

Stereotyped movement disorder associated with language delay - data from case report that contribute to differential diagnosis

Transtorno do movimento estereotipado associado ao atraso da linguagem – dados de estudos de caso que contribuem para o diagnóstico diferencial

Trastorno del movimiento estereotipado asociado con el retraso del lenguaje: datos de estudios de casos que contribuyen al diagnóstico diferencial

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Abstract

Introduction: The repetitive movements associated with language disorders represent two important warning signs for ASD (Autism Spectrum Disorders). Even if, according to current research, the delay in language acquisition may not be part of the set of characteristics commonly observed in toddlers with Stereotyped Movement Disorder (SMD), this co-occurrence of language impairment and Stereotyped Movement Disorder may be more common than can be imagined, which leads to mistaken ASD diagnoses. **Objective:** To characterize the deviant language acquisition process associated with SMD, seeking to differentiate the specific characteristics of ASD. **Method:** This research presents a case report of two toddlers, aged 30 to 36 months, with an important delay in the acquisition and development of speech associated with the presence of stereotyped movements, with profiles considered at risk for autism. **Results:** The first assessment showed important results indicating ASD for both children. After a 6-month intervention, there was a decrease in the number of risk signs, such as remission of some be-

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Authors' contributions:

MCA: conception of study, methodology, data collection and sketch of the manuscript.

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havior characteristic of ASD, improvement in the intensity of repetitive movements and increase of the speech repertoire. **Conclusion:** Although the presence of repetitive or stereotyped movements is one of the classic signs of ASD, even if it co-occurs with other disorders equally suggestive to this diagnosis, such as delayed speech, for a conclusive diagnosis it is necessary the observation of other symptoms that manifest themselves persistently throughout development.

Keywords: Stereotypic Movement Disorder; Language Development Disorders; Autism Spectrum Disorder; Comorbidity; Early Signs.

Resumo

Introdução: Movimentos repetitivos associados a alterações de linguagem representam dois importantes sinais de alerta para os TEA (Transtornos do Espectro do Autismo). Ainda que, segundo pesquisas atuais, o atraso na aquisição da linguagem não faça parte do conjunto de características comumente observadas em crianças na primeira infância com Transtorno do Movimento Estereotipado (TME), a sua coocorrência pode ser mais comum do que se imagina, o que pode levar a diagnósticos falso positivo para os TEA. **Objetivo:** Caracterizar o processo desviante de aquisição da linguagem associado ao TME, buscando diferenciar das características específicas aos TEA. **Método:** A presente pesquisa apresenta o relato de caso de duas crianças, na faixa etária dos 30 aos 36 meses, com importante atraso na aquisição da fala associado à presença de movimentos estereotipados, com perfis considerados de risco para o autismo. **Resultados:** Na primeira avaliação as duas crianças apresentavam escore médio referente ao número de sinais de alerta para os TEA. Após intervenção de 6 meses, para diagnóstico diferencial, houve queda no número de sinais de risco, como remissão de alguns comportamentos característicos dos TEA, melhora na intensidade dos movimentos repetitivos e aumento do repertório de fala. **Conclusão:** Ainda que a presença de movimentos repetitivos ou estereotipados seja um dos sinais clássicos dos TEA, mesmo que coocorra com outras alterações igualmente sugestivas a este diagnóstico, como o atraso na fala, para que o diagnóstico seja conclusivo, é necessária a observação da presença de outros sintomas que se manifestam de forma persistente ao longo do desenvolvimento.

Palavras-chave: Transtorno de Movimento Estereotipado; Transtornos do Desenvolvimento da Linguagem; Transtorno do Espectro Autista; Comorbidade; Sinais de Risco.

