

## THERAPEUTIC APPROACHES FOR PEDIATRIC AUTISM: IMPACT ON COGNITIVE, BEHAVIORAL AND EMOTIONAL DEVELOPMENT

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**Abstract: Objective:** To investigate and synthesize therapeutic approaches and interventions used in the treatment of autism spectrum disorder (ASD) in children, with a focus on analyzing the impact of these approaches on cognitive, behavioral and emotional development. **Methodology:** A literature review was carried out through searches in the PubMed database, resulting in 1,310 articles. After applying inclusion and exclusion criteria, 24 articles were selected for analysis. **Discussion:** Alternative and early approaches demonstrate benefits in the development of communication, interaction and social behavior in children with ASD. Examples include umbilical cord blood infusion to reduce inflammation and reorganize brain connectivity, therapeutic horse riding to improve social behavior, behavioral interventions to improve sleep, and the importance of parenting in raising awareness about autism. It is crucial to carry out these therapies individually and under the supervision of specialized professionals to obtain significant results. **Conclusion:** Given the challenges faced by children with ASD during childhood, promising treatment alternatives emerge, highlighting the importance of an individualized approach and parental involvement. The comprehensive and effective development of these children requires, first and foremost, an in-depth understanding of ASD.

**Keywords:** Autism Spectrum Disorder, Therapeutic Approaches, Pediatric Interventions, Cognitive Development.

## **INTRODUCTION**

Autism Spectrum Disorder (ASD) is a comorbidity characterized by deficits in neurodevelopment, affecting social aspects, cognitive functions and resulting in restricted interests, often focused on repetitive patterns of behavior, interests and activities (American

Psychiatric Association, 2013) ( Tsai et al., 2018). Autistic people have heightened sensory sensitivity, focused interests and difficulties in socialization and communication (Oshima et al., 2023). Autistic characteristics can predispose children to interpersonal, academic, and behavioral difficulties, including aggression and withdrawal. With advancing age, rates of depression and anxiety tend to increase compared to non-autistic individuals (Oshima et al., 2023).

Approximately one in every 54 children is diagnosed with ASD. The presence of many associated changes, such as motor dysfunctions, such as dyspraxia, apraxia, hypotonia and oculomotor abnormalities. In the context of social skills, although some treatments help children, the same benefit is not observed in young adults with ASD. These demonstrate increased rates of isolation and family reports of increased levels of stress as they age. Additionally, significant levels of stress are found in parents of children with ASD compared to parents of children with other comorbidities. Mothers report high levels of overload, decreased well-being and quality of life, in addition to worsening relationships with their children. A considerable worsening of these factors is observed, directly related to the increase in problematic behaviors (Maenner et al., 2020).

The stigma associated with autism among parents/guardians can prevent autistic teenagers from receiving quality treatments, worsening the psychological burden. Therefore, destigmatization is crucial to reducing stigma regarding the treatment of autistic individuals. This can be achieved by helping children perceive their autistic characteristics in a positive way through discussions and psychotherapies (Oshima et al., 2023). Parent-mediated interventions are advantageous as they reduce the need for child interventions by approaching treatment

in a comfortable environment and involving parents in the role of therapists for a more individualized and sensitive intervention (Conrad et al., 2021).

The objective of this literature review article is to investigate and synthesize the various therapeutic approaches and interventions available for the treatment of autism in pediatrics. Furthermore, it aims to analyze the impact of these approaches on the cognitive, behavioral and emotional development of children diagnosed with this condition. This article provides a comprehensive review of therapeutic strategies, including behavioral therapies, educational interventions, pharmacotherapy, and alternative therapies.

## **METODOLOGY**

This study refers to a literature review conducted according to the criteria of the PVO strategy, which is an acronym that covers the population or research problem, variables and results. This approach was used to design the research around the following central question: “What are the various therapeutic approaches and interventions currently employed in the treatment of autism in pediatrics, and how do these strategies affect the development and well-being of affected children ?”. Thus, according to the aforementioned parameters, the population or problem in focus in this study involves pediatric patients diagnosed with Autism Spectrum Disorder (ASD), with a view to examining the various therapeutic approaches and interventions currently used, as well as their impact on development. and the quality of life of these patients. The searches were conducted through searches in the PubMed Central (PMC) database. Descriptors were used in combination with the Boolean operator “AND”: Autistic Disorder, Child and Treatment, as well as the Boolean operator “OR”: Therapy. Initially, we identified 1,310 articles, which were subsequently subjected

to rigorous selection criteria. The inclusion criteria covered articles in English, Portuguese and Spanish, published between 2018 and 2023 and that addressed themes related to this research. We considered studies such as review, systematic review, meta-analysis, observational and cross-sectional studies, as long as they were available in full. Duplicate articles, those available only in abstract form and that were not directly related to the study proposal were excluded. As a result, we selected a total of 24 articles to compose this study.

## **DISCUSSION**

### **TREATMENT**

There are several theories about the mechanisms underlying the development of ASD. Although there is no definitive answer regarding these mechanisms, it is clear that their origin is multifactorial. Based on this understanding, therapeutic research for ASD encompasses various approaches and objectives, recognizing the wide range of manifestations and symptoms associated with this condition. These interventions aim to clinically improve specific areas of development, notably communication, interaction and social behavior.

