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EVOLUTION OF ASPECTS OF MOTRICITY AND COMMUNICATION IN CHILDREN AND ADOLESCENTS WITH ASD DURING PHYSICAL ACTIVITIES

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Abstract: Autism Spectrum Disorder (ASD) is characterized by persistent deficits in verbal and non-verbal communication, in addition to the presence of restricted and repetitive behavior patterns. In this sense, this study aimed to subjectively verify the evolution of aspects of motor skills and communication in children and adolescents with ASD during the practice of physical activities. This is a descriptive, qualitative and quantitative study, with 20 children participating in the Focinhos Terapeutas extension project aged between 4 and 16 years old, divided into two groups. Group 1 was made up of individuals diagnosed or suspected of grade 1 autism and group 2 was made up of individuals diagnosed or suspected of grade 2 autism. The results showed that in the valences verbal communication, non-verbal communication and gross motor coordination, children group 2 evolved more than children in group 1. In relation to fine motor coordination, both groups showed 50% positive evolution. It can be concluded that children in group 1 have a better classification, but children in group 2 improved more with the proposed activities.
Keywords: Autism spectrum disorder. Non-verbal communication. Physical exercise. Down's syndrome.

INTRODUCTION

Autism Spectrum Disorder (ASD) is characterized by persistent deficits in verbal and nonverbal communication and social interaction in multiple contexts, including deficits in social reciprocity, in nonverbal communication behaviors used for social interaction, and in skills to develop, maintain and understand relationships. In addition to deficits in social communication, the diagnosis of autism spectrum disorder requires the presence of restricted and repetitive behavioral patterns (DSM-V, 2013).

Even in cases where there are greater social skills and cognitive skills, the language remains with its pragmatic aspects affected (Miilher, 2012). For Balestro et al (2019), it is not enough for the child to speak morphologically and grammatically correct words and phrases, with appropriate phonology and semantics, it is necessary that this entire composition is consistent with the speaker's intentionality and coherent with the social and communicative context. According to Hartman and Klatt (2005), deficits in verbal behavior can be considered among the most crucial, as they make it impossible to develop other skills, such as social interaction, which in childhood includes the simple act of playing, which in turn, is associated with the development of motor skills.

Motor behavior disorders are considered a characteristic that requires more attention when referring to ASD, as several studies associate changes in gross and fine motor coordination with physiological changes in children with autism. Imaging studies have identified significant abnormalities within the seminal structures that control motor behavior in individuals with ASD (Fournier et al, 2010). In their article Stanfield et al, (2008), they noticed that the total brain, the cerebral hemispheres, the cerebellum and the caudate nucleus were increased in volume, while the area of the corpus callosum was reduced, concluding that autism may result from abnormalities in specific brain regions and a global lack of integration due to brain enlargement. Furthermore, fMRI studies have highlighted differential functional activation in related brain areas when comparing neurotypical and autistic individuals, suggesting the use of alternative functional pathways by the latter group (Verhoeven et al, 2010).

The World Health Organization recommends an average of 60 minutes of moderate aerobic physical activity per day

for children and adolescents. In relation to this group, physical activity provides benefits for the following health outcomes: improved physical fitness, cardiometabolic health, bone health, cognition (academic performance and executive function), mental health and reduced adiposity.

Since physical exercise has proven to be an effective means of preventing these problems in the general population, it is likely that it will also be effective in the ASD population. Sixteen studies describing exercise-based interventions reported positive and promising effects in two of the three main symptom domains: motor and social deficits (Sowa and Meulenbroek, 2012).

Therefore, being able to provide physical exercise services associated with cognitive activities becomes an important resource for the motor and communicative development of these children. Based on the above, the objective of the following study was to subjectively verify the evolution of aspects of motor skills and communication in children and adolescents with ASD during the practice of physical activities.

MATERIAL AND METHOD

TYPE OF STUDY AND SAMPLE

This is a descriptive, qualitative and quantitative study, whose sampling was done for convenience with children who are part of an animal-assisted intervention project.

