International Journal of Innovative Technologies in Social Science

e-ISSN: 2544-9435

Operating Publisher
SciFormat Publishing Inc.
ISNI: 0000 0005 1449 8214

2734 17 Avenue SW,
Calgary, Alberta, T3E0A7,
Canada
+15878858911
editorial-office@sciformat.ca

ARTICLE TITLE	ADHD IN ELITE ATHLETES: PHARMACOLOGICAL TREATMENT, TUE AND STIMULANT MISUSE RISK
DOI	https://doi.org/10.31435/ijitss.2(50).2026.5308
RECEIVED	22 February 2026
ACCEPTED	05 May 2026
PUBLISHED	11 May 2026
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ADHD IN ELITE ATHLETES: PHARMACOLOGICAL TREATMENT, TUE AND STIMULANT MISUSE RISK

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ABSTRACT

Background. Attention-deficit/hyperactivity disorder (ADHD) is a common neurodevelopmental condition that frequently persists into adolescence and adulthood, affecting attention regulation, impulsivity, emotional control, sleep and overall functioning. In elite/competitive sport, these domains are tightly linked to training adherence, tactical decision-making, injury risk and recovery. Pharmacotherapy is one of the most effective evidence-based treatments for ADHD, yet in high-performance sport it must be implemented within additional constraints: potential cardiovascular and sleep-related adverse effects under heavy training load, elevated risk of non-medical use and diversion of prescription stimulants in athlete-adjacent environments and anti-doping regulations that may require a Therapeutic Use Exemption (TUE) for prohibited stimulant medications.

Aim: To summarize evidence and practical guidance on pharmacological treatment of ADHD in elite/competitive athletes with specific focus on medication selection and monitoring under high training demands, TUE and anti-doping compliance, and prevention and management of stimulant misuse/diversion risk.

Materials and Methods: A narrative literature review was conducted using a structured search strategy in PubMed/MEDLINE, supplemented by targeted retrieval of relevant World Anti-Doping Agency (WADA) TUE/ISTUE documents. The search covered the period from January 2011 to January 2026. The final search was executed on 16 February 2026. Eligible publications included original research, systematic reviews/meta-analyses, and regulatory guidance addressing ADHD pharmacotherapy, athlete contexts, TUE/anti-doping implications, and/or stimulant misuse/diversion.

Results: The evidence supports that core pharmacotherapy principles for ADHD are broadly similar in athletes and non-athletes; however, elite sport requires additional implementation safeguards. Stimulants remain highly effective for symptom control but warrant careful monitoring of heart rate/blood pressure, sleep, appetite/energy availability, and anxiety—particularly during titration and high-load training periods. Non-stimulants (e.g., atomoxetine; selected cases guanfacine) may be appropriate when stimulants are not tolerated, contraindicated or when misuse/diversion risk is high. In tested sport, clinically necessary stimulant use often necessitates early, well-documented TUE planning to avoid inconsistencies between prescribing and regulatory submissions. Misuse and diversion are most commonly documented in young adult and collegiate settings, where sport-relevant drivers such as performance pressure, peer "sharing," and weight-control motives may be present; this highlights the need for proactive education, secure storage, and structured follow-up.

Conclusions: ADHD pharmacotherapy can be appropriate and beneficial in elite athletes, but it must be embedded in a sport-specific framework that integrates safety monitoring, stable competition-period planning, anti-doping/TUE documentation, and misuse/diversion risk mitigation. High-quality athlete-specific comparative studies - particularly stimulant versus non-stimulant strategies using objective outcomes - remain a key research priority.

KEYWORDS

ADHD; Elite Athletes, Stimulants, Atomoxetine, Therapeutic Use Exemption, Anti-Doping, Misuse, Diversion, Sports Psychiatry, Sports Medicine

CITATION

Zuzanna Korbel, Katarzyna Pinkowska, Zuzanna Taciak, Anna-Maria Grzeczka, Filip Glista, Patrycja Pietraszkiewicz, Paula Żak, Inez Michalska, Mikołaj Jaszowski, Weronika Nawrocka, Agnieszka Dąbrowska. (2026) ADHD in Elite Athletes: Pharmacological Treatment, TUE and Stimulant Misuse Risk. *International Journal of Innovative Technologies in Social Science*. 2(50). doi: 10.31435/ijitss.2(50).2026.5308

1. Introduction

1.1. Clinical and sports-performance relevance

According to the National Institute of Mental Health, ADHD is a developmental disorder characterized by an ongoing pattern of one or more of the following types of symptoms: inattention, hyperactivity, and impulsivity [1]. Some athlete-focused studies and reviews suggest that ADHD symptoms and diagnoses are not uncommon in competitive sport populations. The estimates vary by setting, sport, and measurement approach, and direct comparisons with general-population prevalence are highly limited [2]. Across the included literature, the term "elite" is applied inconsistently. In this review, terms "athlete" or "competitive athlete" are used as an umbrella term for individuals training systematically and competing in organized events at collegiate, national, professional, or international levels and where possible, the specific competition tier is reported to improve interpretability. This approach aligns with recommendations to explicitly define athlete caliber to improve cross-study comparability.

