

THERAPEUTIC APPROACHES IN CHILDREN WITH AUTISM: CURRENT EVIDENCE AND FUTURE PERSPECTIVES

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Abstract: Autistic Spectrum Disorder (ASD) is a neurodevelopmental disorder characterized by an atypical development whose main changes are related to impaired communication and social interaction, which, in turn, are associated with restrictive and repetitive patterns of behavior. Because it is a disorder for which there is no cure, several therapeutic approaches are used to assist in the development of children's social and communication skills, in addition to minimizing repetitive and stereotyped behaviors. With this in mind, the main objective of this integrative review is to gather the most recent studies regarding the therapeutic approaches currently recommended for the treatment of children with ASD, as well as to evaluate the current evidence and future perspectives in relation to such approaches, since, based on this knowledge, it is possible to implement effective treatments that improve the quality of life of these children and their families. In order to evaluate this phenomenon, the authors searched for terms consistent with the subject in question on the platform USA National Library of Medicine (PubMed) considering the articles published in the last 5 years. The articles found then went through the selection and eligibility stages, with 17 articles being selected for the research. The results demonstrated the existence of several therapeutic approaches that can be beneficial for autistic children, suggesting that alternative therapies, such as music therapy, Occupational Therapy, Animal Assisted Therapy, acupuncture, among others, were associated with improvements in the development of essential skills, such as social and communication. In addition to the aforementioned therapies, other therapeutic approaches have shown promise, such as fecal microbiota transplantation, personalized diets, Sensory Integration training, transcranial direct current stimulation and

autologous intrathecal transplantation of bone marrow mononuclear cells associated with neurorehabilitation. As for the future perspectives for therapeutic approaches in autistic children, some of the articles point to the need for additional studies that support the effectiveness of the currently proposed therapeutic approaches, while other studies point to the importance of personalizing treatment, taking into consideration, the individual needs of every child. Thus, the future perspectives of therapeutic approaches in autistic children include the improvement of previous approaches, personalization of treatment and the development of new therapeutic approaches.

Keywords: Therapy. Child. Autistic Spectrum Disorder.

INTRODUCTION

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by atypical child development, being responsible for affecting areas such as communication, socialization and behavior, which is marked by restriction and repetitiveness (SBP, 2019). This condition has a heterogeneous etiology, with its origin related to numerous genetic bases, environmental factors and epigenetic mechanisms (ARBERAS & RUGGIERI, 2019). According to Wagner et al. (2019), ASD can be diagnosed from the age of two and its impacts significantly affect the life of the child and their family nucleus, since these children, for the most part, have difficulties in relating to other people, communicate and develop social skills.

Because it is a pervasive and permanent disorder, it is essential that there is early recognition in the first years of life, providing adequate intervention (SBP, 2019). With this in mind, several therapeutic alternatives have been investigated to mitigate the symptoms and help the development of social and

communication skills and the reduction of repetitive and stereotyped behaviors, improving their quality of life and providing a better interaction with the environment around them. (RAGHAVENDRA et al, 2018)

Thus, it is essential to emphasize the importance of therapeutic approaches in the follow-up of the autistic child, especially considering the uniqueness of each child, as well as the divergence of response to the proposed treatments. Thus, it is essential that the therapeutic approach is individualized and flexible to meet the specific needs of each child and family (RAO et al., 2021)

Given this scenario, discussing current evidence and future perspectives regarding therapeutic approaches in children with autism is crucial for advancing treatment and quality of life for these children and their families. In this context, the present study aims to bring together the most recent studies regarding the therapeutic approaches currently recommended for the treatment of children with ASD, as well as to evaluate the current evidence and future perspectives in relation to such approaches, since, from this knowledge, it is possible to implement effective treatments that improve the quality of life of these children and their families.

METHODOLOGY

The present study is an integrative review, including articles referring to autistic children aged between 0 and 12 years, studies available in full, related solely to the subject of the study, published in Portuguese, English or Spanish and indexed in the databases of the USA National Library of Medicine (PubMed), during the period from 2018 to 2023. The descriptors used to search for articles were “autism”, “therapeutics” and “child”, and the combination was performed using of the Boolean operator “AND”. Studies that pervaded the proposed theme were excluded.