Resumen

Introducción: Los movimientos repetitivos asociados con los cambios de lenguaje representa importantes señales de advertencia para los TEA (Trastornos del Espectro Autista). Aunque, según la investigación actual, el retraso en la adquisición del lenguaje no es parte del conjunto de características comúnmente observadas en niños en la primera infancia con trastorno de movimientos estereotipados, su coocurrencia puede ser más común de lo imaginado, lo que conduce a diagnósticos falsos positivos de TEA. **Objetivo:** Caracterizar el proceso de adquisición del lenguaje desviado asociado al Trastorno de Movimientos Estereotipados (TME), buscando diferenciar las características específicas de los TEA. **Método:** Esta investigación presenta el caso clínico de dos niños, de 30 a 36 meses, con un importante retraso en la adquisición y desarrollo del habla asociado a la presencia de movimientos estereotipados, con perfiles considerados en riesgo de autismo. **Resultados:** En la primera evaluación, los dos niños obtuvieron una puntuación media con respecto al número de señales de advertencia de TEA. Después de una intervención de 6 meses, diagnóstico diferencial, hubo una disminución en el número de signos de riesgo, como la remisión de algunos comportamientos característicos de los TEA, una mejora en la intensidad de los movimientos repetitivos y un aumento en el repertorio del habla. **Conclusión:** Si bien la presencia de movimientos repetitivos o estereotipados es uno de los signos clásicos de los TEA, aunque concurra con otros cambios igualmente sugestivos para este diagnóstico, como el retraso en el habla, para que el diagnóstico sea concluyente es necesaria la observación de la observación. otros síntomas que se manifiestan de forma persistente a lo largo del desarrollo.

Palabras clave: Trastorno de Movimiento Estereotipado; Trastornos del Desarrollo del Lenguaje; Trastorno del Espectro Autista; Comorbilidad; Signos Tempranos.

Introduction

The disorders that affect child development are characterized by deficits in beginning of development in the first years of the child life. Such disorders lead to personal, social and academic losses, and may compromise cognitive aspects such as language acquisition, learning, social skills and executive functions¹.

According to the last version of DSM-5 (Diagnostic and Statistical Manual of Mental Disorders)¹, the essential characteristic of Stereotyped Movement Disorder (SMD) is the presence of repetitive motor behavior, apparently impulsive and without apparent reason or purpose. In general, the movements mostly seen are hand and arm movements, head bobbing and rhythmic body movements, all without an obvious adaptive function.

After the recent appearance of the nomenclature, some practical criteria have been established in order to differentiate stereotypies from other possible conditions, but confusions of wrong misdiagnoses, and sometimes mistaken and cursory diagnoses, still occur with some frequency.

The literature²⁻⁵ has been engaged in debating and trying to clarify some aspects of stereotyping that cover both the current clinical definition, its etiology, and the bases and fundamentals for the intervention process, however, these are questions still without widely accepted answers.

The main difficulty in dealing with stereotyping in childhood is related to its presence in different conditions that may be associated, such as ASD (Autism Spectrum Disorders), the different genetic conditions such as Lesch-Nyhan Syndrome and Rett Syndrome, sensory processing disorders, Attention Deficit Hyperactivity Disorder, and moderate to severe intellectual disabilities.

According to researchs, the most frequent cases of stereotyped and repetitive movements are secondary, with about 90% of the cases occurring with some type of comorbidity. The most well-known is the occurrence of stereotyped movements in ASD. It is not unusual to observe children with autism showing stereotypes such as rhythmic head movements or hand and arm movements (flapping).

The stereotyped movement tends to bring some kind of pleasurable sensation, which leads many children to show frustration when the movement is interrupted. The feeling of pleasure represents

a distinguishing feature between SMD and Tic Disorder for example, however, this trait is not enough to distinguish SMD from ASD. The possibility of redirecting the child's attention, or even interrupting movements is the key to the differential diagnosis^{6,9,10}.

On the other hand, stereotypes may represent only a physiological and transient condition. Research^{5,11,12} indicates that about 60% of children with typical neurological development aged 2 to 5 year-old, present some form of repetitive and stereotyped movement.

In SMD, the stereotypes movement occur in a primary manner, i.e., isolated, without the co-existence of another condition that justifies their presence. The stereotypes emerge around 3 year-old and persist until adulthood, and there are reports of children who presented stereotyped movements before the age of 24 months¹².

