

Evidence-Based Considerations and Recommendations for Athletic Trainers Caring for Patients With Attention-Deficit/Hyperactivity Disorder

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Context: Patients with attention-deficit/hyperactivity disorder (ADHD) can be noncompliant, impulsive, and disruptive in an athletic training or physical rehabilitation facility. Athletic trainers (ATs) are valuable and essential health care providers for active patients with ADHD. However, for a patient with ADHD to have a successful outcome in a busy athletic training environment, the AT or health care provider must tailor the treatment setting to the patient's needs.

Objective: To educate and raise awareness among ATs about patients with ADHD and to provide ATs with strategies and tools that will allow them to treat patients with ADHD more effectively.

Data Sources: We retrieved and reviewed articles from PubMed, PsychINFO, and Ovid without date restrictions. Search words were *attention deficit hyperactivity disorder* plus 1 of the following topics or search words: *athletic training, athletics, coaching, sport, or sport psychology*.

Study Selection: Any ADHD articles that were not applicable or translatable in good faith to athletic training, physical rehabilitation, or sport and exercise were excluded.

Data Extraction: Nonpharmacologic interventions were reviewed and amassed into categories from which the recom-

mendations were created. No statistical analyses were conducted for this review.

Data Synthesis: We identified 1241 articles, and 86 met the inclusion criteria. Five groups of evidence were observed: (1) goal setting and coaching, (2) reinforcements and outcomes, (3) routines and treatment timing, (4) simplified feedback and instructions, and (5) environmental control. Reliable evidence suggests that these techniques can be translated and applied within an athletic training and physical rehabilitation setting.

Conclusions: Athletic trainers are a vital component in providing health care for patients with ADHD. Using goal contagion creates a structured environment and positive reinforcements that accommodate patients with ADHD. Furthermore, ATs may use the evidence-based recommendations in this review to create a treatment and physical rehabilitation program and space that are tailored to the needs of the ADHD patient to increase the chance of a successful outcome.

Key Words: athletic training, sport, exercise program, physical rehabilitation, setting

Key Points

- For patients with attention-deficit/hyperactivity disorder (ADHD) to thrive in the athletic training facility, the environment must be tailored to their needs.
- Athletic trainers must be aware of and knowledgeable about the signs and symptoms of ADHD in their patient population.
- The severity of ADHD symptoms and the needs of each patient will vary; thus, each patient needs an individualized care plan (ie, one size does not fit all).

The most commonly diagnosed attention disorder is attention-deficit/hyperactivity disorder (ADHD), which the *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*¹ has divided into 2 categories: inattention and hyperactivity/impulsivity. Symptoms of both categories of ADHD are high-rate intrusive behaviors, deficient communication and reciprocity, biased social-cognitive performance, poor emotional regulation, inattentiveness, impulsivity, and hyperactivity.^{1–4} Impulsive and inattentive behaviors in ADHD patients can be both behavioral and cognitive and may include but are not limited to sensation seeking, negative sense of urgency, lack of planning, and lack of perseverance.⁵ Patients with ADHD also possess decreased executive functioning, which affects their ability to self-regulate. This limitation

may lead to impairments in behavior inhibition, planning, working memory, and cognitive-processing speed.⁶

Attention-deficit disorders have been diagnosed more commonly in young children and adults over the past several decades, jumping from an approximate diagnosis rate of 2.5% to 5% in both children and adults in the 1990s to more than 9% in the late 2000s.^{7–9} Although many adults do not seek treatment for their ADHD, the number of ADHD-diagnosed adults who have sought treatment has risen from 2.1% in 1996 to 11% in 2006.^{10–12} Multimodal treatment involving psychological counseling, coaching, psychotherapy, and pharmacologic stimulants has been widely endorsed as one of the most effective treatment plans for patients with ADHD because each treatment or

