

Importance of Sports and physical activities for children with ADHD and the development of motor skills

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Abstract:

the aim of this study was to clarify the importance of physical and sports activities for children with attention deficit hyperactivity disorder and to develop their motor skills, as it is known sports is among the activities that plays a role in the treatment of behavioral disorders, the researcher used the analysis of references and studies that dealt with the topic of attention deficit hyperactivity disorder as a tool of the study, the study showed that sports helps to reduce dangerous behaviors and increase peer relationships, in addition the study also revealed that the high level of this disorder reduces the accuracy of the basic motor skills performance, thus, the researcher recommended the need to design educational sports programs that help to reduce attention deficit hyperactivity disorder, and the development of basic motor skills for children in primary schools.

Keywords: sports and physical activities; ADHD; motor skills.

• INTRODUCTION

In the world of sports, we have different games with each having its own specific rules. These games are usually physical activities that are done by either individuals or teams for leisure, entertainment as well as to compete against one another. The topic of sports is very broad: it can serve as a form of therapy as well as a tool in different aspects of life which can help to change the world. The Novak Djokovic Foundation (NDF, 2017) states that sports are also quite beneficial for children. By playing sports children develop physical skills; learn how to exercise; make new friends, have fun; learn to be team players; and improve their self- esteem. (Laura Ekinde, 2017, p4)

Sport participation has also been proposed as a means to manage symptoms of ADHD (Conant-Norville & Toer, 2005), but there is limited evidence for its effectiveness. Kiluk, Weden, and Culotta (2009) found that children and youth (age 6–14 years) with ADHD who played three or more sports were reported (by their parents) to display fewer symptoms of anxiety or depression than those who played two or fewer sports. On the other hand, in another study using parental reports, Johnson and Rosén (2000) found, compared with boys who did not have ADHD that boys with ADHD were involved in team sports for a significantly shorter period of time, displayed aggression and emotional reactivity more frequently, and experienced more frequent disqualification. (Homan Lee, and all, 2014)

Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurobehavioral condition characterized by excessive restlessness, inattention, distraction, and impulsivity. It is usually first identified when children are school-aged, although it also can be diagnosed in people of all age groups. In an average classroom of 30 children, research suggests that at least one will have ADHD. (American Academy of Child, p1)

Cases and diagnoses of ADHD have been increasing dramatically in the past several years. The American Psychiatric Association (APA) says that 5 percent of American children have ADHD. But the Centers for Disease Control and Prevention (CDC) puts the number at more than double that. The CDC says that 11 percent of American children, ages 4 to 17, had the attention disorder as of 2011. That's an increase of 42 percent between 2003 and 2011. (Timothy J. Legg, 2016)

Brain imaging studies have revealed that, in youth with ADHD, the brain matures in a normal pattern but is delayed, on average, by about 3 years. the delay is most pronounced in brain regions involved in thinking, paying attention, and planning. more recent studies have found that the outermost layer of the brain,

the cortex, shows delayed maturation overall, and a brain structure important for proper communications between the two halves of the brain shows an abnormal growth pattern. These delays and abnormalities may underlie the hallmark symptoms of ADHD and help to explain how the disorder may develop. (National Institute of Mental Health, p1)

There are many signs and symptoms of ADHD. Some are rather subtle, while others are quite obvious. For example, if your child has poor behavioral skills, academic difficulties, or problems with motor skills. (TimothyJ. Legg, 2018)

Considering the severity of their symptoms, children with ADHD may find they enjoy playing some sports more than others. Factors like the coaching dynamic, overall pace of the sport and focus on teamwork versus individual performance may influence the decision on which sport is best. (Leonard Pollack, (2017)