Although children with primary stereotyped movements or SMD show typical neuro-cognitive development, motor problems may interfere with the development of activities of daily living or aspects involving social interaction. In particular, some studies point to the relationship between stereotyped movement and Motor Coordination Disorder^{5,13,14}, as well as according to reports from parents and caregivers, the children may present difficulties in concentrating and maintaining focused attention¹³. Meanwhile, there are no reports about delay in the acquisition of expressive language or even motor speech alterations such as Childhood Apraxia of Speech.

The present research brings the case report of two children, aged between 30 and 36 months, with severe delay in speech acquisition, presenting repetitive and impulsive motor behavior, aggravated in situations of agitation and excitement, who, after going through an intervention process aimed at the differential diagnosis, were diagnosed with SMD. The data were compared with those from two other children of the same age group with a similar profile but who were diagnosed with ASD. Although the research has as its main focus the case report of the two children with SMD, we will present a total of four cases; two children with SMD versus two children with ASD, functioning as a control group, in order to make the data analysis more robust and detailed.

According to researches about predictive signs for ASD¹⁵, repetitive movements as well as delay in the acquisition of expressive language represent characteristics that demand attention in view of a possible diagnosis of autism. Nevertheless, what was observed after inclusion in early intervention for 6 months, both children with SMD had a decrease of the other possible risk signs for ASD, including evolution in the language acquisition process remaining only the repetitive and stereotyped movements, although less frequently.

Method

Casuistry

This is a retrospective cross-sectional study developed in two approaches, qualitative, defined by 4 case studies (2 SMD cases and 2 control/ASD cases), based on descriptive data analysis.

The cases described are four male children, aged 30 to 36 months, with initial complaint of delayed speech acquisition, and concern, by parents and caregivers, regarding a possible diagnosis of ASD. At the time of reassessment, 6 months after the initial assessment of risk signs, two children were diagnosed with SMD and two with ASD, as shown in Table 1 below.

Table 1. Identification of research subjects based on age range and diagnosis

Case	Age Group		Diagnosis
	Assessment	Reassessment	
Case1	36 months	42 months	SMD
Case 2	34 months	40 months	SMD
ASD 1	36 months	42 months	ASD
ASD 2	32 months	38 months	ASD

Legend: SMD - Stereotyped Movement Disorder; ASD - Autism Spectrum Disorder

Procedure

All children underwent the same initial assessment and reassessment protocol, the latter occurring after 6 months of early intervention. The assessment/reassessment protocol consisted of three semi-structured clinical behavioral observation sessions based on the PROTEA-R-NV (ASD Suspected Assessment System, revised version)¹⁶ and by formal assessment of the level of language acquisition on both domains, speech, and comprehension, and development, by means of the Clinical Assessment of Language Development or ADL¹⁷.

The entire assessment and reassessment protocol was applied by a single evaluator. Parents signed the Free and Informed Consent Form (ICF) as directed by the Research Ethics Committee of Universidade Presbiteriana Mackenzie, where the research was approved for its development (CAAE 09955919.0.0000.0084).

After the initial assessment, the children were introduced into a multidisciplinary intervention process covering the areas of speech therapy, occupational therapy and psychology, structured

from an individualized teaching program based on Applied Behavior Analysis⁽¹⁾, focused on the minimization of the difficulties presented by each child and acquisition of new skills and improvement of pre-existing skills.

After 6 months of intervention, all children underwent reassessment based on the same protocol of the assessment, followed by evaluation with a neuropediatric to the final diagnosis.

Criteria for data analysis

The descriptive data of the children Case1 and Case2, both diagnosed with SMD were analyzed and compared to the results of two ASD children (ASD1 and ASD2), also male of the same age group and with similar initial complaint. These two children went through the same process of assessment, structured and multidisciplinary inter-

1 Applied Behavior Analysis, or ABA, is a widely studied science developed from Skinner's behaviorist theory. ABA-based intervention is recommended worldwide for people with ASD, as well as for children with different disorders that affect child development¹⁸.

vention, followed by reassessment after 6 months, however receiving at the end of the process the diagnosis of ASD.

