Pegem Journal of Education and Instruction, Vol. 15, No. 4, 2025 (pp. 4595-4604)

RESEARCH ARTICLE WWW.PEGEGOG.NET

Autism spectrum and physical activity

Dr. Garmat Mustafa [1], Beneddine kamel [2]

[1] Laboratory of Cognitive Dimensions and Applied Perceptions in Sports Training Sciences through Multidisciplinary Approaches; Laghouat – Algeria. Email: m.garmat@lagh-univ.dz

[2] Contemporary issues in sports training systems and human movements, University Center of El Bayadh-Algeria. Email: k.beneddine@cu-elbayadh.dz

Received: 12/05/2025 ; Accepted: 17/11/2025 ; Published: 14/12/2025

Abstract

This article addresses autism spectrum disorder and its relationship with physical activity from an educational and therapeutic perspective, beginning with a conceptual and historical foundation of the disorder and moving through its behavioral, cognitive, and neurological characteristics. The study highlights that autism is a multidimensional developmental disorder whose manifestations vary among individuals and are not limited to deficits but also include latent abilities that can be developed. It emphasizes the effective role of physical activity and sports in improving attention, reducing stereotypical behaviors, and enhancing social interaction and psychological well-being. The article also presents models of adapted sports programs that take into account individual differences, levels of severity, psychological support, and safety. It concludes that physical activity represents a comprehensive educational and therapeutic tool for improving the quality of life of children with autism spectrum disorder.

Keywords: Autism Spectrum Disorder – Physical Activity – Adapted Sports – Educational Intervention – Social Interaction.

Introduction

Autism spectrum disorder is one of the most complex and multifaceted neurodevelopmental disorders, given the ,overlap of its biological, psychological, social and educational dimensions. This disorder has firmly established itself in contemporary scientific literature, particularly with the increasing rates of diagnosis worldwide and the growing societal awareness of the rights of people with disabilities. Autism is no longer viewed as a closed disease, but rather as a broad spectrum of characteristics and abilities that vary from one individual to another in terms of severity, function, and independence. aims to provide a comprehensive theoretical foundation for the concept of autism spectrum ,disorder, tracing its historical development analyzing its various definitions, outlining its ,behavioral and cognitive characteristics reviewing its modern classifications, and discussing the most prominent factors and theories that explain it. This foundation serves as a crucial knowledge base for understanding how physical activity and sports can later be employed as an effective educational and therapeutic approach.

What is the autism spectrum ? 1:

The linguistic and terminological concept of autism spectrum1.1 disorder

Linguistically, the term "autism" is derived from the Latin root*Autos* Meaning "self," it is used to denote self-absorption or excessive self-focus. The term was initially used to describe patterns of social withdrawal and psychological isolation.

In technical terms, autism spectrum disorder refers to a neurodevelopmental disorder that appears in early childhood and is characterized by persistent difficulties in social communication and interaction, along with ,restricted and repetitive patterns of behavior "interests, and activities. The term "spectrum is used to emphasize the wide variation in the severity and manifestations of symptoms among individuals, reflecting the heterogeneous nature of thisdisorder.[1]

The American Psychiatric Association(APA) has defined autism spectrum disorder as “a neurodevelopmental disorder characterized by qualitative impairment in social communication and social interaction, and by the presence of repetitive and restricted

patterns of behavior, with symptoms appearing in early developmental stages."[2] This definition highlights the neurological dimension of autism and emphasizes that it is not caused by parenting styles or purely psychological factors.

From an educational perspective, autism spectrum disorder is viewed as a developmental condition that affects a child's ability to learn and adapt socially, but it does not negate the existence of latent abilities that can be developed through appropriate educational interventions, including adapted physical activity, which contributes to improving motor, social, and psychological aspects.

The historical development of the concept of autism spectrum1.2

did not crystallizein its modern scientific form until the twentieth century, despite the existence of historical references to cases resembling autism in some ancient medical writings. The credit for the first accurate scientific description of autism goes to the American psychiatrist LeoKanner in1943 , when he published his famous study on "Subjective Disorders of Affective Communication," describing a group of children who showed severe social withdrawal, clear language difficulties, and a rigid adherence toroutine.[3]

Around the same time, the Austrian physician Hans Asperger described similar cases, but characterized by better linguistic and cognitive abilities, which later became known ,as " Asperger's syndrome ." However Asperger's work did not gain widespread recognition until later decades, due to the circumstances of World War II and the language barrier.