RESULTS

When searching the above-mentioned descriptors with the Boolean operator “AND”, 1642 articles were found to be submitted to selection and eligibility analysis.

In the initial selection, 1568 articles that did not fit the inclusion criteria or were part of the exclusion criteria were discarded. Thus, after this selection, 75 articles were obtained, which had their titles and abstracts read. Of these, 25 were selected to be read in full for evaluating the eligibility criteria. Of these, 17 studies met the established eligibility criteria and were included in the integrative review. The steps in the article selection process for this integrative review are shown in detail in the flowchart below. (Figure 1).

The characteristics of the studies included in this integrative review were summarized in Table 1.

DISCUSSION

The article by Akhter et al (2018) discusses the use of occupational therapy as a therapeutic approach in the treatment of autistic children. According to the article, this therapy can help improve motor, cognitive and emotional skills in autistic children, as well as help them adapt to daily activities, improving their quality of life. However, each child is unique and thus each child can benefit from different types of occupational therapy, requiring multiple sessions of therapy to see significant results. Therefore, although occupational therapy may be a beneficial option for some autistic children, it is critical to evaluate each case individually and work with qualified professionals to ensure the safety and effectiveness of this intervention.

The study by Xia & Li (2022), in turn, discusses the use of music as complementary therapy for autistic children. According to the review, there is preliminary evidence to suggest that music may be beneficial for improving

attention, communication, language and social behavior in autistic children.

This fun and enjoyable form of therapy, although it can be easily adapted to each child's individual preferences, is not a cure for autism and must be used in addition to other interventions.

The study by Lun et al (2023) advocates the use of acupuncture as a therapeutic approach for autistic children. Study results suggest that acupuncture may improve social behavior and communication skills in autistic children. However, this therapy can be invasive and not all autistic children can tolerate it, requiring an individualized assessment to determine its safety and indication.

In their study, Huang et al (2020), present a systematic review on the use of physical activities as an approach to the treatment of autistic children. According to the review, physical activities are beneficial to improve the physical fitness, health and well-being of autistic children, being considered a playful form of therapy that can improve motor coordination, social skills and reduce challenging behaviors in autistic children. Like the other approaches mentioned above, this one must consider the individual needs of the child and be carried out under the supervision of qualified professionals.

The articles by Malcolm et al (2018), Byström et al (2019) and Zhao et al (2021) point to the use of animals as a therapeutic approach for the treatment of autistic children. According to the articles, the use of animals, such as dogs and horses, can bring many benefits to autistic children, such as improved communication, social interaction and reduction of challenging behaviors. Furthermore, contact with animals can help increase self-esteem and reduce stress in autistic children. Although animal-assisted therapy may be an interesting and beneficial approach for some autistic children, it is

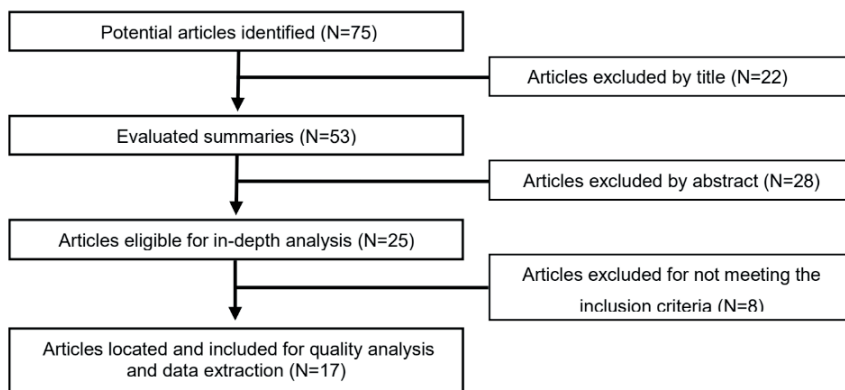


Figure 1 - Study selection and screening flowchart.

Source: Fruchtgarten et al., 2023.

