

# ADHD in Athletes

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Attention Deficit Hyperactivity Disorder (ADHD) is a common neurodevelopmental disorder which is characterized by symptoms of inattention, hyperactivity, and impulsivity. The estimated prevalence of ADHD in the general population is 7,2% in children, with persistence into adulthood of approximately 35%. [1,2]

Although there is a lack of population studies, the postulated prevalence of ADHD in young athletes ranges from 4,2 to 8,1%, suggesting ADHD could be more common in athletes compared to the general population. [3] The reasons for a presumably higher prevalence of ADHD among athletes could be, among other things, that the influence of the sporting activity leads to better well-being of the potential patients and therefore becomes a central part of their lifestyle. A further reason could be that intensive physical activity can have a beneficial effect on the comorbid symptoms of ADHD. [4,5] People with ADHD may, therefore, benefit more from physical activity than people without ADHD, and maybe attracted to physical activity for this reason. [6] Adolescents

with ADHD may also be more attracted to sports activities than to academic activities because of their inherent motor restlessness and possible negative feedback in class due to disruptive behavior. [7] Besides, some research has shown that athletes and individuals with ADHD have specific traits that are shared by both groups, such as novelty-seeking behavior and reward dependency. [8]

The clinical course of ADHD is associated with a variety of different impairments and can lead to mental, social, educational, and professional impairments. Athletes with ADHD may also suffer from a loss of performance due to comorbid disorders (e.g., affective disorders, anxiety, drug abuse), a significantly increased and socially unaccepted impulsiveness, and reduced self-esteem. [9,10] Besides those negative consequences of ADHD, athletes with ADHD can also use their elevated impulsivity as a resource, allowing them to make quick and unpredictable decisions, reportedly losing this trait under ADHD treatment. [11,12]

The treatment of ADHD in adults includes different treat-

ment strategies, which can be divided into behavioral and pharmaceutical interventions. While the former does not underlie restrictions in the care of athletes, there are essential considerations to be made about the latter: Medications can be divided into two classes, Stimulants (Amphetamine, Methylphenidate and its derivatives) and Non-Stimulants. First-line treatment of adult ADHD according to NICE and other national guidelines are stimulants (namely Methylphenidate and Lisdexamfetamine). Switching to Non-Stimulants (Atomoxetine, Guanfacine, Atypical Antipsychotics) is recommended in case of insufficient symptom response despite having used adequate doses of stimulants or if the patient does not tolerate medication with stimulants. From a clinical point of view, the effect strengths of stimulants are slightly higher than those of Non-Stimulants.

While stimulants, in general, are effective and well-tolerated, there are specific limitations when used by athletes: The World Anti-Doping Agency (WADA) lists stimulant medication as prohibited in-competition, which means athletes who are under treatment need to have a therapeutic use exemption (TUE). WADA bans stimulants because they can be misused for performance enhancement. If taken before physical activity, stimulants can cause an “ergogenic effect”, which leads to an increase of muscular strength, running speed, acceleration, and anaerobic capacity. [13,14,15] Athletes using stimulants could, therefore, gain an unfair advantage over athletes who do not use these substances. Some experts, therefore, recommend that stimulants should not be used by athletes. [16]

Besides the distortion of competition, there are specific side effects of stimulants, which raised concern about the dangerous consequences of use, mainly sudden cardiac death (SCD) and heat illness. SCD is a frequently reported cause of death in athletes. [17] Stimulants can cause cardiovascular side effects (e.g., the elevation of heart rate and blood pressure) and have therefore been suspected of causing an increased risk of SCD. However, to this date, no evidence of correlation of ADHD medications and sudden cardiac death has been shown. [18,19] Heat illness is caused by increased heat production of the body and impaired dissipation of heat. Ultimately it can lead to heatstroke, which is the third most common cause of death in athletes. [7,20] It has been shown that in warm environments, Amphetamines can lead to higher physical performance and higher body temperature without the athlete experiencing more stress while exercising. [15] Therefore, an increased risk of heat illness caused by stimulants seems possible, but further research is warranted.

Management of ADHD in athletes remains controversial. We think it is necessary to conduct population studies among athletes first to provide more accurate prevalence rates. To contribute to this, we are planning a cohort study consisting of 2 phases: At phase one, we will screen undiagnosed athletes for symptoms of ADHD and typical comorbidities by using questionnaires. At phase 2, we will invite those study participants with striking scores and test them for ADHD by structured clinical interviews. We will also compare their results with a healthy control group of athletes. This way, we hope to be able to get reliable data on the prevalence of ADHD in athletes.

