Original Article

Artigo Original

Ana Carina Tamanaha[1]
Jacy Perissinoto[2]

Comparison of the evolutional process of children with autism spectrum disorders in different language therapeutic interventions

Comparação do processo evolutivo de crianças do espectro autístico em diferentes intervenções terapêuticas fonoaudiológicas

Keywords

Autistic disorder
Asperger syndrome
Language disorder
Language therapy
Controlled clinical trial

ABSTRACT

Purpose: To analyze and compare the extension and the speed of the evolutional process of children with Autism Spectrum Disorders in direct and indirect interventions as opposed to only indirect intervention. **Methods:** The design of this study is a clinical trial. The sample was composed of 11 children diagnosed with Autism (n=6) and Asperger syndrome (n=5) by a multidisciplinary team, that attended specialized speech-language pathology therapy at the institution were the study was carried out. These children were randomly divided into two groups: Therapy Group (TG) – composed by six subjects receiving both direct and indirect intervention; and Orientation Group (OG) – constituted by five subjects receiving exclusively indirect intervention. It was used the Autism Behavior Checklist (ABC) to interview the mothers, and the Sample of Vocal Behavior (SVB), in three occasions: at the beginning of the intervention process (time 0), six months later (time 1) and 12 months later (time 2). **Results:** It was observed greater speed and extension in the evolutional process of the TG Group, both in the analysis of the Autism Behavior Checklist (total and partial scores) and the Sample of Vocal Behavior, especially in the item Full Language. The performance of children with Asperger syndrome was considered more positive when compared to that of children with autism. There was greater evolution in younger children and with normal, mild, and moderate adaptive functioning. **Conclusion:** The tendency towards better performance of the children attending direct and indirect intervention showed that this association is fundamental in the therapeutic process of children with Autism Spectrum Disorders. Clinical trial registry number (ICMJE): NCT00725556

Descritores

Transtorno autístico
Síndrome de Asperger
Transtorno de linguagem
Terapia da linguagem
Ensaio clínico controlado

RESUMO

Objetivo: Analisar e comparar a extensão e a velocidade do processo evolutivo de crianças com Distúrbios do Espectro Autístico assistidas em intervenção terapêutica fonoaudiológica direta e indireta em detrimento à indireta. **Métodos:** Trata-se de ensaio clínico piloto. A amostra constituiu-se de 11 meninos de quatro a dez anos diagnosticados por equipe multidisciplinar com Autismo Infantil (n=6) e síndrome de Asperger (n=5), que frequentavam terapia fonoaudiólogica especializada na instituição onde o estudo foi realizado. As crianças foram divididas aleatoriamente em dois grupos: Grupo GT – constituído por seis crianças assistidas em intervenção terapêutica fonoaudiológica direta e indireta; Grupo GO – com cinco crianças acompanhadas apenas indiretamente. Utilizamos o *Autism Behavior Checklist* para entrevistar as mães e a Avaliação do Comportamento Vocal, em três momentos: tempo zero, após seis (tempo 1) e doze meses (tempo 2). **Resultados:** Verificamos tendência à maior velocidade e extensão do processo evolutivo no Grupo GT, tanto na análise dos valores totais do *Autism Behavior Checklist* e nas áreas que o compõem, quanto na avaliação do Comportamento Vocal, especialmente no item Faixa da Linguagem. O desempenho das crianças com síndrome de Asperger foi considerado mais positivo quando comparado ao das crianças autistas. Houve padrão evolutivo mais acentuado em crianças de maior faixa etária e com quociente social normal, leve e moderado. **Conclusão:** A tendência de melhor desempenho das crianças assistidas em ambas as intervenções mostrou que a associação de ações diretas e indiretas é fundamental no processo terapêutico fonoaudiológico de crianças com Distúrbios do Espectro Autístico. Número de registro do ensaio clínico (ICMJE): NCT00725556