Authors and Year	Objective	Kind of study	Main results
Huang et al, 2020	Discuss the effects of physical activity intervention in children and adolescents with autism	Meta-analysis	Intervention with physical activity is beneficial for children with autism, having a positive impact on social interaction, communication, motor skills and the degree of autism in autistic children.
Lun et al, 2023	Evaluate the efficiency and safety of acupuncture in the central symptomatic improvement of children with autism spectrum disorder	Systematic review	Children with ASD can benefit from acupuncture because of its effectiveness and safety.
Xia & Li, 2022	Analyze and summarize how the three main music teaching methods are implemented in the music classroom for autistic children and how they can help autistic children with different characteristics	Observational study	Music education can improve performance in social and cognitive skills of autistic children.
Akhter et al, 2022	Evaluate how the adoption of a casein and gluten free diet would impact the manifestations of children with autism	Narrative review	A gluten- and casein-free dietary approach showed therapeutic benefits in autistic children, however, due to the sample size, further studies are needed.
Salehinejad et al, 2022	Provide the latest update on published randomized controlled trials applying transcranial direct current stimulation in disorders such as autism to assess its efficacy and safety.	Systematic review	The use of prefrontal anodic transcranial direct current stimulation has been found to be safe and effective in improving behavioral problems in autistic children.
Wang et al, 2022	To investigate the impacts of the application of sensory integration training on the behavior of autistic children	Clinical trial	There was a relative reduction of stereotyped behavior about the stimulus seeking function in autistic children after sensory integration training
Li et al, 2021	To evaluate the effect of fecal microbiota transplantation on gastrointestinal symptoms and changes in the intestinal microbiota in children with ASD	Clinical trial	Fecal microbiota transplantation can improve gastrointestinal symptoms and ASD symptoms without inducing serious complications, as well as change the bacterial community of these children to typically developing controls

Zhao et al, 2021	Evaluate the effects of the therapeutic riding program on the social and communication skills of children with autism	Clinical trial	The therapeutic riding program was beneficial and significantly improved the subdomains of social and communication skills in the areas of social interaction, communication, responsibility and self-control of autistic children.
Zhou et al, 2020	To investigate tdc-induced brain network changes in children with ASD before and after active and sham stimulation	Clinical trial	The use of tdc's increased the flexibility of the neural network and increased inter-hemispheric connectivity within the alpha frequency band, which would help modify the dynamics of the local and global brain network
Maric et al, 2020	To report the use of autologous intrathecal transplantation of bone marrow mononuclear cells associated with neurorehabilitation as a therapeutic approach in autistic children	Case report	There was positive evidence of the safety and efficacy of autologous intrathecal transplantation of bone marrow mononuclear cells associated with neurorehabilitation in the treatment of autism
Byström et al, 2019	Identify a theoretical model that deepens the understanding of the mechanisms underlying the positive effects of involving nature and animals in a treatment that supports the development of children with autism	Narrative review	The use of animals can bring many benefits to autistic children, such as improving communication, social interaction and reducing challenging behaviors.
Kang et al, 2019	To investigate the efficacy and long-term effects of fecal microbiota transplantation on the behavior of autistic children	Observation study	After two years of fecal microbiota transplantation treatment, most improvements in gastrointestinal symptoms were maintained, and autism-related symptoms improved further after the end of treatment.
Schoen et al, 2019	Evaluate the effectiveness of research from 2006 to 2017 on the Ayres Sensory Integration (ASI) intervention for children with autism	Systematic review	Ayres Sensory Integration (ASI) as a therapeutic approach is effective in treating autistic children
Akhter et al, 2018	To investigate the effect of occupational therapy on children with autism	Observation study	The integration of therapies helped to improve the social, learning and behavioral skills necessary for the rehabilitation of autistic children
Malcolm et al, 2018	Evaluate how horseback riding can have therapeutic effects in autistic children	Observation study	Equine therapy is suggested to be effective in treating autistic children because of the sensory and embodied experience of riding a horse, the horse's specific movements and rhythms, and the horse's personality.
Żarnowska et al, 2018	To report the adoption of a ketogenic diet in an autistic child refractory to other treatments	Case report	The adoption of a ketogenic diet as a therapeutic approach in autistic children showed good efficacy, with behavioral and intellectual improvement
Pereira et al, 2018	To examine the effects of carnosine supplementation on sleep disturbances and the severity of core symptoms in autistic children	Clinical trial	It is suggested that carnosine supplementation may be effective in improving sleep disorders, in particular in sleep duration and parasomnias subscales

Table 1- Distribution of scientific productions according to the following variables: authorship, year of publication, objective, type of study and results (n=17).