therapy option addresses only certain ADHD symptoms and not all.^{13–16}

Initially, health care providers believed that ADHD patients might outgrow their symptoms as they moved from adolescence into adulthood.¹⁷ Recent literature, however, suggests the opposite: that ADHD can be prolonged and last throughout a patient's lifespan.^{4,9,18–20} To alleviate the hyperactivity and impulsivity as well as the anxiety and depression associated with ADHD, physical activity has become a popular form of treatment.^{21–30} Moreover, sport participation and athletic activity can serve as a form of therapy that helps to improve social competency and cognitive function,^{31,32} yet due to poor motor control, behavioral inhibition, and executive functioning, patients with ADHD are at a higher risk for sustaining a musculoskeletal injury,^{33–37} traumatic dental injury,^{38,39} and concussion^{40–43} than those without ADHD,⁴ especially patients with ADHD who participate in team sports.⁴⁴ Additionally, patients with ADHD have longer recovery times from concussion than those without ADHD. Thus, medical supervision by an athletic trainer (AT) is essential for their safe return to play.⁴⁵ To that end, ATs may treat and see ADHD patients more frequently than other health care providers and, therefore, must create an environment in which this unique patient population can succeed.⁴⁶

Some of the most common hindrances that patients with ADHD face are the inability to focus and plan, lack of social engagement, and difficulty organizing their daily lives.^{17,47} These struggles can lead to social isolation, problems with academic achievement and work, and negative or disqualifying behaviors in sport.^{2,32,44} Sport involvement offers many benefits to patients with ADHD, but their disruptive behaviors can challenge their performance and ability to cooperate or collaborate with team members, parents, coaches, teachers, and medical professionals.⁴⁸ Sports medicine physicians and ATs are often the first point of contact for injured active and athletic patients.⁴⁹ To maximize patient compliance with treatment protocols while reducing behaviors distracting to themselves and others, ATs need to recognize and make accommodations for ADHD behaviors in their athletic training facilities.^{9,18,22,46,50}

The purpose of this systematic review is to provide ATs and allied health care professionals with evidence-based considerations and recommendations when caring for patients with ADHD. Awareness and acceptance of patients with ADHD in the athletic training facility will promote a culture shift by aiding each patient's individual needs rather than requiring them to conform and comply with the demands of the health care provider.

METHODS

We identified resources and research articles for this systematic review using the Ovid, PubMed, and PsychINFO databases without date restrictions. Search words were *attention deficit hyperactivity disorder* and 1 of the following search words: *athletic training*, *athletics*, *coaching*, *sport*, or *sport psychology*. Abstracts of all articles identified in the literature databases were reviewed for relevance to ADHD in physically active or athletic populations, physical rehabilitation settings, and nonphar-

macologic psychological interventions. If the abstract met 1 of these 3 criteria, we reviewed the full article and considered it for this study. The articles that were not applicable or translatable in good faith to physical rehabilitation, athletic training, or sport or exercise psychology were excluded (eg, ADHD accommodations for classroom, educational, or academic performance; ADHD in nonathletic populations or older adults; pharmacologic treatment for ADHD; ADHD prescription stimulant misuse; clinical psychological interventions for ADHD by a psychologist or psychiatrist; ADHD prisoner studies; ADHD and family counseling or parenting). Relevant articles were then grouped by topic and analyzed for commonality and themes from which patient care considerations and recommendations were constructed.

RESULTS

A total of 1241 articles were identified, with 86 meeting the inclusion criteria. Five commonly observed categories were (1) goal setting and coaching, (2) reinforcements and outcomes, (3) routines and treatment timing, (4) simplified feedback and instructions, and (5) environmental control. These 5 themes relevant to ADHD patient care are as follows:

1. Goal setting and coaching: Establishing patient-led treatment goals motivates and provides a framework for an individualized plan for the ADHD patient. Using a goal-contagion approach (ie, the patient will pursue and adopt a goal that is implied by another person's behavior)⁵¹ can be an effective teaching and coaching tool for these patients.⁵² Coaching and motivating the patient to understand that the treatment protocol will facilitate the achievement of goals is critical to success and compliance.^{53–61} Moreover, positive coaching can instill a sense of hope in the patient, which may build self-esteem and confidence and enhance interest in treatment goals and rapport and trust with the health care provider.⁶²

It is important to note that the patient's treatment protocol needs to include both quantitative (eg, sets and repetitions) and qualitative (eg, outcomes measures) aspects, so that he or she can receive comprehensive feedback that is tailored to his or her goals.⁶³ The SMART-Goal Evaluation Method (SMART-GEM) is 1 reliable and valid way to assist the patient in establishing goals that are specific, measurable, attainable, realistic, and time bound.⁶⁴ A sample SMART-GEM⁶⁵ for an ADHD patient is shown in Table 1.