Correspondence address:
Ana Carina Tamanaha
R. Botucatu, 802, Vila Clementino,
São Paulo (SP), Brasil. CEP: 04023-900
E-mail: anacarina.otor@unifesp.epm.br

Received: 11/28/2010

Accepted: 2/24/2011

Studied carried out at Universidade Federal de São Paulo – UNIFESP – São Paulo (SP), Brazil.
(1) Speech-Language Pathology and Audiology Department, Universidade Federal de São Paulo – UNIFESP – São Paulo (SP), Brazil.
(2) Speech-Language Pathology and Audiology Department, Universidade Federal de São Paulo – UNIFESP – São Paulo (SP), Brazil.

INTRODUCTION

Conditions that compose the Autism Spectrum Disorders are characterized by severe chronic impediments to social interaction, communication and interests[1,2]. Among the categories that are a part of this group of disorders are Child Autism and Asperger syndrome.

Several studies have discussed the need to provide more efficient communication opportunities to individuals in these conditions[2-8]. Therefore, the presence of interlocutors who are aware of the specific characteristics of these subjects is essential, as is the use of strategies that simultaneously take advantage of, and expand each communicative signal observed, either verbal or nonverbal.

In recent decades, language and speech intervention has been emphasized as a method for social adaptations of communicative behavior, enabling better inclusion of autistic children in their social environment. It is also observed that when a direct intervention is followed by an indirect one, where the therapeutic context and setting are widened by means of orientation to the family and school, the course of the evolutionary process has increased its speed and thoroughness. The design of therapeutic language interventions should consider the participation and engagement of the family. It is important for parents to detect the atypical manifestations in development and to create communicative contexts in which children have effective participation[3-8].

Caring for the parents, either providing them with accurate information about child development, welcoming questions and requests, or even inviting them to participate as language agents, is fundamental in the child's speech therapy process[3-8].

Believing that combined direct therapeutic intervention to indirect speech and language intervention allows a greater evolutionary pattern of children within the autistic spectrum compared to the mere implementation of indirect intervention, the purpose of this study was to analyze and compare the length and speed of the evolutionary process of children with Autistic Spectrum Disorders assisted by combined direct and indirect speech therapy intervention as opposed to those receiving only indirect assistance.

METHODS

Study design

This was a pilot clinical trial, approved by the Research Ethics Committee of the Universidade Federal de São Paulo, under process number 1570/05. All parents/guardians of the children signed terms of informed consent.

Sample

The sample was composed by 11 children diagnosed by a multidisciplinary team with Autism (n=6) and Asperger syndrome (n=5) based on the criteria of the DSM-IV-Tr[1] and under care at the Language and Speech Laboratory for Autism Spectrum Disorders of the Universidade Federal de São Paulo (UNIFESP). All the children were male, with ages between four and ten years, with an intelligence quotient indicating mild to moderate degrees of mental retardation[9] and a social quotient classified in the categories normal/mild-moderate or severe-profound impairment[10].

Both neurological and hearing developments were determined based on normality parameters.

Three children were considered non-verbal, presenting vocalizations as the predominant means of communication at the beginning of the study. Eight children were classified as verbal, as they produced verbal emissions involving at least 75% of the phonemes in the Portuguese language[11]. All children were regularly enrolled in public schools – six in preschools and five in elementary schools, in the latter group, two children attended special education classes.

The inclusion criteria were a multidisciplinary diagnosis of Autism Spectrum Disorder, enrollment in an educational institution and availability of the family to participate in orientation sessions and sessions of speech and language therapy for at least twelve months, thus ensuring the adherence of at least 70% of the parents and children to the study.

The exclusion criteria were co-morbidities involving motor, sight, hearing and/or physical impairment.

Procedures

The children were randomly divided into two groups: six were receiving both direct and indirect intervention (Therapy Group – TG), and five were receiving exclusively indirect intervention (Orientation Group – OG) (Chart 1).