During the 1950s and 1960s, erroneous psychological explanations of autism prevailed, most notably the "refrigerator mother" theory, which blamed the family, and especially the mother, for the onset of the disorder. These theories led to serious psychological and social harm to families before being scientifically refuted with the development of neuroscience andgenetics.

Towards the end of the 20th century, the concept of autism underwent a radical transformation, coming to be recognized as a multifactorial neurodevelopmental disorder .that cannot be explained by a single factor This shift led to the emergence of the concept of "autism spectrum," which reflects the great diversity of characteristics and needs.

.Autism Spectrum Classifications in Modern Diagnostic Guidelines

The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition(DSM-5), brought about a significant shift in the classification of autism spectrum disorders, as all previous diagnoses were consolidated into a single category: "Autism Spectrum Disorder"[5]. This consolidation came in response to criticisms leveled at previous classifications, which lacked accuracy and consistency.

The DSM-5 is based on two main diagnostic criteria:

- persistent deficit in social communication and social interaction across multiple contexts.
- ,and repetitive patterns of behavior interests, and activities.

The guide also acknowledges different levels of intensity, determined based on the amount of support an individual needs, reflecting a functional approach that focuses on practical needs rather than rigid classifications. This approach is of paramount importance in the field of education, as it allows for the design ,of individualized intervention programs including adapted sports programs.

Behavioral characteristics of children with autism spectrum disorder

are diverse, but the scientific literature agrees on a set of common features, most notably difficulties in social interaction, poor non-verbal communication, and the presence of stereotypicaland . repetitive behaviors[6]

Social deficits manifest as difficulty forming relationships, weak responsiveness to social .initiatives, and limited interest in others Stereotypical behaviors are evident in repetitive body movements, excessive attachment to specific objects, or rigid adherence to routines.

These characteristics directly affect the child's ,ability to integrate into school and society which calls for comprehensive educational interventions that take these characteristics ,into account and employ alternative activities

such as physical activity and sports, to reduce their severity and improve adaptation.

This section of the first chapter provided a conceptual and historical foundation for autism spectrum disorder, highlighting the evolution of the concept, its modern definitions, and its most important behavioral characteristics. The next chapter will expand on the cognitive and neurological characteristics, then explore the explanatory causes and factors, along with modern theories of autism, culminating in a20+ pageWord document with full Chicago-style footnotes.

Cognitive and Neurological Characteristics of Autism Spectrum and Explanatory Factors

Cognitive and Neurological Characteristics of Children with Autism Spectrum Disorder

Cognitive Characteristics

vary considerably, ranging from very low levels to above-average abilities in some areas. Some of the most prominent cognitive characteristics associated with the spectrum include:

1. **Focus on details**: Children with autism spectrum disorder tend to focus on minute details, sometimes at the expense of the overall picture, as noted by both Heller and Kanner in the classic studies[7].
2. **Excellent memory for facts and patterns**: Some children have an exceptional ability to remember accurate information or visual and auditory patterns, and this ability has been used in the development of adapted teaching strategies.
3. **Difficulties in symbolic thinking**: Challenges arise in the use of symbols or abstract language, which is reflected in language skills and understanding of social contexts.
4. **Limited cognitive flexibility**: Children have difficulty adapting to ,changes or switching between tasks and this is directly related to repetitive and . routine behaviors[8]

Neurological Characteristics

Recent neurological studies have shown that the autism spectrum is associated with changes in certain brain regions, such as the .prefrontal cortex , cerebellum, and amygdala The findings suggest that these changes affect :

- **Sensory organization:** Hypersensitivity or hyposensitivity to sensory stimuli, leading to sensory processing disorders[9].
- **Neural communication:** Differences in signal transmission between brain regions explain difficulties in social communication and emotional interaction.
- **Executive positions:** Challenges in planning, organization, problem-solving, and selective attention, which are associated with routine and stereotypical behaviors[10].