When creating a treatment protocol for a patient with ADHD, the AT must prescribe exercises that can be safely and successfully executed given the patient's motor coordination and function.^{66,67} If the AT is not certain the patient understands the technique for an exercise, he or she can ask the patient to perform a teach-back to demonstrate correct understanding of the directions and safe and effective performance of the exercise.⁶⁸

2. Reinforcements and outcomes measures: Positive behavioral reinforcements for attendance and good attitudes have shown great success in patients with ADHD in a wide variety of settings, including sports and athletics.^{24,69–74} A relatively minor action, such as

Table 1. SMART-Goal Evaluation Method Example⁶⁵

After sustaining a lateral ankle sprain, the goal is to be able to jog for 10 min without pain within 3 wk by gradually increasing exposure time (walking or running) on the treadmill by at least 30 s/d.		
Letter	Definition	Example
S	<i>Specific</i> objective that will be accomplished	To run on the treadmill without pain for 10 min
M	Specify how this objective will be <i>measured</i>	Minutes of exposure, daily pain scale outcomes measure, pain-free treadmill exposure time
A	Specify how this will be <i>attained/achieved</i>	Increase pain-free treadmill exposure each day by 30 s
R	Specify how <i>realistic</i> the goal is	Realistic and easy to reach based on the severity of the injury, daily pain scale, and protocol for treatment
T	What is the <i>time-bound</i> nature of the goal?	3 Wk to achieve pain-free running with a daily, gradual increase in treadmill time

placing a sticker on an attendance, exercise, or treatment flow sheet for a completed exercise, can provide a mental and emotional sense of accomplishment that motivates the patient to remain focused on the treatment plan and goals. Outcome measures or daily progress reports on their performance and clinical findings (or both) provide feedback to the patient.⁷ Progress reports help to maintain patient motivation and can serve as a reminder to continue the home program and care away from the athletic training facility.^{75,76} Thus, by reinforcing positive behavior and providing tangible measures of feedback, ATs can help improve the patient's quality of life.⁷⁷

- Establishing a treatment or exercise routine and time: Patients with ADHD need consistency in their daily routines to stay on task and remember their responsibilities. Establishing an individual treatment session on a day and time that is best for the patient will maximize attendance compliance. However, schedule changes and unforeseen life events may impede compliance and affect attendance at treatment sessions. Thus, adding an element of flexibility to the treatment schedule also encourages attendance by providing the patient with a sense of responsibility and autonomy for his or her own care.⁷⁸ For example, if a female patient needs to attend 3 treatment sessions in a week but her schedule only allows for 2 sessions, she could complete an at-home program 1 day. Between-sessions assignments have been shown to reinforce goals and increase treatment gains in patients with ADHD.⁷⁹
- Simplified instructions and feedback: Patients with ADHD have difficulty processing multiple pieces of information at 1 time. Providing the patient with single-tier tasks and streamlined feedback increases the likelihood of his understanding both the task at hand and the AT's response. Feedback that is specific, direct, and concise is received and processed more effectively than feedback that is metaphorical, indirect, and long-winded.⁸⁰ One way of simplifying directions is by writing exercises on a notecard or tongue depressor and having the patient complete the exercise written on that object before moving on to the next one. That is, instead of giving the patient a flow sheet, which may be overwhelming, he or she can focus all attention on the exercise written on the object.
- Create a controlled environment free of distractions^{24,59,61,69,70}: Patients with ADHD are easily distracted, and the athletic training facility can be a very busy and distracting place. Identifying an individualized and private treatment or exercise area that is separate

from high-traffic areas and limiting patient flow near this designated area can help patients with ADHD focus on their treatment. Additionally, having a separate treatment or exercise area reduces the likelihood that a patient with ADHD will distract others. If space in the athletic training facility is limited, an outdoor green space (eg, courtyard) is a good alternative that has been shown to increase focus and attentiveness in those with ADHD.⁸¹

DISCUSSION

Although no specific evidence-based guidelines are currently available to ATs caring for patients with ADHD, we found sufficient evidence in other fields to create recommendations for success in an athletic training facility.