Results

From the application of the assessment protocol, we obtained the data about the manifestations

that put the children at risk for ASD, based on the PROTEA-R-NV risk signs screening protocol.

The level of language acquisition, which could indicate the presence of a language disorder either secondary, for cases of ASD, or primary for cases of SMD was analyzed from the application of the ADL assessment instrument.

The data were collected and described qualitatively as shown in Chart 1 below.

Chart 1. Risk signs for ASD associated with language skills

	Age Group	Manifestations - PROTEA-N-RV	Language Skills - ADL	
			Comprehension	Speech
Case1	36 months	Deficit in shared attention response; deficit in social engagement, low assistance seeking, deficit in functional play, only evidence of symbolic play and restricted symbolic sequence, presence of stereotyped hand and body movements of medium magnitude, deficit in imitation behavior.	Maintains attention for 2 minutes on auditory and visual stimuli; understands simple orders supported by visual clues, identifies familiar objects; identifies familiar figures; understands simple orders unsupported by gestural clues; identifies everyday figures; recognizes actions within context.	Syllabic vocalizations; uses non-verbal communication.
Case2	34 months	Deficit in shared attention initiative and shared attention response; low search for assistance; presence of stereotyped hand and body movements of medium magnitude; deficit of imitation behavior.	Maintains attention for 2 minutes on auditory and visual stimulus; understands simple orders supported by gesture clues; identifies familiar objects; identifies everyday figures; understands simple orders without visual clues.	Syllabic vocalizations; produces 1 word; imitates 1 word; uses non-verbal communication.
TEA1	36 months	Deficit in shared attention initiative and shared attention response; deficit in social engagement; diffuse smiling; low assistance seeking; deficit in functional play; only evidence of symbolic play and restricted symbolic sequencing; presence of stereotyped hand movements of medium magnitude; deficit in imitation behavior.	Maintains attention for 2 minutes on auditory and visual stimuli; understands simple orders supported by gestural cues; identifies familiar objects; identifies familiar figures; understands simple orders not supported by gestural cues; identifies everyday figures; recognizes actions within the	Syllabic vocalizations; produces 1 word; imitates 1 word; uses non-verbal communication; produces 2-word sequence.
TEA2	32 months	Deficit in shared attention initiative and shared attention response; deficit in social engagement; diffuse smiling; low search for assistance; atypical exploration of objects; holds toys firmly but does not coordinate with gaze; deficit in functional play; only evidence of symbolic play and restricted symbolic sequencing; presence of stereotyped hand movements of medium magnitude; absence of imitation behavior.	Understands simple commands with support from gestural cues; identifies familiar objects.	Syllabic vocalizations.

The PROTEA-R-NV System is a screening tool for the presence of behaviors inherent to the symptomatology of ASD, which, divided into three axes, indicate the degree of risk for such diagnosis presented by the child.

Symptoms such as difficulty in shared attention initiative, deficit in shared attention response, deficit in imitation, restricted symbolic play, and presence of repetitive body movements are considered critical items for their theoretical-empirical or psychometric relevance in assessing the degree/risk for an ASD diagnosis.

These critical items are analyzed regarding the quality of the behavior and its frequency to

three diagnostic hypotheses: 1) absence of risk for ASD; 2) presence of relative risk for ASD; and 3) presence of risk for ASD.

The two children with SMD (Case1 and Case2), in the first assessment showed scores for the critical item's indicative of relative risk for ASD, while the ASD1 and ASD2 children reached scores indicative of risk for ASD.

The difference in the final scores indicates that although at first glance the four children show apparently similar deficit behaviors there are important differences in the quality and frequency of such behaviors as shown in Table 2.