) Modern neuroimagingfMRI) has also shown that children with autism spectrum disorder exhibit a different pattern of brain activity during social tasks, supporting the neurological theory of autism and confirming that this disorder is not the result of incorrect education or upbringing.

Factors Explaining the Autism Spectrum :

Genetic Factors :

Genetic studies have shown that autism has a strong genetic basis, with the likelihood of developing it increasing among siblings or first-degree relatives.11 Some genes associated with increased susceptibility, such asSHANK3 andCNTNAP2 have been , identified, and they affect synaptic and neurotransmitter functions.

Biological Factors :

Biological factors include:

- **Neurological and brain disorders**: As previously mentioned, this includes ,changes in the cerebral cortex cerebellum, and amygdala.
- **Metabolic and hormonal disorders**: Some studies have indicated the role of hormones such as oxytocin in influencing social interaction behaviors[12].
- **Factors related to pregnancy and childbirth:** Such as exposure to toxins, lack of oxygen during birth, or low birth weight.

Environmental and Educational Factors

Recent studies suggest that the early environment, including family interaction, is not the primary cause of autism, but it may

influence the severity of symptoms and a child's ability to cope. These factors include:

- Quality of family care and socialization.
- Level of cognitive and sensory stimulation in the early environment.
- Exposure to some harmful environmental factors, such as some chemicals during pregnancy[13].

Modern Theories for Explaining the Autism : Spectrum

The Theory of Social-Emotional Inadequacy : fact that autism results from children's difficulty in processing social and emotional information, leading to their social withdrawal and poor interaction with others.14

Sensory integration theory :

This theory suggests that children with a spectrum experience disturbances in processing sensory input, which is reflected in motor and social behavior, and affects learning andattention.15

Cognitive Neuro-Interpretation Theory：

This theory combines neurological and cognitive studies, and asserts that variation in brain structure and function leads to challenges in symbolic thinking, motor organization, and social interaction, which explains the difference in symptom severity betweenindividuals.14

,This section presents a conceptual , historical and scientific framework for autism spectrum disorder, beginning with its linguistic and terminological definition, moving through its diagnostic history, and culminating in its behavioral, cognitive, and neurological characteristics, while also reviewing explanatory factors and modern theories. This foundation forms the necessary theoretical basis for understanding the role of physical activity in educational and therapeutic interventions for children with autism spectrum disorder, a topic that will be further explored in the second section.

Section Two – Physical Activity: Concept and Educational and Therapeutic Dimensions

Physical activity and sports play a ,fundamental role in children's development and are of particular importance to children with autism spectrum disorder, as they constitute a non-pharmaceutical educational and therapeutic tool for promoting holistic growth. The concept of physical activity refers to any bodily movement generated by skeletal ,muscles that increases energy expenditure while sports activity is associated with organized physical activity that adheres to specific rules and aims at educational or competitivegoals.[1]

Recent studies have shown that regular ,physical activity improves motor skills promotes mental health, and supports social interaction, making it an effective tool for developing cognitive, motor, and social skills in children with autism spectrum disorder[2].

The concept of physical activity and sports :

Definition of physical activity :

Physical activity is defined as any bodily movement resulting from the contraction of skeletal muscles, leading to increased energy expenditure compared to the resting state.3 This concept includes daily activities such as walking, running, playing, and performing household chores, and is considered essential for children's healthy development.

From an educational perspective, physical activity is viewed as an educational tool for promoting physical, cognitive, and social development through interaction between the child and their environment. It is characterized by its ability to strengthen motor skills and ,develop essential life skills such as balance coordination, and motor planning.

Definition of sports activity :

Sports activity is a form of organized physical activity that adheres to specific rules and aims to improve physical fitness, develop motor skills, and achieve educational or competitive goals.[4] Sports activity differs from general ,physical activity in that it is more structured requires careful planning and monitoring, and allows for the evaluation of individual performance and progress.

Sports activity is of particular importance to children with autism spectrum disorder, as it can be adapted to their abilities, which ,contributes to enhancing concentration developing social skills, and improving interaction with others.