Altering the AT Treatment Culture

In an athletic training setting, patients often receive an exercise or treatment flow sheet and are told to come back to the AT once they have completed the exercises. However, this "return when completed" tactic is not appropriate for patients with ADHD.¹² An inability to process numerous tasks in a busy, distracting environment is not a personal weakness, but the increased distractibility caused by ADHD limits the ability to maintain focus and successfully complete treatment.⁸²

Emergency rooms (ERs) across the United States have begun altering their treatment environments and health care providers have modified their bedside manners to fit the needs of autistic patients.^{83–85} Since this autism-centered patient care began, ERs have seen an influx of autistic patients, as "having special accommodations 'attracts patients to [those facilities]'.⁸³ Nicholas et al⁸⁴ concluded that the ER health care delivery system was not meeting the unique needs of patients with autism spectrum disorder, and thus, ER health care providers must adjust the patient care environment and culture to meet the needs of their patients.⁸⁴ To that end, ATs need to apply the care concepts for patients with autism in the ER^{83–85} to change the health care culture for patients with ADHD in the athletic training facility.

In 2010, Manos¹² described 2 models that health care providers and psychologists may use to treat and care for patients with ADHD: (1) defect model and (2) difference model.¹² Examples of the defect and difference models in the athletic training facility are provided in Table 2.

In the athletic training facility, the difference model is more likely to be effective for patients with ADHD because

Table 2. Defect and Difference Models¹²

Scenario: A patient is unable to focus and complete the exercises on the rehabilitation flow sheet due to the noise and numerous other patients in the athletic training facility.		
Model	Definition	Examples
Defect	Disease model: locates the problem within the individual	The AT or health care provider reprimands the patient for a lack of discipline and focus. The patient forgets to clean up the rehabilitation station and is reprimanded by the AT or health care provider.
Difference	The patient becomes the agent of change in the environment: making the environment work with the patient's symptoms	The AT or health care provider asks the patient what is needed to improve focus (eg, private space, individual in another medium). The AT or health care provider asks the patient what kinds of reminders are needed to remember to clean up the rehabilitation area (eg, cell phone alarm or automatic reminder, add a tongue depressor with "clean up" written on it).

Abbreviation: AT, athletic trainer.

they are given the opportunity to adapt and change their behaviors rather than being blamed and punished for their ADHD symptoms. The defect model requires “a change in functioning that cannot change its cause, no matter how hard one tries or wants to be different.”¹² This implies that the source of ADHD behaviors is innate and unchangeable, regardless of an AT’s efforts to correct a patient’s demeanor in the athletic training facility. In contrast, with the difference model, the AT or health care provider facilitates the patient’s taking control and managing and engaging with the environment to minimize ADHD symptoms.¹²

Psychological Theories for ADHD in the Athletic Training Facility

To assist ADHD patients in managing the busy and distracting athletic training facility, we can explore Deci and Ryan’s self-determination theory (SDT) from 2000.⁸⁶ A “macrotheory” of human motivation, SDT describes how individuals strive for goal attainment.⁸⁷ At its core, SDT describes how people satisfy 3 universal needs: autonomy, competence, and relatedness. A unique theoretical perspective of human motivation, SDT addresses types of motivation rather than the level or amount of motivation.

The 2 types of motivation discussed by Ryan and Deci⁸⁸ were intrinsic motivation and extrinsic motivation, with *amotivation* being a complete lack of motivation (Figure). The type of motivation an individual has depends on how successful he or she is in satisfying the 3 basic needs. Complete satisfaction of all 3 needs results in an individual becoming intrinsically motivated, whereas the inability to satisfy 1 or more needs causes a person to be controlled by an external force to compensate for the lack of need fulfillment and become extrinsically motivated. The degree to which one is extrinsically motivated varies depending on the severity of the extrinsic control. Thus, patients with ADHD can present with a wide range of relative autonomy. The AT may need to supervise directly or from a short distance to keep a patient motivated to complete the assigned tasks.⁸⁹

Individuals who are intrinsically motivated generally experience a variety of positive outcomes, including better health, wellbeing, behavioral outcomes, and performance.^{89,90} Self-determination theory has been successfully applied to a wide variety of domains; 2 areas with direct links to ADHD are sport and exercise⁹¹ and wellbeing and health.⁹² The theory offers useful tools for ATs providing care to patients with ADHD.