Table 2. Critical Items - PROTEA-R-NV

Item	Case 1	Case 2	ASD1	ASD2
Shared Attention Initiative (CAI)	A	B	B	C
Shared Attention Response (SAR)	B	B	C	C
Imitation (IN)	C	B	C	D
Symbolic Play (SP)	B	A	C	C
Repetitive Body Movement (RBM)	C	C	C	C

Legend: A - typical; B - slight deviation; C - poor; D - absent

Note: The reading for the presence of repetitive body behavior should be done based on the following nomenclature: A - absent; B - low magnitude; C - medium magnitude; D - high magnitude

The child in Case1 exhibited typical behavior regarding shared attention initiative, that is, he directed the adult's focus of attention either by showing or handing a toy to the evaluator, always coordinating gestures with eye contact. In Case 2 and in the ASD1 child, what was observed was a difficulty in coordinating gestures such as pointing to the maintenance of eye contact. The ASD2 child had low eye contact associated with unconventional gestures, such as pointing to the floor when the toy was in the evaluator's hands.

Both children with SMD followed the same adult's focus of attention, looking where the evaluator points to, or responding, even if with gestures, to the interactions with the adult, but eye contact occurred only in restricted situations and after the evaluator's insistence. The ASD children (ASD1 and ADS2) observed in the study, despite following the same focus of attention as the adult, watching him manipulate an object, were unable to coordinate eye contact effectively and their interest was focused on the item and not on their interlocutor.

The imitation, either gestures or actions, of the Case2 child occurred intentionally, but in a mechanical way, in specific contexts, such as from songs of previous knowledge. However, the Case1 and ASD1 children did not imitate intentionally, that is, seeking to maintain interaction with the adult; when they did, they showed more interest in the sensory properties of the action, tending to excessive repetition, without changing turns. Only the ASD2 child did not present imitation behavior.

Among the four children, only Case 2 had pretend skills, such as pretending that a toy is another object, spontaneously and with different toys. The Case 1 child had behavior like Case 2, but with few toys and not very spontaneously. The two ASD children, on the other hand, showed signs of symbolic play, often occurring with the help of the evaluator.

The four children presented repetitive body movements, such as jumping, stamping their feet or rocking their bodies, in addition to hand movements of medium magnitude. This means that although the movements were of high intensity,

i.e., the child ignored or resisted interruption attempts, these adjustments did not always trigger intense inappropriate behaviors, such as crying, self-aggressive behavior or being aggressive with others. In the same way, the intensity of the movements was associated with specific situations, like switching activities, or even associated with a highly reinforcing toy or activity.

It is important to note that only the SMD children, Case1 and Case2, showed some behavior, among the critical items, with expected functioning for typical development.

In addition to the repetitive and stereotyped movements, the delay in language acquisition is also a point of congruence between the two pairs, as we saw in Chart 1 and as presented in Chart 2 below.

Chart 2. Acquisition level in the two language domains - ADL – Assessment

	Age group	Comprehension		Speech	
		Achieved item	Milestone achieved	Achieved item	Milestone achieved
Case1	36 months	Understands actions within a context	18 to 23 months	Gestural communication; Vocalizations - combinations of functional sounds	12 to 17 months
Case2	34 months	Understands simple commands without visual clues.	18 to 23 months	Vocabulary of at least 1 word; Imitates one word	12 to 17 months
ASD1	36 months	Understands quantity concepts; Understands some pronouns	24 to 29 months	Produces sequence of two single words	18 to 23 months
ASD2	32 months	Understands simple orders with the support of visual clues; Identifies familiar objects	12 to 17 months	Syllabic vocalizations	12 to 17 months

During the first evaluation, the four children presented significant delay in the language acquisition process. Although the comprehension tended to function better than speech, none of the children presented acquisitions expected for their range in both linguistic domains, indicating possible severe language disorder.

It is worth considering that, at the time of the first assessment, the children had considerable difficulty in the ability to follow instructions, which interferes with the quality of responses on formal tests.

After 6 months of intervention, the children went through a reassessment process, using the same initial protocol. Table 3 below presents the reassessment data compared to the initial assess-

ment, based on the answers to the critical items for ASD diagnosis of the PROTEA-R-NV.

As can be seen in Table 3 above, both the children in Case 1 and Case 2 started to show behaviors similar or close to what is expected for typical development, especially in shared attention skills, either the attention response or the shared attention initiative. Only the repetitive body movements remained at medium and low magnitude for Case1 and Case2, respectively.