ADHD symptoms can be effectively managed by the use of stimulant medications and behavioral interventions (Goldman, Genel, Bezman, & Slanetz, 1998; Jensen et al., 2001; Pelham & Fabiano, 2008). Recently, physical activity has gained prominence as a potential behavioral intervention for ameliorating cognitive and affective symptoms of ADHD (Gawrilow, Stadler, Langguth, Naumann, & Boeck, 2013). There is some evidence that the effects of physical activity are similar to the effects of stimulant medications in individuals with ADHD (Wigal, Emmerson, Gehricke, & Galassetti, 2013). For instance, engagement in various forms and levels of intensity of physical activity has been associated with improved executive function, affect, and social behavior, along with reduced impulsivity, hyperactivity, inattention, anxiety, and depression symptoms among individuals with ADHD (Gapin & Etnier, 2010; Gapin, Labban, & Etnier, 2011; Gawrilow et al., 2013; Medina et al., 2010; Verret, Guay, Berthiaume, Gardiner, & Béliveau, 2012). Nevertheless, evidence for the symptom-management/reduction benefits of physical activity for individuals with ADHD is by no means conclusive. (Homan Lee, 2014)

There are two components of children movement ability that needed to be developed including fundamental and fine motor skills aspects. Fundamental motor skills is a movement used big muscles such as walking, running, two legs jumping, and hopping the obstacles. On the other hand, fine motor skills is a movement used small muscles such as cutting, sticking, tearing, drawing, coloring, writing and arranging the blocks. Each child has different motor ability. (Komaini, 2018, p1)

Motor skills include locomotion (running, walking, jumping, hopping), manipulation (throwing, kicking, catching, bouncing), and stability (bending, twisting, rolling, dodging), Mastery of a range of motor skills, combined with good overall physical fitness, is critical to the healthy development of a child and forms the basis of their athletic competence, To perform a task or movement, our brain sends signals to our motor units (individual nerves and collections of muscle fibers) at precise intervals to orchestrate the contraction of muscles throughout our body, Learning a motor skill is like writing a computer program to a disk – the program, imprinted on the brain, plays back as a motor reflex. The method of imprinting a motor skill "program" on the brain is repetition (i.e., "practice, practice, practice"). (Great play, 2015)

"Motor skills" describe your child's ability to perform movements with their body. Gross motor skills are large movements, such as running. Fine motor skills are small movements, such as writing. Researchers in the journal *Research in Developmental Disabilities* report that more than half of children with ADHD have problems with gross and fine motor skills.

Study in the journal *CNS & Neurological Disorders* examined the effects of medication and motor skills training on children with ADHD. Children who received motor skills training alone, or in combination with medication, showed improvements in their gross and fine motor skills. In contrast, those who received medication alone showed no improvements. (TimothyJ, 2016)

At the same time, Dr. James McGuire, a developmental and behavioral pediatrician at Elliot Health System in Manchester, New Hampshire, makes clear that while there may be associations between motor skill delays or coordination difficulties and ADHD, it's not a matter of "cause and effect." Motor skill delays are not a part of an ADHD diagnosis, he explains, urging people not to jump to hasty conclusions. Plus, he adds that "there are some ADHD kids with superior motor skills who are really good at sports, and there are those with motor skill delays and coordination difficulties," reinforcing that there isn't a one-size-fits-all standard in this situation. "You have to look at each child individually," he says. "You can't assume ADHD and motor skills challenges go together, it can also be the other way around: That it's not motor skill delays that intensify ADHD symptoms, but instead ADHD symptoms that can interfere with motor skills and coordination efforts. For example, because ADHD children may have trouble paying attention, McGuire says, there might be more coordination challenges that develop indirectly. (Jennifer Lea Reynolds, 2017)

Leisure activity participation in middle childhood may help to clarify what is driving participation in physical activity at this age. It would be expected that the relationships between motor skill proficiency and physical activity participation would strengthen as children age as it has been suggested that, in middle childhood, motor competence provides a foundation for participating in sports and physical activities. (Clark, J.E, 2002)

Based on the above the need to conduct this study arose to identify the importance of Sports and physical activities for children with Attention Deficit / Hyperactivity Disorder and the development of motor skills.