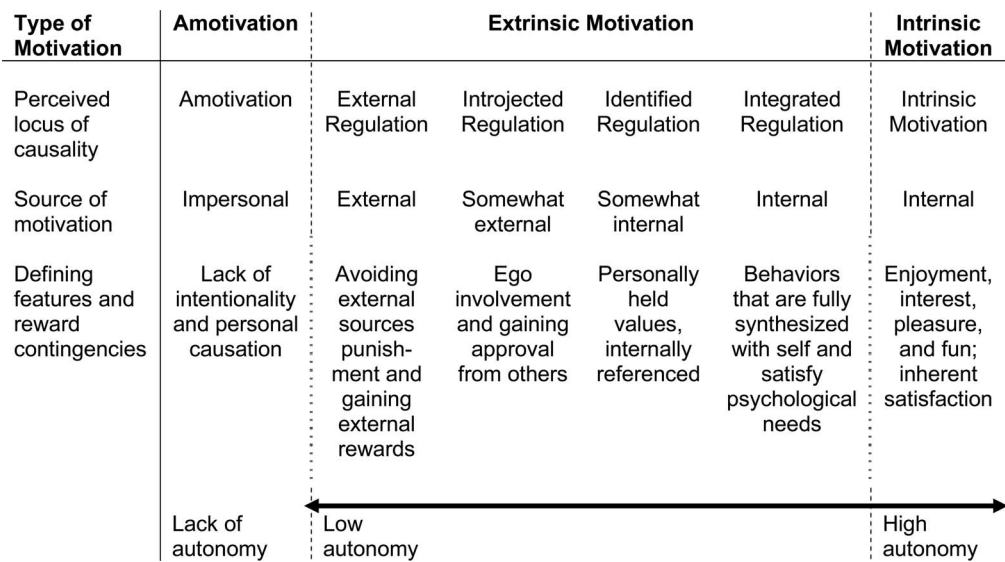


Figure. Two types of motivation as adapted from Ryan and Deci.⁸⁸

One method is self-directed learning (SDL) and instruction.⁶⁸ Steeped in the tenets of SDT, SDL has been associated with a variety of positive outcomes. Students have shown high levels of self-management, focus, and compliance with completing tasks when they self-teach or self-direct their studies.⁶⁸ A self-directed approach is a promising method to improve outcomes for patients with ADHD and could assist them with completing their exercises and meeting their treatment goals in the athletic training facility. Applying SDL in the athletic training facility is simple and could have significant effects on the outcomes of patients with ADHD.

An SDL treatment program provides feedback and positive reinforcement to the patient in real time to keep him or her on task and offer intrinsic motivation to adhere to the program. One example of an SDL opportunity (in line with theme 4: simplified instructions and feedback) in the athletic training facility is to demonstrate all of the exercises the patient needs to perform daily and then have the patient devise a unique name or term for the exercise (eg, straight-leg raise = Frankenstein) and write it on a tongue depressor, including the sets and repetitions. Once the patient has established names for the daily exercises, charge him to focus attention on only the task listed on the tongue depressor and nothing else. Once he completes that task, he moves on to the next tongue depressor and repeats this cycle until all of the exercises have been performed. This will help to establish a treatment routine for the patient that is at his pace, is in terms he can understand (ie, not in scientific and anatomical terms), and is self-facilitated. The AT will be nearby to supervise the patient, encourage and offer positive reinforcement, and answer any questions the patient might have.