The difference between physical activity : and sports activity

Despite the close link between physical activity and sports activity, there are key differences:

1. Scope: Physical activity includes all bodily movements, while sports activity is limited to movements organized according to rules.
2. The goal: Physical activity may be spontaneous, while sports activity has specific educational or competitive goals.
3. Assessment: Sports activity allows for performance assessment and gradual improvement, which is difficult to achieve in unstructured physical activity[5].

This distinction allows for the development of intervention strategies adapted to children with autism spectrum disorder, so that general physical activity is used to improve sensory regulation, and organized sports activity is used to develop social skills and behavioral discipline.

The different dimensions of physical : activity and sports

Physical and health dimension ::

Physical activity contributes to improved ,physical fitness in terms of muscle strength flexibility, balance, and coordination. It also promotes cardiovascular and respiratory health, reduces obesity, and improves sleep quality.[6]

,For children with autism spectrum disorder regular physical activity helps strengthen the motor system, improve the ability to perform daily activities, and increase independence in movement, especially in children with impaired motor coordination.

The psychological dimension :

Regular physical activity promotes mental ,health by reducing anxiety and stress levels improving mood, and increasing feelings of accomplishment and self-confidence.[7] It also helps regulate emotions and control repetitive behaviors.

,In children with autism spectrum disorder adapted physical activity can reduce repetitive compulsive behaviors, increase a child's ,ability to cope with changes in daily routines and stimulate social participation.

The social dimension :

Team sports activities contribute to the development of cooperation skills, teamwork .respect for rules, and shared responsibility[8] , They also encourage the development of non-verbal communication skills, such as using signs, and understanding facial expressions and movements.

This dimension is extremely important for children with autism spectrum disorder, who face difficulties in social interaction, as it allows them to engage in group activities in a structured and safe way.

The educational and therapeutic : dimension

a form of recreation, but a comprehensive educational and therapeutic tool. They can be integrated into educational and rehabilitation programs to improve academic and behavioral performance, and develop social and cognitive skills.[9]

Educational research emphasizes the importance of using adapted physical activity as part of individual plans for children with autism spectrum disorder, as it helps improve social interaction, regulate behaviors, and promote motor and mental development.

Characteristics of physical activity and : sports for children with autism spectrum disorder

1. Flexibility and individual adaptation: The level of difficulty and duration can be adjusted according to the child's abilities.
2. The motivational aspect: It focuses on enjoyment and reward to promote continuity.
3. Group interaction: encourages participation and social interaction.
4. The possibility of integrating learning with play: It combines motor learning and educational experience[10].

Recent studies on physical activity and : sports

Studies have shown that children with autism spectrum disorder who engage in regular physical activity show improvements ,in attention, social skills, and motor abilities compared to those who do not participate in sportsprograms.11

- study(2019) indicated a significant improvement in attention and control

of repetitive behaviors after 12 weeks of adapted fitness programs[12].

- A studyby Rosenblatt & Aylward (2018) confirmed that organized group activities contributed to increasing cooperation and communication skills in children with autism[13].

This section demonstrates that physical activity is multidimensional and directly impacts the physical, psychological, and social development of children, especially those with autism spectrum disorder. It also emphasizes the need to design tailored programs that consider individual differences ,and are based on clear scientific principles thus paving the way for a practical study of the impact of physical activity in the third section .

Third axis: The impact of physical activity and sports on children with autism spectrum disorder

,This is the central focus of the study which examines the multifaceted effects of physical activity on children with autism spectrum disorder, aiming to analyze its psychological, behavioral, social, and motor impacts. Scientific literature has shown that physical activity is not merely a means of movement, but rather an educational and therapeutic intervention capable of improving quality of life, developing essential skills, and promoting sensory and socialintegration.[1]

is based on theoretical and experimental studies, including the results of Arab and foreign research, with a focus on adapted programs for children with autism, and their effect on improving attention, controlling stereotypical behaviors, enhancing social interaction, and developing motor and health abilities.