A study conducted by Carpenter et al. (2019) used imaging tests to identify increased neuroinflammation and changes in brain connectivity in individuals with ASD. One intervention, which consisted of the infusion of umbilical cord blood, sought to reduce inflammation and reorganize brain connectivity. The results indicated significant improvements in cognition, communication and social interaction, corroborated by assessment scales such as the Vineland Adaptive Behavior Scales-II Socialization Subscale (VABS-SS) and the Clinical Global Impression Severity Scales (CGI-S and CGI-I).

Additionally, current studies explore alternative approaches, such as therapeutic horse riding (THR), focused on social improvement. Chen et al. (2022) conducted a meta-analysis that showed improvements in communication and social interaction in children with ASD undergoing THR. The interaction between the individual, horse and instructor during sessions plays a crucial role in this process. When comparing invasive therapeutic approaches, such as autologous cord blood infusion, with alternative interventions, such as therapeutic horse riding, we observed different foci of improvement, highlighting the need for diversified methods to achieve therapeutic goals, especially in the context of social symptoms. from TEA. In short, the studies reviewed address varied aspects of ASD, from invasive interventions to more innovative alternatives, such as therapeutic riding. Understanding the pathophysiology of ASD is crucial to guide new therapies, as comprehensive drug therapies do not yet exist.

As highlighted by Hunter et al. (2021), the severity of ASD symptoms, such as stereotypy, can influence sleep disorders, compromising the transition to a calm state necessary to initiate sleep. This phenomenon has led to the implementation of personalized interventions, aiming to reduce stereotypy and, therefore, improve sleep. The treatment covered strategies such as establishing a bedtime routine, using the technique of ignoring behaviors to attract attention and removing favorite objects from the room. Visual interventions, such as a digital clock representing the day/night cycle, and tangible rewards were incorporated to reinforce sleep-friendly behaviors. The results demonstrated a significant reduction in stereotypy in all children, corroborating previous research that emphasizes the effectiveness of behavioral interventions in improving sleep in children

with ASD.

According to Vernon et al. (2019), the presence of an adult is fundamental in each interaction related to language attempts, promoting the child's involvement in socially planned activities. In a pilot randomized clinical trial, we evaluated the preliminary efficacy of the Pivotal Response Intervention for Social Motivation (PRISM) model, a derivation of Pivotal Response Treatment (PRT). PRISM adopts strategies such as the selection of motivating materials, task variation to maximize motivation, clear stimuli to guide verbal responses, and a balance between simple (maintenance) and more complex (acquisition) tasks. Preliminary results indicate PRISM's potential to enhance development, justifying a more comprehensive evaluation. When comparing the studies, we observed that both highlight the importance of personalized interventions to address specific aspects of ASD. While Hunter et al. (2021) focuses on the relationship between stereotypy and sleep disorders, Vernon et al. (2019) explores social communication strategies, highlighting the diversity of approaches necessary to meet the diverse needs of children with ASD.

From the perspective of Van Dyke et al. (2021), parents who adopted a more positive communication style had children with the best post-treatment scores, verified using the Pediatric Autism Spectrum Therapy Observation System (PASTOS) approach. This intervention provides a quantitative assessment of the clinical progress of the skills and symptoms of children with Autism Spectrum Disorder (ASD) in individual psychotherapy sessions. The results indicate that PASTOS demonstrated to be a promising tool, exhibiting internal consistency, post-treatment convergent validity, and sensitivity to treatment efficacy. This study represents one of the first to establish a connection between

changes in parents' communication style and the benefits obtained in treating children with ASD.

Continuing the idea of the importance of parenting, the study by Oshima et al. (2023), revealed that adolescents whose parents voluntarily shared their diagnosis had a better understanding of their autistic traits compared to those whose parents did so involuntarily or did not do so at all. The study also emphasized the importance of starting discussions about autism at an early age to promote a positive perception of autistic traits and reduce the stigma associated with treatment. Additionally, a program called Awareness and Care for My Autistic Traits (ACAT) was developed that aims to raise awareness about autism and improve the skills of autistic teenagers with the support of their parents.

The ACAT program is divided into three phases, focusing on raising awareness of autistic characteristics, understanding autistic responses to stressors, and developing coping strategies. Study results indicated that the ACAT program increased adolescents' and their parents' awareness of autism, reduced treatment stigma, and improved the emotional and behavioral attributes of autistic adolescents. It was concluded that ACAT can be an effective tool to improve the self-awareness of autistic adolescents and reduce treatment stigma, but does not necessarily affect the social adjustment of these young people (Oshima et al., 2023).

## INTERVENTIONS

According to educational policies and human rights conventions, it is extremely important that children with ASD participate in less restrictive environments, associated with educational adaptations (National Research Council, 2021; United Nations, 2006). However, this approach has evolved

with the help of techniques that assess the attention and learning of these children, aiming to provide a successful educational experience. A notable example is eye tracking, which allows understanding the relative interest in people compared to objects, as well as the duration of attention to people, especially those expressing eye-catching facial movements (Vivanti, Fanning, et al., 2017; Vivanti, Hocking et al., 2017).