The direct speech and language therapy intervention TG Group was formed in planning and implementation of strategies focused on the abilities and disabilities of each child, implemented by the speech and language therapist. Individual sessions were performed (48), always with parent participation, which involved either watching the interventions, or actually dealing with the child. The average duration of each session was 45 minutes. All children and their families were treated by the same speech and language therapist to guarantee the entail and reliability in the execution of the procedures.

The indirect speech therapy intervention in turn, constituted the planning of strategies performed by the speech and language

Chart 1. Distribution of children in groups according to criteria adopted

Groups	Age		Diagnosis		Social quotient	
	50m-72m	73m-120m	Autism	Asperger	N-M-M	S-P
TG	3	3	3	3	2	4
OG	3	2	2	3	2	3

Legend: TG = therapy group ; OG = orientation group; N-M-M = normal-mild-moderate; S-P = severe-profound

therapist, but these were implemented by the families. Parents of both groups were instructed and encouraged to express their doubts and implement strategies for solving routine problems in fifteen orientation sessions without the presence of the children.

We used the following parts of ASIEP-2[12] on three occasions: at the beginning on the intervention process (time 0), six months later (time 1) and 12 months later (time 2).

Part 1: Autism Behavior Checklist (ABC), translated into Portuguese and pre-validated[5,6], is a list of 57 different behaviors that allows a detailed description of the non-adaptive characteristics in the following areas: Sensory (9); Body and Object Use (12); Language (13); Social Self Help (11); and Relating (12). It was administered to caregivers in interview form by the speech therapist in charge of the therapy process, in order to minimize the possible effects of the caregivers' schooling.

Part 2: Sample of Vocal Behavior (SVB)[5,7] analyzes verbal and pre-verbal communication according to the parameter: Average Length; Characterization of Speech (number of atypical verbalization), and Full Language (typical verbalization).

Re-assessment data were analyzed by two blind observers, that is, by two speech and language therapists with clinical experience in caring for children with Autism Spectrum Disorders who did not know the origin and the groups to which each child belonged. The agreement between these measures was obtained using the Intraclass Correlation Coefficient.

For data analysis, we considered the mother's perception about the progress of her child, registered by the results of the ABC. The ABC records were analyzed in their total scores, and in each of the areas that compose the checklist, in both groups, over the three different moments. We also compared the extent and speed of the evolutionary process of both groups, as far as their communication, using the items in the Sample of Vocal Behavior.

In this study we considered the term extent as any improvement the children's progress, measured by comparison of the results of the instruments mentioned above. The term speed refers to the velocity gain in the evolutionary process, considering the extension over time (12 months). The influence of the multidisciplinary diagnosis (Autism – Asperger syndrome), age (50-72 months or 73-120 months), and measures of adaptative functioning (normal-mild-moderate or severe-profound) was also analyzed.

Statistical analysis

For descriptive analysis of group and occasions, the sample data was summarized in tables. In the inferential analysis, analysis of variance (ANOVA) for repeated measurements was employed to determine the effect of group, social quotient and time on the mean scores. A p-value of 0.05 was adopted for the effect of the interaction between group and time. When ANOVA revealed significant effects, the Bonferroni criterion was used to locate the differences between the means involved.

RESULTS

Tables 1 and 2 show the descriptive statistics of total scores and of each area of the ABC.

In inferential analysis the average total in the social category for Severe-profound was higher (p=0.000). TG had a significant decrease between the different times, while this was true in OG only between times 1 and 2. We observed differences between groups only at time 0 (p=0.000), while the average was higher in GT.

The ANOVA indicated significant differences, with higher averages in category Severe-profound in all areas and in both groups.