The psychological and behavioral impact : of physical activity and sports

Improving attention and focus :

Children with autism spectrum disorder experience difficulties with attention and selective attention, which affects their learning and interaction with their environment. Recent studies have shown that regular physical activity improves a child's executive functions, including attention, working memory, and planningability.[12]

The improvement in concentration is partly due to the effect of physical activity on the central nervous system, through increased blood and oxygen flow to the brain, and activation of areas of the prefrontal cortex associated with executive functions.13 Structured motor activities also train the child to follow instructions, manage time, and adhere to a motor sequence, which enhances concentration and attention.

Reducing stereotypical and repetitive : behaviors

are among the most prominent characteristics ofchildren ,with autism spectrum disorder such as repeating movements or adhering to routines. Several studies have shown that physical activity significantly reduces these behaviors, both during and after the activity.[14] suggesting that physical activity provides a ,structured alternative to repetitive behaviors allowing children to release excess energy in an organized way. Furthermore , engaging in repetitive motor activities such as running or structured swimming helps children develop a sense of control, thus reducing the need for dysfunctional behaviors.[15]

Enhancing emotional stability and self- : esteem

- esteem, which is crucial for children with autism spectrum disorder who frequently face challenges in other areas.17

The social and communicative impact of : physical activity and sports

Developing social communication skills :

Research shows that group physical activity provides opportunities to develop communication skills, both verbal and non- ,verbal, and helps children use gestures understand facial expressions, and interact withpeers.18

evident in organized group games, where the child is encouraged to look at others, respond to their directions, and express his needs in a practical and direct way.

Improving social interaction and : integration

Physical activity helps break down the social isolation experienced by many children with disabilities by providing a shared environment that brings them together with their peers in a fun and meaningful activity.19 Studies

indicate that regular participation in sports activities promotes a sense of belonging to a group and teaches respect for social roles and rules.

Building self-confidence and social : independence

Physical activity contributes to the development of social independence skills, as it provides the child with multiple opportunities for gradual success and increased self-efficacy.[20] It is also a way to train the child in real social situations, such as cooperation, accepting loss, and adhering to rules, which promotes social integration.

The physical and health effects of physical : activity and sports

Developing motor coordination and basic : skills

Many children with autism spectrum disorder face difficulties with balance and motor coordination. Studies show that adapted sports ,programs improve gross and fine motor skills and increase a child's ability to perform daily activities.[21]

Improving physical fitness and general : health

Physical activity contributes to increased ,muscle strength, flexibility, and endurance and protects against health problems associated with a lack of movement, such as obesity and sleep disorders.[22] It also helps to enhance the ability to perform daily activities more independently.

Organizing sensory processing :

Studies indicate that many children with sensory processing disorders. Physical activity, especially activities requiring balance and deep, penetrating movements, helps regulate sensory input, reduce stress, and improve adaptability to the environment.[23]

Applied studies on impact :

- study(2019): observed a significant improvement in attention and control of stereotypical behaviors after 12 weeks of adapted fitness programs[24].
- study Rosenblatt & Aylward (2018): Confirmed that group activities contributed to improving cooperation and social communication skills[25].
- An Arab study (Al-Husseini, 2020) showed that school sports activities led to a decrease in the rate of stereotypical behaviors and an increase in social interaction for children with autism spectrum disorder[26].

This section demonstrates that physical activity has a multidimensional positive impact on children with autism spectrum disorder, encompassing psychological, behavioral, social, motor, and health aspects. Recent studies also underscore the importance of designing tailored programs that consider individual differences and leverage the structured and enjoyable nature of physical activity to achieve the desired effect. This analysis forms the basis for moving to the fourth axis, which will focus on the design of . sports programs

axis : Adapted sports programs for children with autism spectrum disorder

Adapted sports programs are effective tools for translating theories about physical activity into practical applications that suit the abilities of children with autism spectrum disorder. These programs are based on scientific principles that take into account ,individual differences, the children's motor cognitive, and social needs, and the severity level of the spectrum for each child.[1]

This axis aims to analyze the foundations of adaptive program design, educational and organizational principles, safety and psychological support conditions, and the role ,of the family and the multidisciplinary team in addition to providing applied models of adapted sports activities that can be used in schools, rehabilitation centers, and community programs.

