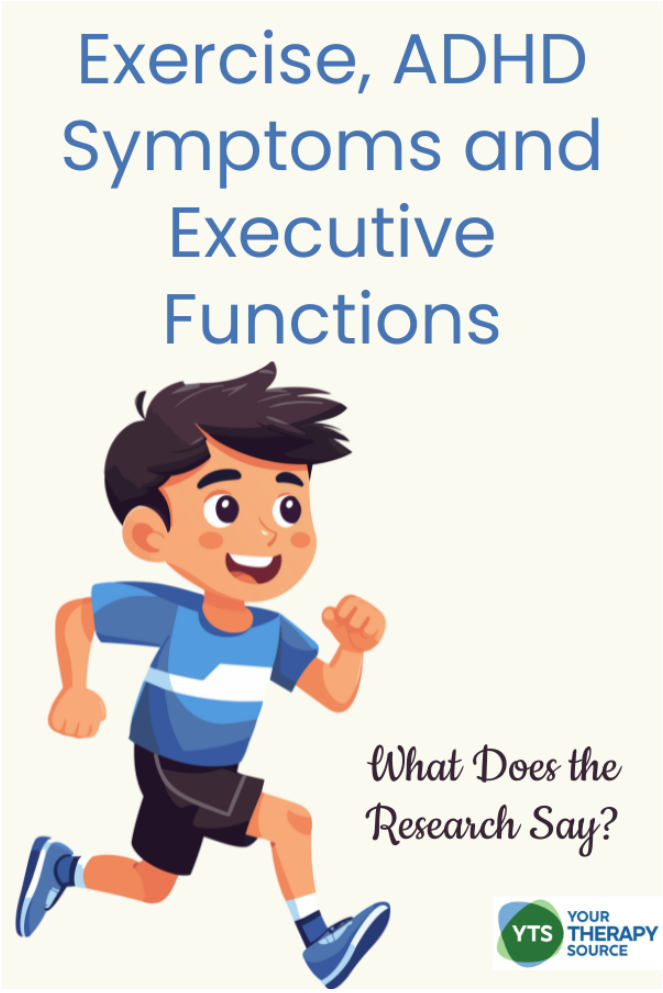
Exercise, ADHD Symptoms and Executive Functions



ADHD, or Attention Deficit Hyperactivity Disorder, is the most common neurodevelopmental disorder among children and adolescents. It has three types based on symptoms: predominantly inattentive (ADHD-I), predominantly hyperactive-impulsive (ADHD-HI), and combined (ADHD-C). About 5% to 10% of adolescents are affected, with boys being twice as likely as girls to have ADHD. Approximately half of these cases may continue into adulthood, contributing to risky behaviors and potentially severe consequences if not treated. Medications like methylphenidate are common treatments and help improve attention, hyperactivity, and executive functions, but they can also lead to side effects like anxiety and depression. Consequently, there is a push for non-drug therapies, including exercise, which has shown promise in improving attention, mood, and memory without the side effects of medication. A recent study investigated the impact of exercise, ADHD symptoms and executive functions in adolescents.

METHODOLOGY OF THE STUDY ON EXERCISE, ADHD SYMPTOMS, AND EXECUTIVE FUNCTIONS

The research followed the PRISMA guidelines for systematic reviews and meta-analyses. Eligibility Criteria for the study was as follows:

- **Age Range**: Adolescents aged 10–24 years diagnosed with ADHD.
- **Type of Study**: Only studies where participants did a single session of exercise were included; studies combining exercise with other interventions were excluded.
- **Outcome Measures**: Core ADHD symptoms and executive functions.

WHAT DID THE RESEARCH SAY?

The study on the effects of single exercise sessions on adolescents with ADHD produced several significant findings. Below is a simplified summary of the key results:

- **Meta-Analysis Outcomes**:
  - Single sessions of exercise were found to improve core symptoms of ADHD (Standardized Mean Difference [SMD] = 0.35) and executive functions (SMD = 0.28).
  - The improvements showed low levels of variability between different studies, indicating consistent effects across various settings and methods.
- **Subgroup Analyses**:
  - Improvements in ADHD symptoms and executive functions were observed across different age stages, with notable effects in early adolescents (10–13 years) and late adolescents (18–24 years).
  - Both moderate-intensity continuous training and high-intensity interval training were effective, with cycling showing particularly positive results.
  - Shorter sessions (less than 30 minutes) were more effective than longer ones.
- **Impact of Medication**:
  The positive effects of exercise on ADHD symptoms and executive functions were significant regardless of whether the participants were taking medication during the study period.

These results suggest that single sessions of exercise can be a viable supplementary treatment to improve attention and executive functioning in adolescents with ADHD, offering benefits regardless of medication status and across various types of exercises and session lengths.

Here are more detailed insights into the specific symptoms and executive functions that improved:

- **Core ADHD Symptoms**:
  - **Attention**: There was a significant improvement in attentional capabilities, indicated by a standardized mean difference (SMD) of 0.35.
  - **Hyperactivity/Impulsivity**: Although detailed metrics were not provided for all studies, some improvement in this domain was noted.
- **Executive Functions**:
  - **Inhibition**: Exercises showed a positive impact on the ability to inhibit responses, with a SMD of 0.36.
  - **Working Memory**: The results for improvements in working memory were not explicitly detailed in the subgroup analysis, due to insufficient data from the studies.

These findings highlight that exercise specifically helps improve attention and inhibitory control, which are crucial for managing ADHD symptoms.

KEY TAKEAWAYS ABOUT EXERCISE, ADHD SYMPTOMS, AND EXECUTIVE FUNCTIONS

Based on the findings of the systematic review and meta-analysis on exercise interventions for adolescents with ADHD, here are some key takeaways that can guide professionals and parents in supporting these adolescents:

- **Incorporate Regular Exercise**: Encourage adolescents with ADHD to engage in regular physical activity, particularly moderate-intensity aerobic exercises and high-intensity interval training, which have shown to improve attention and executive functions.
- **Short Sessions are Beneficial**: Even single sessions of exercise lasting less than 30 minutes can have significant positive effects on the core symptoms of ADHD, making them a practical option for busy schedules.
- **Variety in Exercise Types**: Cycling and running are recommended types of exercise, with cycling showing particularly positive results in improving ADHD symptoms. Activities should be engaging and varied to maintain interest.
- **Consider Timing and Consistency**: Regular exercise routines that fit well with the adolescent's daily schedule can help in managing symptoms effectively. Early intervention, particularly during the early stages of adolescence, appears to be more effective.
- **Monitor and Adapt**: Keep track of the adolescent's response to different types of exercises and adjust the activities accordingly. What works well for one individual may not be as effective for another. Try this Emotion Check In packet before and after exercise to monitor preferences.

- **Non-Medication Approaches**: Exercise can be a valuable part of a comprehensive treatment plan that includes, but is not reliant exclusively on, medication. It provides a non-pharmacological option that can help manage symptoms potentially with fewer side effects.
- **Engagement and Cognitive Involvement**: Exercises that require more cognitive engagement (e.g., sports that require strategy and focus) can be particularly beneficial, potentially leading to greater improvements in attention and executive functioning.

These strategies can empower parents and professionals to effectively support adolescents with ADHD through exercise, potentially enhancing their ability to manage symptoms and improve their overall well-being.

REFERENCE

Chen, J. W., & Zhu, K. (2024). Single Exercise for Core Symptoms and Executive Functions in ADHD: A Systematic Review and Meta-Analysis. *Journal of Attention Disorders*, *28*(4), 399-414.

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