In Sensory, Language, Social, Self Help and Relating areas, significant decreases in averages occurred between times 0 and 1 in both categories of social quotient. In the area of Body

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

Occasion (months)	Group	n	Mean	SD	Minimum	Median	Maximum
T0 (0)	TG	6	124.67	21.62	93	132	146
	OG	5	101.8	31.9	54	115	134
T1 (6)	TG	6	95.67	23.67	60	104.5	118
	OG	5	94.2	30.4	52	104	132
T2 (12)	TG	6	86.0	22.31	54	88.5	113
	OG	5	79.0	28.3	42	86	114

Legend: TG = therapy group; OG = orientation group; SD = standard deviation

Table 2. Descriptive statistics of the ABC areas per group on the three assessment occasions

Occasion (months)	Group	n	Mean SE	SD	Mean BO	SD	Mean LG	SD	Mean SSH	SD	Mean RE	SD
T0 (0)	TG	6	22.3	2.6	24.3	14.7	22.5	6.4	19.8	5.0	35.2	3.4
	OG	5	17.6	8.1	27.4	14.8	17.0	6.4	16.8	5.3	25.0	13.7
T1 (6)	TG	6	16.0	4.9	20.3	11.9	21.5	7.0	15.2	4.7	22.7	6.6
	OG	5	15.4	7.6	25.2	14.0	15.4	5.1	16.6	3.8	24.0	12.9
T2 (12)	TG	6	13.7	5.6	16.5	11.2	17.8	8.8	15.3	3.3	22.7	9.6
	OG	5	12.6	5.6	17.2	10.8	14.0	6.0	15.6	5.2	22.0	15.7

Legend: TG = therapy group; OG = orientation group; SD = standard deviation; SE = sensory ; BO = body and object use; LG = language; SSH = social and self help; RE = relating

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

Occasion (meses)	Group	n	Mean AL	SD	Mean CS	SD	Mean FL	SD
T0 (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
T1 (6)	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
T2 (12)	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

Legend: TG = therapy group; OG = orientation group; SD = standard deviation; AV = average length; CS = characterization of speech; FL = full language

and Object Use, there was a statistically significant difference between times 1 and 2, especially in the category Normal-Mild-Moderate

Table 3 shows the descriptive statistics of items of the Sample of Vocal Behavior.

When applying ANOVA to data from the Extension Media and Characterization of Speech, there were no significant groups, times, social quotients or their interactions. When analyzing Full Language, a time effect was detected (p=0.002). With Bonferroni's test, the average in time 1 was higher than in time 0 (p=0.026) and the mean at time 2 was greater than in time 1 (p=0.030).

Regarding the analysis of interference of the variables: age, multidisciplinary diagnosis and social quotient, there was a tendency towards a greater extent and speed of the evolution pattern of children aged 73-120 months. The same is true for the children with Asperger syndrome, as well as for those classified as having normal-mild-moderate social quotient.

DISCUSSION

In analyzing the total values of the ABC, when considering only the means, there is a trend toward better performance of the TG throughout the three stages,that is, the evolutionary pattern of this group had a higher rate and extent throughout the entire period of intervention monitoring. These findings were confirmed by inferential analysis. In OG, a statistically significant difference was detected between means, only in the last semester. There were differences between the averages in the two groups only at time zero, being higher in TG.

Even though there was a statistically significant difference between the comparative performances of the groups only at time zero of the study, we noted that the GT group had a significantly more pronounced pattern of evolution, as there was a general decrease of the ABC score between the three different moments. In the OG Group, as mentioned above, the only statistically significant difference was found between times 1 and 2.

Several authors have stressed the importance of assistance for families due to the severe disturbance in the relational dynamics that takes place because of the impairment in mental and emotional development of their children, which limits the creation and maintenance of reciprocity conditions between the child and his family[14-20]. Other conducted studies have also shown that family engagement ensures that therapeutic goals are enhanced in the household, providing a greater synchronicity and both communicative and social between children and their interlocutors[2-8,15-20].

We note that in the first six months of the study, the extent and speed of the evolutionary process became more evident, especially in the TG group, both in the total values of the ABC, and in the separate areas that comprise it. This shows that during the first semester, the guidelines and direct intervention with the child had a greater impact, allowing for a more significant therapeutic gain. In Sensory and Relating areas, for example, there was a statistically significant decrease of the values obtained between times 0 and 1, in both groups. Although not statistically significant, the Language and Social and Self Help areas have also signaled towards a favorable performance over time.

