

## Comprehensive Management of Autism: Current Evidence

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### ABSTRACT

Autism is a neurodevelopmental disorder characterized by impaired social interaction, verbal and nonverbal communication, and restricted repetitive behavior. The goals of treatment are to target core behaviors, improve social interactions and communication, and reduce disruptive behavior. The present paper discusses the role of applied behavioral analysis and pharmacotherapy.

**Key words:** *Applied behavioral analysis, autism, behavioral management, pharmacotherapy*

### INTRODUCTION

Autism is a neurodevelopmental disorder, with a multifactorial etiology, characterized by persistent deficits in social communication and social interaction and the presence of restrictive and stereotyped patterns of behavior, interests, or activities.

The prevalence of this diagnosis has increased over the past few decades, and it is unclear whether this is solely attributable to the increased awareness of milder forms of the disorder among medical providers.


The primary goals of treatment are to maximize the child's ultimate functional independence and quality of life by minimizing the core features of autism spectrum disorder (ASD), facilitating development and

learning, promoting socialization, reducing maladaptive behaviors, and educating and supporting families.

In current practice, there is no curative treatment for autism, but the recommended treatment involves various therapies which include applied behavioral analysis, speech therapy, and sensory integration therapy. Medications have been used for behavioral symptoms. Techniques such as stem cell therapy and hyperbaric oxygenation are being tried.

### CHANGES IN DIAGNOSTIC CRITERIA

Changes to diagnostic criteria in the Diagnostic and Statistical Manual of Mental Disorders, 5<sup>th</sup> Edition (DSM-V) included eliminating several

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subdiagnostic categories (i.e., Asperger syndrome, pervasive developmental disorder not otherwise specified, disintegrative disorder) and using only one term: ASD.<sup>[1,2]</sup>

The requirements for this diagnosis also decreased from three criteria (social reciprocity, communicative intent, and restricted and repetitive behaviors in DSM-IV-Text Revision) to two criteria (social communication/interaction and restricted and repetitive behaviors in DSM-V).<sup>[1,2]</sup>

The new criteria in DSM-V for ASD is as follows:<sup>[2]</sup>

- A. Persistent deficits in social communication and social interaction across multiple contexts, as manifested by the following, currently or by history:
  1. Deficits in social-emotional reciprocity
  2. Deficits in nonverbal communicative behaviors used for social interaction, and
  3. Deficits in developing, maintaining, and understanding relationships.
- B. Restricted, repetitive patterns of behavior, interests, or activities, as manifested by at least two of the following, currently or by history:
  1. Stereotyped or repetitive motor movements, use of objects, or speech
  2. Insistence on sameness, inflexible adherence to routines, or ritualized patterns of verbal or nonverbal behavior
  3. Highly restricted, fixated interests that are abnormal in intensity or focus, and
  4. Hyper- or hypo-reactivity to sensory input or unusual interest in sensory aspects of the environment.
- C. Symptoms must be present in the early developmental period (but may not become fully manifest until social demands exceed limited capacities, or may be masked by learned strategies in later life)
- D. Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning
- E. These disturbances are not better explained by intellectual disability (intellectual developmental disorder) or global developmental delay.

Intellectual disability and ASD frequently co occur. To make a comorbid diagnosis of ASD and intellectual disability, social communication should be below that expected for general development level.

## MANAGEMENT

Despite the advances in early diagnosis and intervention, no therapy has been yet proven to completely reverse the core symptoms of autism.

Nutritional intervention and complementary and alternative medicine approaches are highly prevalent (about 74%) among children affected with ASD.<sup>[3]</sup>

The only treatment in ameliorating the core behavioral deficits is early intensive behavioral and educational interventional therapy.<sup>[4]</sup>

A team of trained healthcare professionals such as developmental pediatrician, child psychiatrist, occupational and behavioral therapist, speech therapist, psychologist, specialist teacher, and social worker are necessary for the management of autism.

There is an improvement in the cognitive, communication, adaptive, and social functioning and reduction in inappropriate behaviors such as aggression, hyperactivity, and temper tantrums after early (initiated before 4 years of age) intensive behavioral and educational therapy in autistic children. It was postulated that early, intensive applied behavior analysis (ABA) intervention might lead to remarkable outcomes, including almost half of the children receiving this treatment gaining significant intelligence quotient (IQ) points and being mainstreamed into regular classes.<sup>[5]</sup>

Individualized one-to-one therapy is provided in a distraction-free structured environment by behavioral therapists.

## APPLIED BEHAVIORAL ANALYSIS

In 1987 and 1993, Lovaas *et al.* published articles describing the “recovery” of almost 50% of a group of very young children with autism, treated intensively with applied behavioral analysis for several years.<sup>[6]</sup>

ABA is a treatment based on theories of learning and operant conditioning. It includes specific intervention targets, coupled with positive reinforcement (verbal praise, tokens, or edible rewards) with repetition of learning-trials a key component.<sup>[4]</sup>

A meta-analysis examining the efficacy of ABA interventions for young children with autism showed medium to large positive effects on intellectual functioning, language development, daily living skills acquisition, and social functioning, with the larger effect sizes observed on language-related outcomes.<sup>[7]</sup>

### Primary goals of treatment: (Rutter, 1985)

1. As much as possible, facilitate and stimulate the normal development of cognition, language, and socialization
2. To decrease autism-bound maladaptive behaviors such as rigidity, stereotypy, and inflexibility

3. To reduce or even eliminate nonspecific maladaptive behaviors such as hyperactivity, irritability, and impulsivity
4. To alleviate stress and burden for the family.

