC)*, translated and pre-validated to the Portuguese Language<sup>(14,15)</sup>, is a list of non-adaptive behaviors (57) divided into the following areas: Sensory, Body and Object Use, Language, Relating, Social and Self-Help. From the overall score is plotted a behavioral profile that allows the adult to analyze the severity of the condition and monitoring of the children. It was applied by the speech and language therapist in the form of an interview, in order to minimize the eventual effects of the level of academic education of the responsible adults.

Part 2: *Sample Vocal Behavior (SVB)*<sup>(15)</sup> analyzes verbal and pre-verbal communication by the following parameters using behavioral observations (45 minute session) that should be recorded and logged: Average length, Autistic speech characteristics (number of atypical emissions) and Language age raw score (typical emissions).

Part 3: *Interaction Assessment (IA)*<sup>(15)</sup> takes into account social responses of the child towards the adult and toys, in sessions of 45 minutes, in the following situations: Autistic Interaction Score, Interaction; Constructive independent play; No response and Aggressive negative

The data of the re-evaluations was analyzed by two blind observers, in other words, by two speech and language therapists with clinical experience on the treatment of children of the autistic spectrum and who did not know the group each child belonged to. And for coherence between measurements, the Intraclass Correlation Coefficient was used.

For the analysis of the results, the maternal perception on the evolutionary process of the child was considered, registered by way of the application of the ABC. The ABC registers were

analyzed in their total value and in each of the areas which compose it, in both groups and in all three moments. The extension and speed of the evolutionary process of the groups were also compared in the areas of communication and social interaction, through the items of the SVB and the IA.

In this study, the term “extension” is considered as the entire gain obtained during the evolutionary process of the child, measuring comparatively, with the instruments mentioned above. Meanwhile, “speed” refers to the gain in the evolutionary process taking into consideration the extension along the period (12 months).

## Statistical method

For the descriptive analysis, tables were elaborated containing descriptive statistics between group and time. For the inferential analysis, a level of significance of 5% was established. ANOVA was adopted with the objective of verifying the effect of the groups and of time. When ANOVA pointed out a significant effect, the Bonferroni’s method was used.

## RESULTS

The descriptive statistics for the total scores and each area of the ABC, the three times, can be seen in Table 1.

In the inferential analysis, when considering the total values, we found a significant decrease over the three moments, the GT ( $p=0.049$  and  $000.0$ ), and only between times 1 and 2 ( $p=0.004$ ) in the GO. There was difference between groups only at time 0 ( $p=0.000$ ), with the highest average in the GT. There were significant decreases in mean both groups between the times 0 and 1 on Sensory ( $p=0.010$ ), Relating ( $p=0.010$ ) and Social and Self-Help ( $p=0.002$ ) areas. In the areas of Body and Object Use ( $p=0.004$ ) and Language ( $p=0.015$ ) difference was statistically significant only between times 1 and 2, in both groups.

The descriptive statistics for the items of Interaction Assessment are shown in Table 2 and the items of Sample Vocal Behavior, in the three times, in Table 3.

In the Autistic interaction Score, there was a decrease in the averages with the passing of time. In the Interaction item, the

**Table 1.** Descriptive statistics of the ABC areas per group on the three assessment occasions

Occasions (months)	Group	Mean Total	Mean SE	SD	Mean OB	SD	Mean LG	SD	Mean SH	SD	Mean RE	SD
T0 (0)	GT	125	22.3	2.6	24.3	14.7	22.5	6.4	19.8	5.0	35.2	3.4
	GO	102	17.6	8.1	27.4	14.8	17.0	6.4	16.8	5.3	25.0	13.7
T1 (6)	GT	96	16.0	4.9	20.3	11.9	21.5	7.0	15.2	4.7	22.7	6.6
	GO	94	15.4	7.6	25.2	14.0	15.4	5.1	16.6	3.8	24.0	12.9
T2 (12)	GT	86	13.7	5.6	16.5	11.2	17.8	8.8	15.3	3.3	22.7	9.6
	GO	79	12.6	5.6	17.2	10.8	14.0	6.0	15.6	5.2	22.0	15.7

**Note:** SE = sensoria; OB = Object and Body Use; LG = Language; SH = Social Self Help; RE = Relating; SD = standard deviation; TG = therapy group; OG = orientation group

**Table 2.** Descriptive statistics of the Interaction Assessment per group on the three assessment occasions

Occasion (months)	Group	N	Mean E AIS	SD	MMean INT	SD	Mean CIP	SD	Mean NR	SD	Mean AG	SD
0	TG	6	37.2	28.3	20.5	17.9	17.5	10.7	9.70	11.9	0.3	0.80
	OG	5	47.6	32.0	16.6	18.3	9.00	11.1	16.2	16.3	6.2	12.8
1	TG	6	20.5	25.4	33.7	16.6	8.20	9.40	6.20	9.5	0.0	0.0
	OG	5	41.2	30.5	20.6	17.1	11.0	12.8	13,8	16.4	2.4	5.4
2	TG	6	16.3	19.3	35.2	15.5	8.30	10.4	3,50	4.20	1.0	2.50
	OG	5	38.8	25.2	20.4	16.2	10.4	8.60	11.2	9.60	6.0	10.8