- **Literature Review:**

- * **What is ADHD?**

- ADHD is a neurobehavioral condition with symptoms that include excessive restlessness, poor attention, and impulsive acts. Estimates show that between 3 and 7 percent of school-aged children and about 4 percent of adults have ADHD. (American Psychiatric Association, 2004)

- Attention deficit hyperactivity disorder (ADHD) is a behavioural disorder that includes symptoms such as inattentiveness, hyperactivity and impulsiveness.

- Symptoms of ADHD tend to be noticed at an early age and may become more noticeable when a child's circumstances change, such as when they start school. Most cases are diagnosed when children are 6 to 12 years old.

- The symptoms of ADHD usually improve with age, but many adults who were diagnosed with the condition at a young age continue to experience problems.

- People with ADHD may also have additional problems, such as sleep and anxiety disorders. (Nhs, 2018)

- People with symptoms of inattention may often:

- * **Signs and Symptoms:**

- Inattention and hyperactivity/impulsivity are the key behaviors of ADHD. Some people with ADHD only have problems with one of the behaviors, while others have both inattention and hyperactivity-impulsivity. Most children have the combined type of ADHD.

- People with symptoms of inattention may often:

- ✓ Overlook or miss details, make careless mistakes in schoolwork, at work, or during other activities.
 - ✓ Have problems sustaining attention in tasks or play, including conversations, lectures, or lengthy reading.
 - ✓ Not seem to listen when spoken to directly.
 - ✓ Not follow through on instructions and fail to finish schoolwork, chores, or duties in the workplace or start tasks but quickly lose focus and get easily sidetracked.
 - ✓ Have problems organizing tasks and activities, such as what to do in sequence, keeping materials and belongings in order, having messy work and poor time management, and failing to meet deadlines.
 - ✓ Avoid or dislike tasks that require sustained mental effort, such as schoolwork or homework, or for teens and older adults, preparing reports, completing forms or reviewing lengthy papers.
 - ✓ Lose things necessary for tasks or activities, such as school supplies, pencils, books, tools, wallets, keys, paperwork, eyeglasses, and cell phones.
 - ✓ Be easily distracted by unrelated thoughts or stimuli.
 - ✓ Be forgetful in daily activities, such as chores, errands, returning calls, and keeping appointments. (The National Institute of Mental Health, 2016)

- * **MAJOR CHARACTERISTICS:**

- The predominant features of this disorder include:

- 1) Impaired response inhibition, impulse control, or the capacity to delay gratification. This is often noted in the individual's inability to stop and think before acting; to wait one's turn while playing games, conversing with others, or having to wait in line; to interrupt their responding quickly when it becomes evident that their actions are no longer effective; to resist distractions while concentrating or working; to work for larger, longer-term rewards rather than opting for smaller, more immediate ones; and inhibiting the dominant or immediate reaction to an event, as the situation may demand.
- 2) Excessive task-irrelevant activity or activity that is poorly regulated to the demands of a situation. Individuals with ADHD in many cases are noted to be excessively fidgety, restless, and "on the go." They display excessive movement not required to complete a task, such as wriggling their feet and legs, tapping things, rocking while seated, or shifting their posture or position while performing relatively boring tasks. Younger children with the disorder may show excessive running, climbing, and other gross

motor activity. While this tends to decline with age, even teenagers with ADHD are more restless and fidgety than their peers. In adults with the disorder, this restlessness may be more subjective than outwardly observable, although with some adults they remain outwardly restless as well and report a new to always be busy or doing something and being unable to sit still.

- 3) Poor sustained attention or persistence of effort to tasks. This problem often arises when the individual is assigned boring, tedious, protracted, or repetitive activities that lack intrinsic appeal to the person. They often fail to show the same level of persistence, “stick-to-it-tiveness,” motivation, and will-power of others their age when uninteresting yet important tasks must be performed. They often report becoming easily bored with such tasks and consequently shift from one uncompleted activity to another without completing these activities. Loss of concentration during tedious, boring, or protracted tasks is commonplace, as is an inability to return to their task on which they were working should they be unexpectedly interrupted. Thus, they are easily distracted during periods when concentration is important to the task at hand. They may also have problems with completing routine assignments without direct supervision, being unable to stay on task during independent work. (Fact Sheet)

*** ADHD in School Children:**

«Elementary school-age children with ADHD typically have significant difficulties with academic achievement and peer relationships. They obtain significantly lower scores on achievement tests than do their peers without ADHD and are at a higher-than-average risk for grade retention and placement in special education.