In the longitudinal course, the described cohort study could be followed by further research on the effects of long-lasting stimulants on the physical performance of athletes with ADHD, because previous studies focused mainly

on short-lasting stimulants and healthy individuals. We hope to use this research to develop therapeutic strategies that address the specific needs of top athletes and improve the emotional state of athletes.

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## References

1. Thomas R, Sanders S, Doust J, Beller E, Glasziou P. Prevalence of attention-deficit/hyperactivity disorder: a systematic review and meta-analysis. *Pediatrics*. 2015;135(4):e994-1001.
2. Biederman J, Petty CR, Evans M, Small J, Faraone SV. How persistent is ADHD? A controlled 10-year follow-up study of boys with ADHD. *Psychiatry Res*. 2010;177(3):299-304.
3. Poysofion P, Rao AL. Neurocognitive Deficits Associated With ADHD in Athletes: A Systematic Review. *Sports Health*. 2018; 10(4):317-26.
4. Hoza B, Martin CP, Pirog A, Shoulberg EK. Using Physical Activity to Manage ADHD Symptoms: The State of the Evidence. *Curr Psychiatry Rep*. 2016;18(12):113.
5. Kiluk BD, Weden S, Culotta VP. Sport participation and anxiety in children with ADHD. *J Atten Disord*. 2009;12(6):499-506.
6. Parr JW. Attention-deficit hyperactivity disorder and the athlete: new advances and understanding. *Clin Sports Med*. 2011;30(3):591-610.
7. Stewman CG, Liebman C, Fink L, Sandella B. Attention Deficit Hyperactivity Disorder: Unique Considerations in Athletes. *Sports Health*. 2018;10(1):40-6.
8. Perroud N, Hasler R, Golay N, Zimmermann J, Prada P, Nicastrò R, et al. Personality profiles in adults with attention deficit hyperactivity disorder (ADHD). *BMC Psychiatry*. 2016;16:199.
9. Lebrun F, MacNamara A, Rodgers S, Collins D. Learning From Elite Athletes' Experience of Depression. *Front Psychol*. 2018;9:2062.
10. White RD, Harris GD, Gibson ME. Attention deficit hyperactivity disorder and athletes. *Sports Health*. 2014;6(2):149-56.
11. Pujalte GGA, Maynard JR, Thurston MJ, Taylor WC, 3rd, Chauhan M. Considerations in the Care of Athletes With Attention Deficit Hyperactivity Disorder. *Clin J Sport Med*. 2019;29(3):245-56.
12. Conant-Norville DO, Toffler IR. Attention deficit/hyperactivity disorder and psychopharmacologic treatments in the athlete. *Clin Sports Med*. 2005;24(4):829-43, viii.
13. Chandler JV, Blair SN. The effect of amphetamines on selected physiological components related to athletic success. *Med Sci Sports Exerc*. 1980;12(1):65-9.
14. Roelands B, Hasegawa H, Watson P, Piacentini MF, Buysse L, De Schutter G, et al. The effects of acute dopamine reuptake inhibition on performance. *Med Sci Sports Exerc*. 2008;40(5):879-85.
15. Watson P, Hasegawa H, Roelands B, Piacentini MF, Loooverie R, Meeusen R. Acute dopamine/noradrenaline reuptake inhibition enhances human exercise performance in warm, but not temperate conditions. *J Physiol*. 2005;565(Pt 3):873-83.
16. Reardon CL, Factor RM. Considerations in the Use of Stimulants in Sport. *Sports Med*. 2016;46(5):611-7.
17. Koester MC. A Review of Sudden Cardiac Death in Young Athletes and Strategies for Preparticipation Cardiovascular Screening. *J Athl Train*. 2001;36(2):197-204.
18. Putukian M, Kreher JB, Coppel DB, Glazer JL, McKeag DB, White RD. Attention deficit hyperactivity disorder and the athlete: an American Medical Society for Sports Medicine position statement. *Clin J Sport Med*. 2011;21(5):392-401.
19. Liu H, Feng W, Zhang D. Association of ADHD medications with the risk of cardiovascular diseases: a meta-analysis. *Eur Child Adolesc Psychiatry*. 2019;28(10):1283-93.
20. Howe AS, Boden BP. Heat-related illness in athletes. *Am J Sports Med*. 2007;35(8):1384-95.