The sample was made up of 20 children with ASD (diagnosed or in the diagnosis phase, proven through a medical report, provided by their guardians), participants in the ``Focinhos Terapeutas`` extension project, in the municipality of Maceió. They were divided into 2 groups for better data analysis. Of these, 10 have or are suspected of having grade 1 autism (Group 1), while another 10 children and adolescents have or are suspected of having grade 2 autism (Group 2).

It is important to highlight that this research was carried out after approval by the Research Ethics Committee. As an inclusion criterion, all participants must be between 4 and 16 years old, have a diagnosis of ASD or be in the diagnosis phase and participate and be frequent in the ``Focinhos Terapeutas`` extension project. For exclusion, the criterion adopted was not being present in at least 10 service sessions.

DESIGN

The service sessions took place on the court and in the practice rooms of the Physical Education course at a private higher education institution, once a week, on Tuesdays, lasting 1 hour, from 1:30 pm to 2:30 pm. The sessions consisted of physical activities in circuits, associated with cognitive activities. Regarding the evaluation of the children's progress, a form was created to record the child's behavior that day, that is, how was their gross motor coordination, fine motor coordination, verbal communication, non-verbal communication, among other aspects evaluated. In this, there were the options: excellent, good, reasonable, weak, very weak, non-existent and not worked on that day, with each of them assigned a number from 7 to 1, respectively, for better understanding and completion.

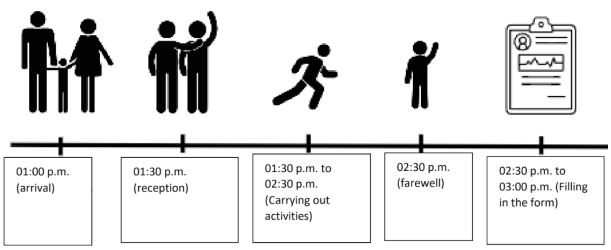


Figure 1 - Activity Schedule

Source: Own authorship

PROCEDURE

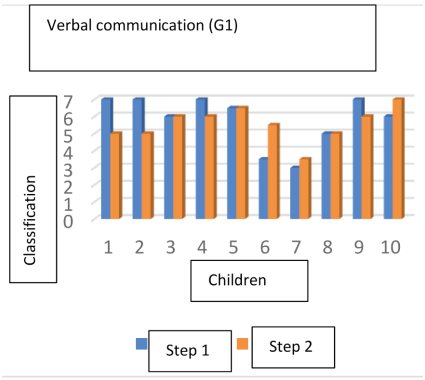
Upon arriving at the institution, on Tuesdays, at 1:30 pm, the children were directed to their place of care (court or practice room). Soon, the proposed activities began. The evaluated valences of verbal and non-verbal communication were stimulated and observed throughout the session. While in verbal communication the intentionality and quality of spoken sentences were analyzed, in non-verbal communication notes, communication through images and body contact were the behaviors evaluated. For gross motor coordination, activities such as jumping through hoops, kicking the ball into the goal, throwing balls of different weights and sizes into hoops positioned in the top corner of the beam, going up and down steps, going over the plinth and jumping from the mini trampoline were designed. For fine motor coordination, puzzles, board games, table hockey (foosball) and holding balls of different sizes were the activities developed. Despite being the same circuit for everyone, the proposed execution of each activity varied from participant to participant according to the degree of ASD and their behavior. After 1 hour of service, the children and adolescents were taken to meet their parents. At the end of each session, the evaluating team (previously trained by a professional in the field) filled out an individual form for each participant, and at the end of the 15 sessions the data was tabulated for analysis. Next, the graphics were created. To better understand the results, the 15 weeks of evaluation were divided into 2 stages, the first stage being half of the attendance and the second stage the other half of the attendance of each participant.