Approximately 30% of the children with ADHD also have a learning disability. However, their academic difficulties typically are the result of performance rather than skills deficits. Specifically, these difficulties appear to be secondary to the inherent problems they have with engagement in class activities and instruction, as well as inconsistent completion and accuracy on assigned tasks, tests, and projects.

School-based intervention strategies should target deficits in behavior control, academic performance, and social relationships. A balanced treatment plan that includes proactive (antecedent-based) and reactive (consequence-based) strategies is optimal.

Family-school interventions (such as conjoint behavioral consultation, daily report card, and targeted homework intervention) capitalize on the potential benefits of promoting family involvement in education and family-school collaboration. These strategies may be particularly helpful when combined with effective school-based interventions.

Multimodal interventions usually are required to successfully address the problems presented by children with ADHD. The need for multiple interventions necessitates that professionals from many disciplines be involved in the care of these children. Interdisciplinary collaboration is essential to ensure a comprehensive, well-integrated, systemic approach to treatment.

Interventions should be designed based on assessment data (e.g., functional behavioral assessment) through collaboration among clinicians, educational professionals, and parents. Multiple mediators (e.g., teachers, parents, peers, computer technology) should be used to implement interventions, particularly in classroom settings» (DuPaul GJ, 2009, p55-68)

*** The sports and ADHD:**

Because of the controversy involved with the use of CNS stimulant medication in treating ADHD, attention has turned to other possible modes of controlling behaviors. One realm that shows a great deal of promise is the role of sport participation. Many parents are interested in the use of both to help their children.

Children who exhibit attention-seeking behavior tend to be less accepted by their peers and less active when compared to the average child (Armstrong & Drabman, 2004). For boys, part of this may be related to poor sports performance that leads to poor self-confidence and peer rejection.

There is evidence that children with behavioral disorders are less successful in sporting events and have low self-efficacy in this domain (Armstrong & Drabman, 2004). (Lullo, 2006)

The sports that are most ideal for children with ADHD are those with a more individual focus, said Dr. Pollack. Many of these sports offer the opportunity for an athlete to compete as an individual, but they still get the experience of being part of a team because their individual scores often contribute to the team's overall score. One major benefit of individual sports for children with ADHD is the direct interaction between the coach and the athlete.

“Individual sports offer a coaching dynamic where the instruction is more one-on-one. It's much easier for children with ADHD to focus if there are fewer distractions and the coaching is directed specifically at them. If they are playing a sport where the coaching is directed more at the team as a whole, an athlete with

ADHD may have a harder time paying attention,” Dr. Pollack said.

Because of the coaching and more individual focus, Dr. Pollack says examples of sports that a child with ADHD may enjoy include: Wrestling, Martial arts, Swimming, Track or Cross Country.

While individual sports may provide certain benefits for kids with ADHD, there are still some team sports that they may enjoy playing. If an athlete with ADHD would like to play team sports, Dr. Pollack suggests one of the following: Basketball, Hockey, and Soccer.

“Basketball, hockey and soccer are sports where the athletes are almost always moving and there’s very little idle time,” Dr. Pollack explains. “That constant motion provides a good outlet for the athletes to use their energy, and having less idle time means they are less likely. (Leonard Pollack, 2017)

Seeing that sport participation seems to have a positive effect on the lives of children with ADHD, specifically boys, it is important that sport be structured so that they can reap the greatest benefits.

Several studies have looked at the sport setting and the use of behavioral interventions. Much of the focus in the research on improving behavior in children with ADHD in a sports setting has been on the use of rewards and reinforcement.

Several researchers applied the known effectiveness of a reward system in controlling ADHD behaviors to the sports setting. Realizing that athletic competence and poor sportsmanship affect sport participation of children with ADHD, Hupp and Reitman (1999) investigated the use of a behavioral intervention to improve both athletic competence and sportsmanship (1999).