Despite the improvement in most of the behaviors considered as risk for ASD, the children ASD1 and ASD2 did not show decrease of the main critical items. The children still had difficulty in following the same attentional focus as the adult, in coordinating eye contact with communicative gestures, as well as deficits in spontaneous imitation.

Table 3. Comparison of Answers to Critical Items – Assessment vs Reassessment - PROTEA-R-NV

Item	Case 1		Case 2		ASD1		ASD2	
	Ass.	Reass.	Ass.	Reass.	Ass.	Reass.	Ass.	Reass.
Shared Attention Initiative	A	A	B	A	B	B	C	B
Shared Attention Response	B	A	B	A	C	B	C	B
Imitation	C	B	B	A	C	B	D	B
Symbolic Play	B	A	A	A	C	A	C	C
Repetitive body movement	C	C	C	B	C	B	C	A

Legend: A - typical; B - slight deviation; C - poor; D - absent

Note: The reading for the presence of repetitive body behavior should be performed based on the following nomenclature: A - absent; B - low magnitude; C - medium magnitude; D - high magnitude

The ASD1 child showed considerable improvement in symbolic development, showing make-believe skills and functional play. Similarly, the ASD2 child was able to control repetitive body movements, making them functional or even extinguishing such behavior.

It is also possible to note advances in language acquisition in both pairs after the 6-month period of language intervention and other cognitive and behavioral skills. Chart 3 shows the description of the language acquisition level of the four children at the time of reevaluation.

Chart 3. Level of acquisition in the two language domains - ADL - Assessment

	Age group	Comprehension		Speech	
		Achieved item	Milestone achieved	Achieved item	Milestone achieved
Case1	42 months	Understands the part/all relationship; Recognition of actions through visual clues.	42 to 47 months	Increased vocabulary repertoire; Answers QU_ questions	30 to 35 months
Case2	40 months	Understands negative questions; Understands categories of items.	36 to 41 months	Increased vocabulary repertoire; Answers questions about yourself.	30 to 35 months
ASD1	42 months	Understands the part/all relationship; Recognition of actions through visual clues.	30 to 35 months	Names action in pictures; Answers QU_ questions	30 to 35 months
ASD2	38 months	Understands spatial concepts; Recognition of actions through visual clues.	24 to 29 months	Produces sequence of loose words.	18 to 23 mo

It can be noted that all four children showed significant progress in both language domains. The children in Cases 1 and 2 reached the developmental milestones for their age group for receptive language, and even the ASD1 and ASD2 children approached the expected milestones for typical development.

However, the speech remained below expected for the age groups for all children, although important acquisitions were observed. Case 1 and Case 2 started to present characteristics of a moderate language disorder. In contrast, ASD1 and ASD2 children maintained a profile indicative of severe language disorder.

Discussion

The diagnosis of ASD requires the presence of specific deficits and behaviors covering the areas of communication and social interaction, associated with repetitive and restricted behavioral patterns¹. The early signs of this condition can be observed from an early age, around 9 months of age¹⁵.

There is a growing interest in the characterization of predictive signs for ASD, with the main signs referring to skills such as shared attention, eye contact, and language acquisition¹⁵⁻¹⁶. Still, repetitive hand and body movements represent one of the core symptoms for the diagnosis, as well as one of the most recognized risk signs for ASD.

Initially, the four children of our research presented developmental characteristics and behaviors that resembled each other and placed them in an ASD risk group, since they show deficits in shared attention skills, restricted social interaction, imitation difficulties, and poorly developed symbolic play, in addition to delayed language acquisition associated with the presence of high magnitude repetitive hand and body movements.

Although the children in Case1 and Case2 displayed moderate signs compared to the ASD1 and ASD2 children, based on the frequency and quality with which these signs occurred, the symptoms kept open the possibility of an ASD diagnosis. Given the known heterogeneity with which autism features manifest from individual to individual, both cases required a diagnosis of transitional ASD. A transitional or provisional diagnosis demands observation and reassessment after intensive short- and medium-term intervention, in a developmental window of at least 3 or 6 months, and that considers the potentialities and needs of each child¹⁹⁻²¹.