In addition to SDT and SDL, another key emotional and psychological component that can assist ADHD patients is self-regulation. By definition, *self-regulation* is the ability to control and restrain impulses to attain one's goals, which has been shown to improve autonomy, self-cohesion, and adherence to an exercise program.⁹³⁻⁹⁷ Self-determination theory complements self-regulation, which is required to control focus and reject distractions that may prevent the patient from completing the exercises. A patient who displays amotivation does not self-regulate well and thus needs external motivation to stay on task. For example, to motivate the patient to stay on task in rehabilitation, the AT or health care provider may ask which exercise, set, or repetition she is performing to let her know that she is being monitored. By asking a simple question, the AT or health care provider can motivate the patient to stay focused, complete 1 task at a time, and remind the patient of the monitoring and supervision.

Missed and Undiagnosed ADHD

The prevalence of ADHD among children and adults is heavily cited within the literature, but little information is available about the prevalence among youths and adults who are participating in sports.⁹⁷ Athletes may not know they have ADHD until they enter collegiate or other elite levels of athletic competition. Within the collegiate setting, student-athletes with undiagnosed ADHD can experience major academic dilemmas, including ineligibility, remediation, loss of scholarship, and expulsion.⁹⁸ In 2016, the

National Collegiate Athletic Association (NCAA) released a "Mental Health Best Practices"⁹⁹ statement aimed at providing valuable and lifesaving resources to student-athletes with mental illnesses. The NCAA recommended that mental health screenings should be included in preparticipation examinations.⁹⁹ This recommended pre-season mental health screening could be an essential intervention to identify patients with undiagnosed ADHD and generate referrals for additional evaluations. Health care professionals involved in patient or student-athlete care need to be aware of ADHD behaviors and may use screening tools (Appendix A of the NCAA's "Mental Health Best Practices"⁹⁹) at the discretion of a physician to confirm (or reject) an ADHD diagnosis.

Another important and valuable piece of the NCAA's "Mental Health Best Practices" statement is the fourth key component: "Health-Promoting Environments that Support Mental Wellbeing and Resilience."⁹⁹ The NCAA stressed the importance of a supportive environment from the coaches and fellow student-athletes that "normal[izes] care seeking and foster[s] a health-promoting environment that supports mental wellbeing and resilience."⁹⁹ Coaches and student-athletes can support patients with ADHD by being aware that their teammates may need special accommodations in school or the athletic training facility. Moreover, coaches and student-athletes will become more aware that their behavior might be distracting to the patient with ADHD and may hinder his or her ability to be successful in certain environments (eg, athletic training facilities, busy public spaces). To that end, the NCAA statement reiterates that patients with ADHD can benefit from a difference model environment, regardless of venue.⁹⁹

It can be easy to reprimand a patient for inappropriate behaviors and noncompliance but difficult to acknowledge and accept unproductive or disruptive behaviors as the norm within a social, medical, academic, or athletic environment. Athletic trainers are integral to the mental health and wellbeing of their patients with ADHD and may act as primary, secondary, or tertiary psychological health care providers for those who are diagnosed and those who are undiagnosed.¹⁰⁰ Because patients with ADHD are at higher risk for injury, the AT is a critical asset in preventing injuries in patients with potentially undiagnosed ADHD. The AT should be proactive in deterring risky behaviors and know when to refer patients for advanced medical care before they harm themselves or others.¹⁰⁰

Limitations

This review had several limitations. First, no 2 athletic training facilities are the same, and each institution has its own challenges with providing adequate staffing, space, and resources to accommodate and treat patients with ADHD. Second, these ADHD treatment-setting recommendations are not universal and may vary depending on the severity of ADHD behaviors and comorbidities of the patient. Third, the literature search criteria and key words may have limited and restricted the number of relevant articles we identified and reviewed in this study.

CONCLUSIONS

Treating and caring for patients with ADHD can be challenging for ATs and allied health care professionals.

Frequently, an AT is one of the first health care providers that patients with ADHD encounter after sustaining a sport- or work-related injury. For ADHD patients to be successful in a busy athletic training environment, ATs need to provide coaching and encouragement; patient-centered routines; single-tier, simple tasks; tailored feedback to reinforce the goals and desired behaviors; and a controlled, distraction-free treatment environment. To provide equal and quality care for all, ATs must recognize and accommodate ADHD behaviors in the health care facility.

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