Source: Fruchtengarten et al., 2023.

important to note that the benefits of using animals as therapy for autism have not yet been fully proven, and may vary according to the child's personality and individual reaction to the animal.

Articles by Akhter et al (2022), Żarnowska et al (2018) and Pereira et al (2018) discuss the use of personalized diets as a therapeutic approach in the treatment of autistic children and, respectively, they suggest diets such as the casein-free diet and gluten, ketogenic diet and diet with carnosine supplementation. While these diets may help improve gastrointestinal function, reduce challenging behaviors, improve quality of life, and address the specific nutritional needs of autistic children, it is significant to note that the use of personalized diets as therapy for autism is not a consensual practice and some evidence is still inconclusive.

The works by Li et al (2021) and Kang et al (2019) discuss the use of fecal microbiota transplantation as a therapeutic approach in the treatment of autistic children. According to the articles, fecal microbiota transplantation can help improve gastrointestinal function, social behavior and reduce autism symptoms in some children, and may also be useful for restoring the diversity of the intestinal microbiota of autistic children. However, this therapeutic approach is still in the initial research phase and presents possible risks, such as infections and the possibility of disease transfer. Therefore, although fecal microbiota transplantation may be a beneficial option for some autistic children, it is important to research more about its long-term effects and the potential risks involved.

Articles by Salehinejad et al (2022) and Zhou et al (2020) discuss the use of transcranial direct current stimulation as a therapeutic approach in the treatment of autistic children. According to the articles, this intervention can help improve brain connectivity, reduce

challenging behaviors, improve quality of life, and be useful in modulating executive, social, and emotional functions in autistic children. However, the use of this technique is still in the early stages of research and there is not enough evidence to support its effectiveness in all autistic children.

Articles by Schoen et al (2019) and Wang et al (2022) discuss the use of Sensory Integration training as a therapeutic approach in the treatment of autistic children. According to the articles, this technique can help improve sensory processing, social communication and attention in autistic children, as well as increase sensory tolerance and reduce anxiety in autistic children. However, its use is in the early stages of research, and there is not enough evidence to support its full effectiveness.

In their study, Maric et al (2020) discuss the use of autologous intrathecal transplantation of bone marrow mononuclear cells associated with neurorehabilitation as a therapeutic approach in the treatment of autistic children. According to the article, this treatment can help improve social communication, behavior and quality of life for autistic children. Despite this, although this therapy may be a promising option, its high cost makes it not accessible to all families of autistic children.

FINAL CONSIDERATIONS

Based on the reviewed studies, it was possible to observe the existence of different therapeutic approaches for the treatment of autistic children, which presented, in their entirety, benefits and limitations. With this in mind, it is important that professionals carefully consider the individual needs of each autistic child before deciding which therapeutic approach is most suitable for treatment, in order to guarantee the safety and effectiveness of the intervention. Thus, the analyzed results show that, according to current evidence, therapeutic approaches,

as long as they are used cautiously, can be a valuable tool in promoting the well-being and development of children with Autism Spectrum Disorder.

As for the future perspectives, three main points were raised during the analysis of the studies, namely the improvement of previous approaches, the personalization of the treatment and the development of new therapeutic approaches. Referring to the improvement of previous approaches, the vast majority of therapeutic approaches currently proposed are in the initial research phase, requiring additional studies to

better understand their effects, efficacy and limitations. With regard to treatment customization, one must consider the heterogeneity, limitations and singularities of each autistic child, requiring an individualized assessment to determine which therapeutic approach is most appropriate for treatment. Finally, regarding the development of new therapeutic approaches, it is necessary to search for accessible alternatives that present ideally zero risks to children and their families, so that they can, in the best possible way, manage the challenges that atypical development brings with you.

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