STATISTICAL ANALYSIS

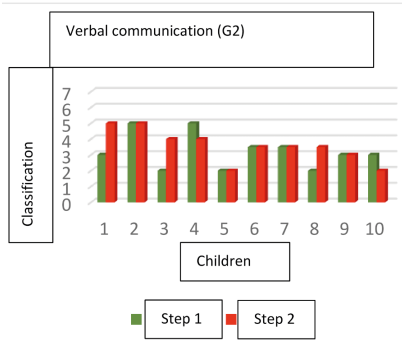
For data analysis, descriptive statistics were used by mode for all valences assessed. To verify the differences between the groups, the percentages of evolution based on the modes were calculated.

RESULTS

From the data collected, modes were calculated for each child, in each valence analyzed. The 20 children included in the study were divided into two groups according to the degree of ASD. Graphic 1 represents data relating to verbal communication in the group with mild autism (Group 1). While graphic 2 presents data from the same valence of the group with a moderate degree of autism (Group 2).



Graphic 1: Verbal Communication, group 1

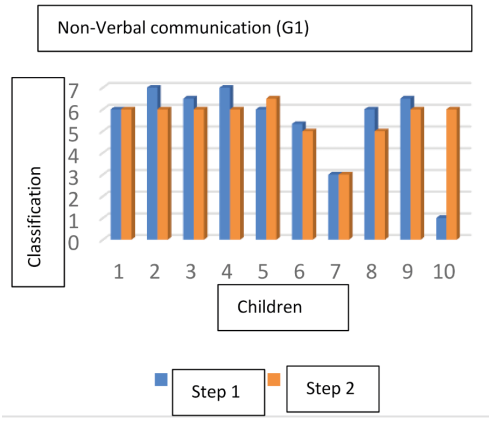


Graphic 2: Verbal Communication, group 2

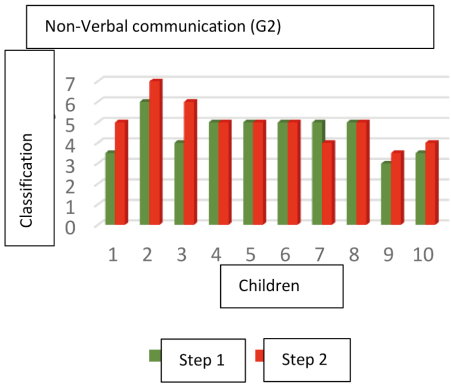
Stage 1: Assessment of verbal communication in the first half of attendance

Stage 2: Assessment of verbal communication in the second half of attendance

Regarding the results of the Non-Verbal Communication valence, the data obtained from group 1 and group 2 are represented in graph 3 and graph 4 respectively.



Graphic 3: Non-Verbal Communication, group 1

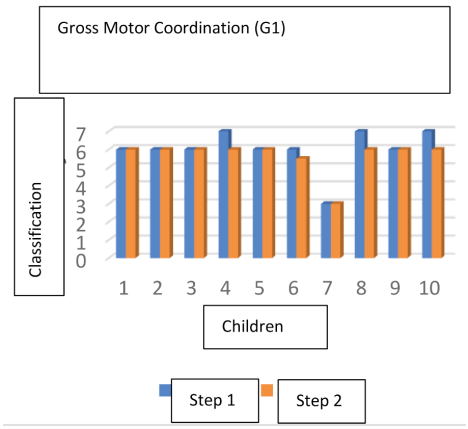


Graphic 4: Non-Verbal Communication, group 2

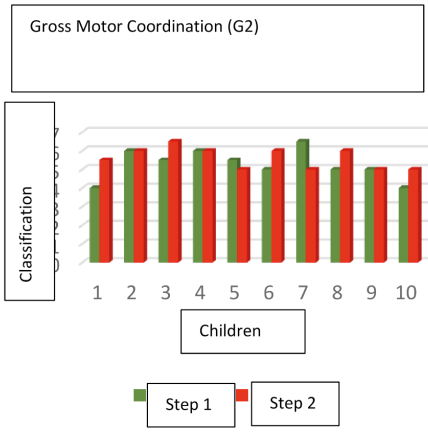
Stage 1: Assessment of non-verbal communication in the first half of attendance

Stage 2: Assessment of non-verbal communication in the second half of attendance

Graphic 5 reflects the data obtained from group 1 in relation to Gross Motor Coordination and graphic 6 presents the data obtained from group 2 in relation to the same valence.