Sport training has been shown to positively influence social status and self-concept. The current study was relatively low in intensity, showing that results can be seen without implementing a high intensity program (Hupp & Reitman, 1999). (Lullo, 2006).

*** Fundamental motor skills:**

Fundamental movement skills are a specific set of skills that involve different body parts such as feet, legs, trunk, head, arms and hands. These skills are the “building blocks” for more complex and specialised skills that kids will need throughout their lives to competently participate in different games, sports and recreational activities. (Good Habits for Life, 1996)

Fundamental motor skills are common motor activities with specific observable patterns. Most skills used in sports and movement activities are advanced versions of fundamental motor skills. For example, throwing in softball and cricket, the baseball pitch, javelin throw, tennis serve and netball shoulder pass are all advanced forms of the overhand throw. The presence of all or part of the overhand throw can be detected in the patterns used in these sport specific motor skills. Similar relationships can be detected among other fundamental motor skills and specific sport skills and movements.

Children normally develop motor skills in a sequential manner. Fundamental motor skills comprise one level in the continuum of motor skill acquisition. Children at the fundamental motor skill stage are building upon previously learned movements and preparing for the acquisition of more advanced skills. (Department of Education Victoria, 1996)

They include:

- **Locomotor skills** such as running, jumping, hopping, galloping, rolling, leaping and dodging, horizontal jump, slide.
- **Manipulative skills** such as throwing, catching, kicking, striking and trapping, dribble, overhand throw, and underhand roll.
- **Stability skills** such as balance, twisting, turning and bending.

The most essential for primary school children to learn: Catch, Kick, Run, Vertical Jump, Overhand Throw, Ball Bounce, Leap, Dodge, Punt, Forehand Strike, Two-hand Side-arm Strike. (Physiopedia, Fundamental motor skills and Sports specific skills)

• **research related Studies:**

- **Lennart Raudsepp, Peep Päll (2006) – “ The Relationship between Fundamental Motor Skills and Outside-School Physical Activity of Elementary School Children”**

The purpose of the present study was to examine the association between fundamental motor skill development and various types of outside-school physical activity. Outside-school physical activity of 133 elementary school children was measured using a modified observational method validated by O’Hara et al. (18) and Caltrac accelerometers (Hemokinetics, Madison, Wisconsin). Developmental level of overhand throwing and jumping was assessed using total-body developmental sequences. The results revealed that developmental levels of both overhand throwing and jumping were significantly correlated with the skill-specific physical activity ($r = .44$ and $.55$ for overhand throwing and jumping, respectively). Caltrac score

was not significantly related to jumping and overhand throwing skills. Skill-specific physical activities accounted for 20% of the variance (adjusted R²) in overhand throwing and 17% of the variance in jumping performance.

- **William J. Harvey, Greg Reid, Natalie Grizenko, Valentin Mbekou, Marina Ter-Stepanian, Ridha Joobar (2007)-“Fundamental Movement Skills and Children with Attention-Deficit Hyperactivity Disorder: Peer Comparisons and Stimulant Effects”**

The purpose of this study was to compare the fundamental movement skills of 22 children with attention-deficit hyperactivity disorder (ADHD), from 6 to 12 years of age, to gender- and age-matched peers without ADHD and assess the effects of stimulant medication on the movement skill performance of the children with ADHD. Repeated measures analyses revealed significant skill differences between children with and without ADHD ($p \leq 0.001$). Results from the stimulant medication trials indicated no significant effect of medication on the movement skill patterns of children with ADHD. It is concluded that children with ADHD may be at risk for developmental delays in movement skill performance.