In this context, Vivanti et al. (2022) highlight in their study on educational intervention in inclusive and specialized environments that children with high levels of social interest demonstrate good development in both environments. In contrast, children with lower social interest respond better in specialized environments. This highlights the importance of understanding the level of development and degree of social interest of this public when making decisions in the context of educational and social development.

When addressing early interventions in infants with a high probability of or already diagnosed with autism, evidence regarding improved development is limited. Furthermore, poor monitoring may underestimate very early interventions, as effects can accumulate over time (Mcglade et al., 2023).

While the study by Vivanti et al. (2022) highlights the importance of social interest in choosing the educational environment, Mcglade et al. (2023) emphasize the need for special attention to early interventions, recognizing that benefits can manifest themselves over time. Both emphasize the complexity of the appropriate approach to the specific needs of children with ASD.

As highlighted by Hampton et al. (2020), there is a promising perspective for expanding the communicative capacity of children with ASD classified as pre-verbal (<20 spontaneous words in 20 minutes of language sample).

Although the study involves a speech-generating device and a learning process for tutors, presenting initial challenges in covering a wide range of patients, the results indicate significant communicative evolution. The majority of the intervention group recorded a doubling in language rate, although they remained pre-verbal. These findings point to a crucial point of intervention to be explored and optimized.

In the context of ASD, not only the development of social communication is affected, but also the child's general health status, including high rates of childhood obesity and harmful social behaviors. For Xu et al. (2019), the Sensory Integration System (SIT) offers a possibility for intervention. Their study reveals that physical and psychosocial disorders associated with autism can be managed through an intervention based on sensory stimuli present in common physical exercises. Activities such as jumping, balancing, slides and throwing are adapted to each patient's individual preferences, encouraging physical contact, communication and teamwork. Despite limitations, the study shows significant improvements in participants' symptoms and social relationships, justifying further investigation into intervention for children with ASD.

The physical and psychosocial disorders of ASD, added to the limitations in neuropsychomotor development, have neuroinflammatory, macrostructural and microstructural implications in the pediatric brain with autism, as reported by Alexander et al. (2022). Research suggests that reduced levels of Heparan Sulfate (HS), an acidic, linear glycosaminoglycan (GAG), may be associated with autism. Although in the early stages of study, the maintenance of ideal levels of HS, whether by replacement or administration of its mimetics, emerges as a potential alternative for the treatment of autism and its clinical

implications.

When comparing the studies, we observed that each one addresses different aspects of ASD, from specific communicative interventions to strategies based on sensory stimuli and approaches to optimizing neuropsychomotor development. While Hampton et al. (2020) highlights the promising prospect of improving communication, Xu et al. (2019) and Alexander et al. (2022) explore physical and neurobiological interventions, respectively.

The importance of child-centered interventions is highlighted, highlighting the need for activities that strengthen the individual skills of each patient, aiming at development as a basis for learning and participation. However, Trembath et al. (2021) recognize the complexity of determining the optimal number of intervention sessions due to the lack of consensus between clinical guidelines and practice recommendations, as well as inconsistency in how the amount of intervention is reported in clinical trials. The importance of flexibility in the number of sessions over time is highlighted, considering the potential therapeutic effect, the impact on child and family outcomes, as well as the social validity of the approaches and results.

Interventions aimed at developing language in autistic children are crucial, and early, individualized approaches with specialized professionals are recommended. According to the meta-analysis by Sandbank et al. (2020), the implementation of the intervention by health professionals specialized in language development, such as speech therapists, produces significantly greater effects than interventions carried out only by caregivers. The analysis also highlights greater benefits in children with more developed early language skills, emphasizing the need to evaluate and adapt interventions according to each child's individual abilities.

While Trembath et al. (2021) address the complexity in determining the ideal number of intervention sessions, Sandbank et al. (2020) highlight the effectiveness of interventions conducted by specialized professionals in promoting language development in autistic children. Both studies highlight the importance of considering individuality and flexibility in therapeutic approaches.

## **FINAL CONSIDERATIONS**

Given the above, it becomes evident that ASD presents substantial challenges in the context of neurodevelopment, having a notable impact on the social, cognitive and behavioral spheres of affected people, especially during childhood. In this context, treatments aimed at ASD in pediatrics have experienced significant innovations, from the application of autologous umbilical cord blood infusions to the adoption of therapeutic horse riding, the latter being a non-invasive alternative.

Specific approaches, such as PRISM and PASTOS, have demonstrated promising results in enhancing cognition, communication and social interaction in individuals with ASD. This scenario highlights the relevance of a personalized therapeutic approach, actively incorporating parental involvement. Therefore, the pressing need for destigmatization and promoting open discussions about autism is highlighted, as well as the importance of flexibility in therapeutic strategies. It is crucial to highlight the need for personalization in care, understanding the individual demands of children with ASD, while maintaining special attention to the patient's general health. This comprehensive approach aims to promote effective and holistic development, reinforcing the importance of considering the uniqueness of each case.

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