Graphic 5: Gross Motor Coordination, group 1

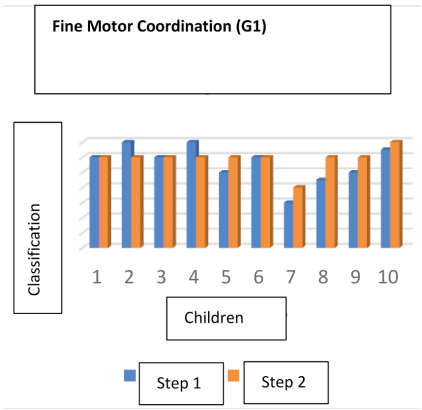


Graphic 6: Gross Motor Coordination, group 2

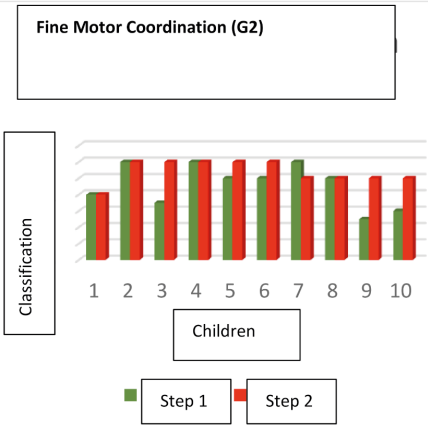
Stage 1: Assessment of gross motor coordination in the first half of attendance

Stage 2: Assessment of gross motor coordination in the second half of attendance

The representation of the Fine Motor Coordination valence of group 1 can be seen below in graphic 7, while that of group 2 is reproduced in graphic 8.



Graphic 7: Fine Motor Coordination group 1



Graphic 8: Fine Motor Coordination group 2

Stage 1: Assessment of fine motor coordination in the first half of attendance

Stage 2: Assessment of fine motor coordination in the second half of attendance

DISCUSSION

As it was seen in the results regarding Verbal Communication (VC) and Non-verbal Communication (NCV), group 1 showed a worsening in evolution, 40% and 60% respectively, while in group 2 we observed that 80% of children maintained or improved CV and 50% showed an improvement in the evolution of CNV. This result can be justified by some factors, such as each evaluator's evaluation criteria and correct stimulus. Because the perception of both the quality and quantity of spoken phrases, as well as notes and body contact is subjective and varies from evaluator to evaluator. Furthermore, the child's trust and comfort in relation to the evaluator can influence their behavior.

Cavalcanti; Kraguljac (2022) subjectively verified the evolution of motor coordination, balance, strength and cardiorespiratory conditioning, as well as verbal and non-verbal communication and socialization in children treated by co-therapy dogs.

The aforementioned study showed that after eight months of follow-up, the children's CV is very weak, which was expected since the group in question is made up of children with mild to moderate autism, in which the majority have impaired speech. development. NVC was considered good, as was eye contact, as children interact through touch, brief glances and indicate what they want. However, when comparing eye contact from the middle to the end of the year, it got worse.

Wolff; Cunha (2021), analyzed in his study the application of a language assessment instrument from the perspective of Supplementary and Alternative Communication (CSA) in children with ASD, in order to verify the possibilities of using graphic symbols as a communication strategy. The results pointed to the use of more than one communication resource in most children, which is in line with the literature, which highlights the importance of evaluating all communication possibilities (gestures, gaze, speech or symbol) in a to favor the insertion of the subject in language, via symbolization.