- **Pan CY, Tsai CL, Chu CH (2009)-“Fundamental movement skills in children diagnosed with autism spectrum disorders and attention deficit hyperactivity disorder”**

The purpose of this study was to compare the movement skills of children with autism spectrum disorders (ASD), attention deficit hyperactivity disorder (ADHD), and those without disabilities. Ninety-one children (ASD, $n = 28$; ADHD, $n = 29$; control, $n = 34$), ages 6-10 years, were of average IQ participated. After controlling for age, both ASD and ADHD groups scored significantly lower than controls (p 's $< .05$) on overall gross motor development as well as locomotor and object control subtests, and the ASD group performed more poorly than the ADHD group (p 's $< .01$) on both subtests. Of the children with ASD and ADHD, only 16% had clinical levels of impairment.

- **William J. Harvey, Greg Reid (1997)-“Motor Performance of Children with Attention-Deficit Hyperactivity Disorder: A Preliminary Investigation”**

The purpose of this study was to describe the fundamental gross motor skills and fitness conditions of children with attention-deficit hyperactivity disorder (ADHD). Nineteen children, ages 7 to 12, participated. Gross motor performance was measured by the Test of Gross Motor Development (Ulrich, 1985). Fitness variables were measured by selected items from the Canada Fitness Survey (Fitness Canada, 1985), the CAHPER Fitness-Performance II Test (CAHPER, 1980), and the 20 m Shuttle Run Test (Leger, Lambert, Goulet, Rowan, & Dinelle, 1984). Percentile scores provided individual and group profiles of performance. It was concluded that fundamental gross motor performance and physical fitness of children with ADHD are substantially below average.

- **B. Corrigan1 (2003),”Attention Deficit Hyperactivity Disorder in Sport: A Review”**

The aim of this review is not to debate the use of stimulants or how often they are necessary or successful in this condition but to point out that a number of young sport people with ADHD require such medication on a regular basis. Although there are problems with their use as far as the International Olympics Committee (IOC) is concerned, it would seem most unfair to penalise sports people by having to give up their medication, even for a few days or at some arbitrary age, in order to compete.

- **Brian D. Kiluk, Sarah Weden, Vincent P. Culotta (2008), “Sport Participation and Anxiety in Children with ADHD”**

This study explores the relationship between participation in physical activity and emotional functioning in children with ADHD. Scores on parent-reported measures of mood and behavior were retrospectively compared among a group of 65 children (ages 6 to 14) diagnosed with ADHD based on their amount of sport participation. A total of 32 children diagnosed with a learning disorder (LD) were used as a comparison group. Results suggest that active sport participation may be associated with a reduced expression of anxiety or depression symptoms in children with ADHD.

- **Teresa Dail &Caroline Smith (2016) “Swimming and Children with Attention-Deficit Hyperactive Disorder: A Winning Combination”**

The benefits of swimming for children with disabilities include improved motor skills, physical fitness, executive brain function and improved social skills. Swimming can also be an activity that provides a positive environment for children suffering from attention-deficit hyperactive disorder (ADHD). This article provides an overview of ADHD and includes best practices associated with teaching and coaching children with ADHD in an aquatic environment. Specifically, the article explores ways in which physical educators can use swimming to provide effective differentiated instruction for children with ADHD.

- **CONCLUSION**

The results of the study indicate that Sport participation is important to all children, due to its relationship to physical activity and therefore chronic disease regardless of ADHD diagnosis. Some of the benefits of sport participation include a decrease in risky behaviors and increased integration into social settings (Kremarik, 2000).

Specific to children with ADHD, participation in a sport can help to increase peer relations, which are often negative (Bagwell et al, 2001). Improved peer relations can increase a child's happiness and self-confidence.

Also, it may be possible to stop the cascade of lack of sustained effort leading to lower training levels, lower self-esteem and lower participation in these children through the use of sport and behavioral interventions.

Children with ADHD can benefit from sports just as much as their peers who don't have the condition. It's all about finding a sport they are comfortable with and enjoy playing.

It is also no secret that there is a relationship between ADHD and basic motor skills, where the high level of this disorder decreases the performance accuracy of basic motor skills.

the most important recommendations of this study is the design of behavioral programs aimed at reducing the attention deficit disorder hyperactivity, and the design of educational sports programs to develop these basic motor skills of children in primary school.

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