At the end of the 12-month study, the behavioral changes in both groups became quite remarkable. Even in the Use of Body and Object area, where values have not suffered such significant changes in the first half of the study, between times 1 and 2, the mothers of both groups began to identify the reduction of non-adaptive behavior. These findings demonstrate the positive effect of a collaboration between family and therapist [3,4,14-19].

In regards to the Sample of Vocal Behavior, there was an observed trend toward better performance of the TG Group, on the three observed times in as far as the Average Length. In the specific item Characterization of Speech, it found that echolalia, not functional, and unintelligible emissions tended to decrease, especially in the TG group. There was a statistically significant increase in Full Language for both groups.Although the Sample of Vocal Behavior specifically contemplates the linguistic productions, we evaluated the atypical communication through the item Characterization of Speech and, in a complementation, by recording progresses through the analysis of the Average lenght and Full Language.

Children's exposure to different situations, whether overseen by an adult or not, allowed a careful look at their disabilities and communication skills[3,4,20-24]. As for multidisciplinary diagnosis, children with Asperger syndrome showed a trend towards greater extent and speed in the evolutionary process both in the analysis of the ABC, and in the Sample of Vocal Behavior[16-18].

In general, the chronologically older children considered in this study (73 to 120 months) showed trends towards greater extent and speed[19,20]. Children with Normal-Mild-Moderate social quotient also had better performances[21-24]. Importantly, advances in both the extent and speed of the evolutionary process of the children could be identified both by their mothers, and by the speech and language therapist. This combination of

different ways of looking provided complementary information and a deeper understanding of the impact of deviations in daily social relationships and a greater reflection on the communicative dynamics of autistic spectrum children assisted in this study[2-8,19-24].

CONCLUSION

Although we have identified evolutionary pattern in both groups, both from the perspective of mothers and professionals, we conclude that the combination of direct and indirect actions is crucial in the therapeutic process for children with autism spectrum disorders. This combination provides greater extent and speed of evolution of patients and, therefore, is more effective than the indirect intervention exclusively.

ACKNOWLEDGEMENTS

To Prof. Marisa Frasson de Azevedo, PhD, Prof. Luiz Celso Vilanova, PhD, and to Prof. Marcia R F Marteletto, PhD, for their valuable contributions in the audiological, neurological and psychological assessments, respectively. To Prof. Jair Mari, PhD, for the availability in contributing to the methodological construction of this study, and to Prof. Brasilia Maria Chiari, PhD, for the constant support towards research.