The present study found that in relation to Gross Motor Coordination, no child in group 1 showed positive progress when comparing stage 1 with stage 2. However, in group 2, 50% of the children showed an improvement in this aspect. In the authors' opinion, this may be related to the degree of difficulty of the proposed exercises, leading us to believe that they were too simple for grade 1 autistic children. Since, the children in group 1

maintained a high score, but did not evolve positively.

In their study, Krüger et al (2018) evaluated the effect of a program of rhythmic activities on the social interaction and motor coordination of children with ASD, with 9 children with ASD as participants, aged 5 to 10 years old, randomly divided into 2 groups (control and intervention), whose main findings of the study were that the intervention group showed a significant improvement in motor skills after 14 weeks of dance activities, while the control group maintained the values of this variable. Furthermore, with regard to social interaction, both groups (intervention and control) maintained the same values after treatment. From what was observed, rhythmic activities contributed to improvements in locomotion motor skills.

In their study, Serra et al (2017) examined the effects of game therapy on motor coordination and visual-motor integration in people with Down Syndrome (DS), with 4 individuals with DS as participants. Sessions were held using the Nintendo Wii video game and games that require general motor coordination among other skills. The results found showed that game therapy was efficient because it was carried out in a stimulating three-dimensional virtual environment, capable of promoting regular physical exercise for people with DS and all participants showed improvements in motor coordination after the 12 sessions.

The Fine Motor Coordination valence was the only valence that showed a similar improvement. In both groups, 50% of the children evolved positively.

Coppede et al (2012), compared the fine motor performance and the performance of functional self-care skills of children with Down Syndrome (DS) and typical children aged two years, and verified whether there was a relationship between these domains. 24 children of both genders participated in the study, 12 belonging to the typical group and 12 children with DS. The results showed that children with DS had lower fine motor and functional profiles than children with typical development; however, the functional performance of the DS group was adequate as expected for the age group. Although self-care tasks require good performance in fine motor skills, no relationship was observed between the domains in this age group studied. The results point to specific difficulties in more complex fine motor tasks. This finding indicates the need for intervention aimed at this aspect, as it can influence the acquisition of functional skills later in development.

Di Renzo et al (2017), in their study, evaluated the psychomotor development profile in children with ASD and verified the different characteristics in relation to the various degrees of autism. The study involved the participation of 61 children aged between 3 and 14 years old. The results showed that children with a more severe degree of autism had difficulties in using their body and in using the body of others compared to children with a milder degree of autism. They also reported difficulties in tonic dialogue, that is, in the ability to modulate body posture to come into contact with others, problems in using objects in the environment, in the ability to organize themselves spatially and in imitating significant gestures.

Cavalcanti's study; Kraguljac (2022) also presented results in relation to physical skills, such as gross and fine motor coordination, strength, endurance and cardiorespiratory fitness. According to the authors, the children showed positive evolution in these aspects and were evaluated as being in good condition, according to their respective ages, concluding that work with animal-assisted therapy has brought progress in children's motor skills, communication and socialization. with

autism spectrum disorder.

CONCLUSION

We concluded that in relation to the results presented in this article, group 1 occasionally presents better results than group 2, presenting modes between 6 (good classification) and 7 (optimal classification), but the evolution of group 2 was superior, as, in 3 In these valences, group 2 showed a positive evolution (CNV, CMG and CMF), while in these same valences, group 1 remained the same or showed a slight decrease.

It is noted that the valences analyzed are interconnected since verbal and non-verbal communication are relevant valences for the socialization of children with ASD, contributing to the development of gross motor coordination and fine motor coordination, considering that it contributes to playing and consequently for the development of these skills.

We also believe that if the weekly frequency increased, children would show more beneficial results, as we consider that once a week is not enough for all skills to be worked on as expected.

However, it must be considered that each child and adolescent have a different degree of autism and their biological individuality, therefore, each one has an individual rate of evolution, which is why the work must be continuous and long-term.

We considered it important to highlight that the project also included the participation of Animal-Assisted Interventions (AIAs), but they were being reintroduced slowly after the pandemic, and this interaction was not considered for this study.

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