After 6 months of intervention, the manifestation profile became more evident among the children in both groups (ASD and SMD). The children in Case 1 and Case 2 showed a decrease of the risk signs for ASD in the skills of shared attention and symbolic play. Case 1 was left with only a slight inadequacy in the imitation skill.

The ability to imitate, or according to Tomasello²² imitation with role reversal is interrelated with the skills of understanding the interlocutor's intention and shared attention. Therefore, it is not surprising that children who were diagnosed with ASD remained with difficulties in shared atten-

tion and imitation skills, since the autism picture predicts deficits in social interaction.

However, this justification does not address the deficit in imitation skills maintained by the child in Case 1, since there were advances in shared attention skills, as well as adequacy in social interaction.

The skills of shared attention and imitation, associated with the development of symbolic play are crucial for the acquisition and development of communication and speech, and for the child's overall development. This is because such skills are related to the ability to elaborate and construct language and thought^{16,23}.

In this way, it is expected that children with delayed language acquisition present deficits in symbolic play and imitation difficulty, leading us to suppose that alterations in these two abilities, or in one of them, may be clinical markers for the differential diagnosis between primary language disorders and ASD²⁴.

Roughly speaking, we suppose that the alteration in the imitation skill presented by the Case1 child is related to language alterations, still persistent in the condition, rather than to a deficit in shared attention skills and social interaction.

When comparing the acquisitions and deficits of the children in Cases 1 and 2 to the development of the ASD1 and ASD2 children, we noted that the remission of important deficits that acted as barriers to language acquisition and placed the two children with SMD in the risk group for TEA.

In general terms, both children, Case1 and Case2, acquired shared attention and symbolic play skills, improved imitation, which enabled the acquisition of language skills, expanding the vocabulary and functional language repertoire. Only repetitive and stereotyped movements remained.

The same could not be observed among the ASD children. Although it is possible to observe significant advances, some deficits showed to be persistent, requiring more time of intensive and targeted intervention.

Conclusion

Late speech and language acquisition is one of the risk signs for different disorders affecting child development. Its occurrence in association with other characteristic signs of important pathologies,

such as stereotyped movements that tend to appear with high incidence in ASD, leads to suspicion of possible diagnosis and much concern on the part of parents.

However, although it is little publicized, it is not uncommon to observe children with primary stereotypical movements, i.e., Stereotypical Movement Disorder, co-occurring with language impairment such as delayed acquisition or Developmental Language Disorder.

A careful evaluation associated with early, intensive, and targeted intervention to stimulate skills that are lagging, such as changes in shared attention behaviors, deficient social engagement, the presence of stereotyped movements of different magnitudes, and delayed language acquisition, are critical and crucial items for the differential diagnosis.

Many of the signs suggestive of or at risk for ASD can be observed in other developmental disorders in children, as well as in typical development. Intensity, frequency, and duration are important aspects for the final diagnosis to be conclusive, which gives the sequential steps of identifying risk signs, intervention, and reassessment great importance for a truly conclusive final diagnosis.