REFERENCES

1. American Psychiatric Association. DSM-IV-TR: manual diagnóstico e estatístico de transtornos mentais. 4a. ed. rev. Porto Alegre: Artmed; 2003.
2. American Speech-Language-Hearing Association. Guidelines for speech- language pathologists in diagnosis, assessment, and treatment of autism spectrum disorders across the life span. 2006. Available from: http://www.asha.org/docs/pdf/GL2006-00049.pdf
3. Tamanaha AC, Perissinoto J, Chiari BM. Development of autistic children based on maternal responses to the autism behavior checklist. Pró Fono. 2008;20(3):165-70.
4. Marteleto MRF, Lima e Menezes CG, Tamanaha AC, Chiari BM, Perissinoto J. Administration of the Autism Behavior Checklist: agreement between parents and professionals' observations in two intervention contexts. Rev Bras Psiquiatr. 2008;30(3):203-8.
5. Green J, Charman J, McConachie H, Aldred C, Slonims V, Howlin P, Le Couteur A, Leadbitter K, Hudry K, Byford S, Barrett B, Temple K, Macdonald W, Pickles A; PACT Consortium. Parent-mediated communication-focused treatment children with autism (PACT): a randomised controlled trial. Lancet. 2010;375(9732):2152-60. Comment in: Lancet. 2010;375(9732):2124-5.
6. Charman T. Developmental approaches to understanding and treating autism. Folia Phoniatr Logop. 2010;62(4):166-77.
7. Drew A, Baird G, Baron-Cohen S, Cox A, Slonims V, Wheelwright S, et al. A pilot randomised control trial of a parent training intervention for pre-school children with autism. Preliminary findings and methodological challenges. Eur Child Adolesc Psychiatry. 2002;11(6):266-72.
8. McConachie H, RandleV, Hammal D, Le Couteur A. A controlled trial of a training course for parents of children with suspected autism spectrum disorder. J Pediatr. 2005;147(3):335-40. Comment in: J Pediatr. 2005;147(3):283-4.
9. Thorndike RL, Hagen EP, Satter JM. Stanford Binet Intelligence Scale: Fourth edition. Technical manual. Chicago: Riverside Publishing Co.; 1986.
10. Sparrow SS, Balla DA, Cicchetti DV. Vineland adaptive behavior scales. Circle Pines (MN): American Guidance Service; 1984.
11. Fernandes FDM. Autismo infantil: repensando o enfoque fonoaudiológico – aspectos funcionais da comunicação. São Paulo: Lovise; 1996.
12. Krug DA, Arick JA, Almond PJ. Autism screening instrument for educational planning. 2nd ed. (ASIEP 2). Austin: Pro-Ed; 1993.
13. Marteleto MRF, Pedromônico MRM. Validity of Autism Behavior Checklist (ABC): preliminary study. Rev Bras Psiquiatr. 2005;27(4):295-301
14. Volkmar FR, State M, Klin A. Autism and autism spectrum disorders: diagnostic issues for the coming decade. J Child Psychol Psychiatry. 2009;50(1-2):108-15.
15. Perissinoto J. Linguagem da criança com autismo. In: Perissinoto J, organizador. Conhecimentos essenciais para atender bem a criança com autismo. São José dos Campos: Pulso Editorial; 2003. p. 39-45
16. Jones W, Klin A. Heterogeneity and homogeneity across the autism spectrum: the role of development. J Am Acad Child Adolesc Psychiatry. 2009;48(5):471-3.
17. Lord C. Commentary: achievements and future directions for intervention research in communication and autism spectrum disorders. J Autism Dev Disord. 2000;30(5):393-8.
18. Aldred C, Green J, Adams C. A new social communication intervention for children with autism: pilot randomised controlled treatment study suggesting effectiveness. J Child Psychol Psychiatry. 2004;45(8):1420-30.
19. Klin A, Lin DJ, Gorrindo P, Ramsay G, Jones W. Two-years-old with autism orient to non-social contingencies rather than biological motion. Nature. 2009;459(7244):257-61.
20. Chawarska K, Klin A, Paul R, Macari S, Volkmar F. A prospective study of toddlers with ASD: short-term diagnostic and cognitive outcomes. J Child Psych Psychiatry. 2009;50(10):1235-45.
21. Stone WL, Yoder PJ. Predicting spoken language level in children with autism spectrum disorders. Autism. 2001;5(4):341-61.
22. Siller M, Sigman M. The behaviors of parents of children with autism predict the subsequent development of their children's communication. J Autism Dev Disord. 2002;32(2):77-89.
23. de Bildt A, Sytema S, Kraijer D, Sparrow S, Minderaa R. Adaptive functioning and behaviour problems in relation to level of education in children and adolescents with intellectual disability. J Intellect Disabil Res. 2005;49(Pt 9):672-81.
24. Klin A, Saulnier CA, Sparrow SS, Cicchetti DV, Volkmar FR, Lord C. Social and communication abilities and disabilities in higher functioning individuals with autism spectrum disorders: the Vineland and the ADOS. J Autism Dev Disord. 2007;37(4):748-59.