Principles of Designing Adapted Sports : Programs

Taking into account individual differences : and levels of intensity

Individual differences are the cornerstone of designing sports programs forchildren with disabilities, as a single model cannot be adopted for all children. This necessitates a comprehensive assessment prior to program ,design, encompassing motor, sensory cognitive, and social aspects.[2]

are categorized according to their difficulty ,levels, in terms of communication ability control over repetitive behaviors, and motor skills. This assessment allows activities to be

tailored to each child's abilities, enhancing motivation and reducing frustration.

The principle of gradualism and flexibility : in activities

The design of adapted sports programs requires a gradual increase in the difficulty of motor tasks, and a gradual transition from simple to more complex activities[3].

also be flexibility to allow for adjustments to activities based on the child's response, such as reducing the number of movements, the duration of the activity, or simplifying instructions. This principle fosters a sense of security in the child and increases opportunities for participation and continued engagement.

Safety and Psychological Support : Standards

The program design includes considerations for physical safety, such as providing a safe environment free from disturbing sensory stimuli, using appropriate tools, and continuous supervision[4].

also an essential part, and includes positive encouragement, the use of verbal reinforcement, and building a relationship of trust between the trainer and the child, which reduces refusal of the activity and promotes participation.

Involving the family and the : multidisciplinary team

The family plays a crucial role in fostering the continuity of activities outside of school or institutional settings. A multidisciplinary team, including specialists in special ,education, psychology, occupational therapy and physical education, also contributes to designing comprehensive programs that effectively meet the child'sneeds.[5]

Educational and organizational principles : of adapted programs

Clarity of goals and tasks :

,should have clear objectives for each activity ,such as developing a specific balance skill .improving attention, or promoting teamwork Tasks and instructions should be explained simply and directly , with repetition as needed .

Repetition and regular practice :

children with disabilities requires frequent and regular practice to ensure the consolidation of motor and social learning. Repetition is an integral part of the program design to ensure sustainable skill acquisition.[6]

Fun and Motivation :

The program's effectiveness depends on ,incorporating elements of fun and motivation such as using adapted games, rewards, and encouraging healthy competition among children. This helps increase motivation and participation.

Practical models for adapted sports : activities

Adapted Motor Games :

Physical games are among the most effective activities, and can be modified according to children's abilities[7].

Practical examples:

- Simple obstacle courses.
- Throwing and catching games with simplified rules.
- exercises on elastic bands or pads.

Swimming and Water Activities :

Swimming provides a calming sensory environment and promotes balance and –muscle development[20]. Short programs of 20 minutes can be designed, including 30 instruction in basic movements and hand-foot coordination, with full supervision.

Modified Individual and Team Sports :

Individual and team sports such as mini-football or cycling can be modified by simplifying the rules, reducing the number of participants, and giving clear and frequent instructions[8].

These sports help to:

- Developing cooperation and respecting rules.
- Boosting self-confidence and the ability to make decisions.
- Improving social interaction.

Integrating motor learning with cognitive : learning

can be combined with learning simple cognitive concepts, such as:

- Counting while running.
- Recognizing colors or shapes while in motion.
- Solve simple tasks during physical games.

This integration contributes to enhancing cognitive and sensory abilities simultaneously[9].

Conditions that must be met for the : success of adapted programs

1. Continuous assessment of the child to adapt activities to his progress.
2. Specialized supervision by qualified trainers.
3. A safe and stimulating environment that reduces negative stimuli.
4. Encouraging family involvement to ensure continuity.
5. multiple motor , cognitive and social needs.[10]

This section clarified that the design of adapted sports programs for children with autism spectrum disorder should be based on ,individual differences, progression ,flexibility, safety, psychological support family involvement, and a multidisciplinary team. The applied models also provided practical evidence of how physical activity can be used systematically to achieve comprehensive educational and therapeutic goals.

This section forms an important practical basis that paves the way for the transition to the ,general conclusion and recommendations where the results will be summarized, and practical and academic recommendations will be presented, along with an extensive list of references.