**Note:** AIS = Autistic Interaction Score; INT = Interaction item; CIP= Constructive Independent Play; NR = No Response; SD = standard deviation; AN = Aggressive negative; TG = therapy group; OG = orientation group

**Table 3.** Descriptive statistics of the Sample Vocal Behavior per group on the three assessment occasions

Occasion (months)	Group	N	Mean LS	SD	Mean AS	SD	Mean AL	SD
0	TG	6	1.8	1.0	38.5	21.12	85	49.5
	OG	5	0.9	1.3	7	8.43	56.6	74.8
1	TG	6	1.9	1.1	20.5	16.68	111.3	49.1
	OG	5	1.0	1.3	17.6	22.5	68	74.2
2	TG	6	1.8	0.8	35.8	60.4	119.7	47.3
	OG	5	1.0	1.3	22.4	30.9	73.8	69.2

**Note:** LS = Language Age Raw Score; SD = standard deviation; AS = Autistic Speech Characteristic; AL = Average Length; TG = therapy group; OG = orientation group

average at time 1 was greater than at time 0 ( $p=0.030$ ). In the Constructive Independent Play item, a significant decrease of the averages between the times of 0 and 1 in TG was detected ( $p=0.022$ ). In the items of No response and Aggressive negative, no effects of time were detected.

In the application of ANOVA (inferential analysis) to data from the Average Length and Autistic Speech Characteristics, were not detected effects of group and time. In the analysis of the Language Age Raw time effect was detected ( $p=0.002$ ). Thus, the Bonferroni’s method, the average time was greater than 1 at time 0 ( $p=0.026$ ) and the mean time 2 was higher than at time 1 ( $p=0.030$ ).

## DISCUSSION

The extent and speed of the evolutionary process, evident in the first six months, especially in the GT Group, both in the total values of ABC and in the areas of which it is comprised, show that during the first half of the year, the guidelines and direct actuation with the child caused a greater impact, allowing for a more expressive therapeutic benefit.

In addition, after 12 months of study, the behavioral changes in both groups became noticeable. Even in the areas of Body and Object Use and Language, which showed no significant changes in the first half of the year, the mothers in both groups reported decreased non-adaptive behaviors for the last six months.

Several authors have stressed the importance of directing

assistance both to children and their families. This has happened due to the severe problems in the families’ relational dynamics that occur as a result of the children’s mental and emotional developmental delays. These delays limit the creation and maintenance of reciprocity situations among families<sup>(14-20)</sup>. Other studies have also proved that a family’s commitment to treatment ensures that the therapeutic goals are amplified in the household context, providing greater synchronicity and communicative and social contingency between the child and their interlocutors<sup>(2-7)</sup>.

In the Interaction Assessment, the Autistic Interaction Score, the value of which should decrease as the child’s social performance improves, we observed a better GT performance. For the Interaction and Constructive Independent Play items, we detected a difference between both groups’ first semester averages. The GT Group performed better in all items, including the No Response and Aggressive Negative items<sup>(6,7)</sup>, whose indices should decrease over time, indicating fewer behaviors of isolation and less refusal to participate in activities. These data show that direct and indirect interventions should always keep in mind those aspects that are related to the promotion of interactive situations since they make it possible to create communication opportunities between the child and the interlocutor.

Regarding the Sample Vocal Behavior, the GT Group performed better throughout the three periods in relation to the Average Length. For the Autistic Speech Characteristics item, we witnessed echolalic production without functionality, and unintelligibility tended to decrease, especially in the GT

Group. There was also a significant increase in Language Age Raw for both groups.

Although the Sample Vocal Behavior addresses the linguistic productions more specifically, it was possible to evaluate communication atypias through the Autistic Speech Characteristics item and to additionally record speech progress by analyzing Average Length and Language Age Raw.

Children's exposure to different situations, whether tutored or not by adults, allowed a careful look at their communicative inabilities and abilities<sup>(3,4,14-25)</sup>. It is important to emphasize that the progress concerning the extent and speed of the children's evolutionary process could be identified both by the mothers and the therapist. This combination of perspectives provided complementary information, thus, deepening the understanding of the impact of social deviations in daily interpersonal relationships and enabling a greater reflection on the communicative dynamics of the children with autism spectrum disorders included in this study<sup>(2-7,19-25)</sup>. In the same way, we witnessed better results and important behavioral changes in GO, in addition to GT, during the 12 months of this study.

The six-month time interval has proven to be important for providing clinical evidence of intervention, because it was possible to see significant changes in both groups over the first six months of the intervention, and these patterns of change persisted throughout the 12 months of the study.

Despite the limitation related to our study's sample size, we suggest that other clinical trials be carried out in order to strengthen evidence-based clinical practice, particularly speech therapeutic therapy.

## CONCLUSION

The six-month time interval has become a reliable evidence marker, both for indirect actions and for the combination of direct and indirect actions. Therefore, it can serve as a parameter for speech therapeutic interventions directed toward autism spectrum disorders.

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