Bibliographic References

1. American Psychiatric Association. Diagnostic and statistical manual of disorders: DSM-5. Arlington: American Psychiatric Association; 2013.
2. Singer, HS. Motor stereotypies. *Semin. Pediatric. Neurol.* 2009; 16: 77-81.
3. Edwards, MJ, Lang, AE, Bhatia, KP. Stereotypies: a critical appraisal and suggestion of clinically useful definition. *Movement Disorders.* 2012; 27(2):179-185.
4. Robinson, S, Woods, M, Cardona, F et al. Intense imagery movements: a common and distinct paediatric subgroup of motor stereotypies. *Devel Med & Child Neurol.* 2014, 56(12):1212-1218.
5. Valente, F, Pesola, C, Baglioni, V, et al. Developmental motor profile in preschool children with primary Stereotypic Movement Disorder. *Biomed Res Int.* 2019; 2019:1427294. Doi:101155/2019/1427294
6. Zinner, SH, Mink, JW. Movement disorders I: tics and stereotypies. *Pediatric Rev.* 2010; 31: 223-233.
7. Edwards, MJ, Lng, AE, Bhatia, KP. Stereotypies: a critical appraisal and suggestion of a clinically useful definition. *Mov Disord.* 2012; 27: 179-185.
8. Mackenzie, K. Stereotypic movement disorders. *Semin. Pediatric. Neurol.* 2018; 25: 19-24. Doi: <https://doi.org/10.1016/j.spen.2017.12.004>
9. Ghosh, D, Rajan, PV, Erenberg, G. A comparative study of primary and secondary stereotypies. *J Child Neurol.* 2013; 28: 1562-1568.
10. Péter, Z, Oliphant, MF, Fernandez, TV. Motor stereotypies: a pathophysiological review. *Front Neurosci.* 2017; 11: 171.
11. Evans, W, Gray, FL, Leckman, JF. The rituals, fears, and phobias of young children: insights from development, psychopathology, and neurobiology. *Child Psych & Human Devel.* 1999; 29(4): 261-276.
12. MacDonald, R, Green, G, Mansfield, R, Geckeler, A, Gardenier, N, Anderson, J, Holcomb, W, Sanchez, J. Stereotypy in young children with autism and typically developing children. *Res Devel Disab.* 2007; 28: 266-277.
13. Lemiere, J. Do children with primary complex motor stereotypies only have movement problems? *Devel Med & Child Neurol.* 2014, 56(10): 923-924.
14. Mahone, M, Ryan, M et al. Neuropsychological function in children with primary complex motor stereotypies. *Devel Med & Child Neurol.* 2014; 56(10):1001-1008.
15. Sacrey, LAR, Zwaigenbaum, L, Bryson, S, Brian, J, Smith, IM, Roberts, W, Szatmari, P, Vaillancourt, T, Roncadin, C, Garon, N. Parent and Clinician Agreement regarding Early Behavioral Signs in 12- and 18-Month-Old Infants at-Risk of Autism Spectrum Disorder. *Aut Res.* 2018; 11(3): 539-547. doi: 10.1002/aur.1920.Epub2018Jan22
16. Bosa, CA, Salles, JF. PROTEA-R: Sistema de avaliação da suspeita de Transtorno do Espectro do Autismo. 1ª Edição. São Paulo: Vetor; 2018.
17. Menezes, MLN. ADL: avaliação do desenvolvimento da linguagem; 2004.
18. Duarte, CP, Silva, LC. Análise do comportamento aplicada. In: Duarte, CP, Velloso, RL, organizadoras. A importância do atendimento multidisciplinar nos Transtornos do Espectro do Autismo. São Paulo: Editora Memnon; 2019.
19. Zaquee, LCC, Teixeira, MCTV, Alckmin-Carvalho, F, Paulo, CS. Associação entre sinais precoces de autismo, atenção compartilhada e atrasos no desenvolvimento. *Psic Teor Pesq.* 2015; 31(3): 293-302. <https://doi.org/10.1590/0102-3772201-377220150322432933302>
20. Saulnier, C, Quirnbach, L, Klin, A. Avaliação clínica de crianças com Transtorno do Espectro do Autismo. In: Schwartzman, JS, Araujo, CA, organizadores. Transtorno do Espectro do Autismo. São Paulo: Editora Memnon; 2011.
21. Arvigo, MC, Schwartzman, JS. Parece, mas não é TEA: desafios no diagnóstico diferencial. In: Serra, TO, coordenadora. Autismo: um olhar a 360°. São Paulo: Editora Literare Books; 2020.
22. Tomasello, M. Origens culturais da aquisição do conhecimento humano. São Paulo: Editora Martins Fontes; 2003.



23. Rogers, SJ, Young, GS, Cook, I, Giolzetti, A, Ozonoff, S. Deferred and immediate imitation in regressive and early onset autism. *Jorn Child Psychol Psych.* 2008; 49(4): 449-457.
24. Arvigo, MC, Schwartzman, JC. Caracterização dos comportamentos sociocomunicativos em crianças com sinais de risco para os TEA: reconhecimento dos sinais de alerta e o diagnóstico diferencial. No prelo.