General conclusion and recommendations

This study concluded with a comprehensive analysis of autism spectrum disorder and physical activity from an educational and therapeutic perspective, beginning with conceptual and historical grounding, moving through the behavioral, cognitive, and neurological characteristics of children with autism spectrum disorder, and culminating in the impact of physical activity and the design of adapted programs to meet their individual needs. The study demonstrated that physical activity not only improves motor skills but also encompasses psychological, social, and educational aspects, making it a multidimensional tool for enhancing the quality of life of children with autism spectrumdisorder.[1]

Key Findings :

1. Grounding the Autism Spectrum: The study showed that understanding the autism spectrum requires viewing it as a multidimensional neurodevelopmental disorder, taking into account the significant variability between individuals. This ,understanding includes behavioral cognitive, and neurological characteristics, while acknowledging the role of genetic, biological, and environmentalfactors.[2]
2. The impact of physical activity: Regular physical activity has been shown to improve attention and concentration, reduce stereotypical behaviors, boost self-confidence, and support social interaction.3 Group activities contribute to the development of cooperation and integration skills, while individual sports promote a child's independence and self-control.
3. Designing Adapted Programs: The results showed that adapted sports programs should consider individual differences, a gradual progression of ,activities, flexibility, safety psychological support, and family involvement, under the supervision of a multidisciplinary team.[4] The applied models provided practical evidence of how to achieve these goals.

Practical Recommendations :

1. Integrating physical activity and sports into educational and rehabilitation programs for children with a spectrum disorder, taking into account adaptation to their individual abilities.
2. Training specialists and trainers on the fundamentals of motor education for children with special needs, and identifying individual differences and methods of adaptation.
3. Encouraging family involvement to ensure the continuity of extracurricular activities and their integration into daily life.
4. Developing diverse sports programs ,that include physical games swimming, and modified team and individual sports, with a focus on fun and motivation.
5. Conducting continuous evaluation of program effectiveness by measuring

motor, social, and psychological performance, and modifying activities based on the results.

6. Encouraging future research to assess the impact of physical activity on other ,aspects such as cognitive skills academic achievement, and school integration for children with autism spectrum disorder.

Future Research Prospects :

1. Studying the long-term impact of physical activity on the development ,of children with spectrum disorders and identifying the most effective programs in the long term.
2. Using technology and digital media to design interactive, adapted sports programs that combine sensory stimulation and motor learning.
3. Integrating physical activity with other therapeutic strategies such as occupational therapy and behavioral therapy, to develop comprehensive and multi-dimensional programs.

A. Arabic References

1. Al-Husseini, Muhammad. Physical Education for Children with Special Needs: Adapted Programs and Activities. Cairo: Dar Al-Fikr Al-Arabi, 2020.
2. Ali, Samira. Autism and the Integration of Children into Sports Activities. ,Amman: Dar Al-Manahij 2019.
3. Al-Zuhairi, Khalid. The Educational Framework for Physical Activity for Children with Autism Spectrum Disorder. Beirut: Lebanese University 2018 ,.

B. Foreign References

1. American Psychiatric Association (APA). *Diagnostic and statistical Manual of Mental Disorders (DSM-5)* . Washington DC: APA, 2013.
2. Pan, CY " Effects of Physical Activity on Children with Autism Spectrum Disorders ." *Research in Autism Spectrum Disorders* , 2019; 63: 1–11.
3. Rosenblatt , J. & Aylward , S. *Adapted Physical Activity Interventions for Children with Autism* . London: Routledge , 2018.
4. Sherrill , C. *Adapted Physical Activity, Recreation and Sport* . 5th ed . Champaign: Human Kinetics , 2013.
5. Smith, T., et al. "Physical Exercise and Autism Spectrum Disorders : Review and Recommendations ." *Journal of Autism and Developmental Disorders* , 2014; 44(7): 1701–1711.
6. Ozonoff , S., Dawson, G., & McPartland , J. *A Parent's Guide to Asperger Syndrome and High-Functioning Autism* . New York: Guilford Press , 2002.
7. Grandin , T. & Panek , R. *The Autistic Brain: Thinking Across the Spectrum* . Boston: Houghton Mifflin Harcourt, 2014.