ABA investigates people's interactions with their environment while developing intervention strategies to decrease inappropriate behavior and increase socially appropriate skills.<sup>[8]</sup>

Behavior analysis focuses on the principles that explain how learning takes place. Positive reinforcement is one such principle. When a behavior is followed by some sort of reward, the behavior is more likely to be repeated. Through decades of research, the field of behavior analysis has developed many techniques for increasing useful behaviors and reducing those that may cause harm or interfere with learning.

ABA is the use of these techniques and principles to bring about meaningful and positive change in behavior.<sup>[9]</sup>

ABA methods are used to:

- Increase and maintain desirable adaptive behaviors
- Reduce interfering maladaptive behaviors or narrow the conditions under which they occur
- Teach new skills
- Generalize behaviors to new environments or situations.

Children who receive early intensive behavioral treatment have been shown to make substantial, sustained gains in IQ, language, academic performance, and adaptive behavior as well as some measures of social behavior, and their outcomes have been significantly better than those of children in control groups.<sup>[10]</sup>

Functional behavior analysis, or functional assessment, is an important aspect of behaviorally based treatment of unwanted behaviors. Most problem behaviors serve an adaptive function of some type and are reinforced by their consequences, such as attainment of (1) adult attention, (2) a desired object, activity, or sensation, or (3) escape from an undesired situation or demand.<sup>[11]</sup>

Functional behavioral assessment involves formulating a clear description of the problem behavior (including frequency and intensity); identifying the antecedents, consequences, and other environmental factors that maintain the behavior; developing hypotheses that specify the motivating function of the behavior; and collecting direct observational data to test the hypothesis.

Effective early interventions include the following components:<sup>[12]</sup>

- Provision at earliest possible age
- High intensity, at least 20 h/week spent one to one with the child
- Strong parental involvement, training, and support
- Systematic instructions with individual goals based on ABA
- Attempts to generalize acquired skills to other settings in daily life.

The techniques used in ABA are as follows:

- Task analysis
- Chaining
- Prompting
- Fading
- Shaping
- Differential reinforcement.

Limitations to this form of intervention include the length of time required to see improvements, questionable generalizability of learned skills, and lack of motivation at times from the patient to work on these skills. Additional limitations to ABA interventions include the cost of these intensive therapies, which can be substantial.<sup>[13]</sup>

## PSYCHOPHARMACOLOGICAL TREATMENTS FOR AUTISM

The pharmacotherapy of autism involves treatment of targeted behavioral symptoms rather than core autism features. Targets generally include hyperactivity, inattention, repetitive thoughts and behavior, self-injurious behavior, as well as aggression toward others or the environment (des Portes *et al.*, 2003).

Antipsychotics have traditionally been shown to improve symptoms related to aggression, social withdrawal, hyperactivity, stereotypies, self-injurious behavior, and sleep disturbances. Although typical neuroleptics, such as pimozide and haloperidol, have been reported to be more effective in treating behavioral problems, the increased risk of tardive or withdrawal dyskinesia in a substantial proportion of children with autism continues to be a major concern (Campbell *et al.*, 1997).

Risperidone was reported to improve self-injury, aggression, and agitation in 70% of the children and adolescents compared to the placebo response rate of 11.5%. More adverse effects, including increased appetite with associated weight gain, transient sedation, tremor, and drooling, were more common with risperidone than placebo. It is considered first line of medication for children and adolescents who display extreme irritability.<sup>[14]</sup>

Studies utilizing aripiprazole in the treatment of tantrums, aggression, and self-injury in children and adolescents with autism found aripiprazole to be efficacious and safe. Doses ranged from 5 to 15 mg/kg.<sup>[15]</sup>

Methylphenidate was found to be at least moderately efficacious at doses of 0.25–0.5 mg/kg for youth with ASD with attention deficit hyperactivity disorder. However, efficacy was lesser in this population than in those without ASD, and children with ASD developed more frequent side effects. Atomoxetine and clonidine have also found to be more effective than placebo.<sup>[16,17]</sup>

Selective serotonin reuptake inhibitors, second generation antipsychotics and mood stabilizers such as valproate have been used for repetitive and stereotypic behavior.<sup>[18,19]</sup>

Several randomized, placebo-controlled trials have examined the efficacy of naltrexone for core symptoms of autism, associated symptoms of hyperactivity and irritability, and for discrimination learning. Overall, it appears naltrexone may have some benefits in reducing hyperactivity and impulsivity in children and adolescents with ASD, but core symptoms did not appear to improve with this medication.<sup>[20-22]</sup>

The efficacy of melatonin for sleep disturbances in children and adolescents with ASD has been examined in multiple double-blind, placebo-controlled studies, making it one of the best-studied complementary alternative treatments used in ASD.<sup>[23]</sup>

Other modalities are sensory integration, speech therapy, and remedial education. In case of all these therapies, earlier the intervention started, better is the outcome.

Newer techniques such as stem cell therapy and hyperbaric oxygenation are being tried, but there is no conclusive evidence for the same.

Thus, treatment of autism requires a multimodal approach with a multidisciplinary team.

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