From a performance perspective, ADHD can have bidirectional effects. On the harmful side, ADHD is linked to executive-function vulnerabilities, for example: sustained attention, response inhibition and greater reaction-time variability, which may reduce consistency and increase error rates under competitive pressure. On the potentially beneficial side, some athletes may leverage ADHD-associated traits such as high energy, novelty seeking and the capacity for intense task engagement known as "the hyperfocus" phenomenon in certain sport contexts - particularly when training structure, coaching strategies and comorbidities like sleep, anxiety, mood symptoms or substance-use risk are well managed [3]. Most frequent ADHD co-occurring conditions or ones that present with similar symptoms include mood disorders, e.g., major depressive disorder and bipolar disorder, anxiety-related disorders, intellectual disability, learning disorders, oppositional defiant disorder, autism spectrum disorder and substance use disorders [4]. Given the high comorbidity burden in adult ADHD, systematic screening for co-occurring conditions is essential for both athlete health and performance optimization [5].

1.2. Rationale for this review

Pharmacological treatment is a cornerstone of evidence-based ADHD management, with stimulant medications often demonstrating strong symptomatic efficacy [6]. However, in elite sports, stimulants intersect with anti-doping regulations and may require a Therapeutic Use Exemption (TUE) depending on the compound and competition rules. This creates a unique tension between medical necessity, regulatory compliance, and concerns about fairness in sports. Additionally, stimulant medications carry a recognized risk of misuse, diversion, and non-medical use - issues that may be amplified in competitive environments because of the performance pressure, peer influence, and potentially easier access to medications. Non-stimulant options as atomoxetine or guanfacine may reduce some regulatory or misuse concerns, yet their role in elite athletes and their potential effects on physical performance, cardiovascular parameters, sleep, and recovery are less frequently synthesized in athlete-focused reviews [7]. For these reasons, a focused appraisal of the literature at the intersection of ADHD pharmacotherapy, TUE procedures, and stimulant misuse risk is clinically meaningful for sports physicians, psychiatrists, and multidisciplinary performance teams.

2. Materials and Methods

This narrative review synthesized evidence on ADHD in athletes, with an emphasis on endurance/ultra-endurance sports, elite performance, neurocognition, comorbidity, treatment, nutrition, and anti-doping considerations. Evidence was identified via targeted PubMed searches and reference-list screening, prioritizing systematic reviews/meta-analyses, consensus/position statements, and recent athlete-specific observational studies. General diagnostic and management principles were contextualized using major guidelines and authoritative sources (NIMH; NICE NG87; Polish Psychiatric Association adult ADHD recommendations). Medication efficacy/tolerability and effects on performance were summarized from high-level evidence, while sport-specific prescribing, misuse/diversion risks, and stimulant regulation were addressed using sports-medicine guidance and WADA TUE Physician Guidelines. Definitions of "elite" status, when required, followed published methodological recommendations to improve cross-study comparability.

Exclusion criteria involved non-human studies and papers that did not address pharmacotherapy, TUE/anti-doping, or misuse risk.

3. Research results

3.1. ADHD diagnosis and clinical profile in elite athletes

A narrative review in the British Journal of Sports Medicine reports ADHD prevalence in student and elite athletes may be ~7–8% [8]. Differentiating ADHD from sport-related mimics is essential, because sleep restriction, travel fatigue, overreaching/overtraining, injury stress, and anxiety can produce ADHD-like symptoms. A systematic review of neurocognitive outcomes indicates athletes with ADHD may show lower baseline neurocognitive performance and report more symptoms, particularly after concussion, which has implications for baseline testing and return-to-play interpretation [9]. Recent data in endurance sport further suggest that ADHD-related symptoms may be more common in this population than typically assumed. In a cross-sectional survey of 601 endurance and ultra-endurance runners, Scheer and colleagues used the ASRS-5 as a screening instrument and found that 9.7% of participants scored above the screening threshold for ADHD symptoms. Rates varied across race distances (half marathon 14.8%, marathon 8.0%, ultra-endurance 8.7%), although these differences were not statistically significant. Screening-positive proportions were similar by sex (10.8% in women vs 9.0% in men), and age emerged as the only significant correlate, with higher screening positivity reported in runners younger than 40 years. Importantly, these findings reflect screening rather than diagnostic prevalence, underscoring the need for structured clinical assessment when ADHD is suspected in endurance athletes [10].

3.2. Pharmacological treatment in athlete populations

Current evidence-based clinical guidelines do not propose a fundamentally different ADHD pharmacotherapy algorithm for athletes compared with non-athletes. The difference remains in the way elite sport shape how the treatment is delivered (monitoring, timing, documentation, and risk mitigation) [11]. In standard care, medication is selected and titrated to achieve meaningful symptom and functional improvement with acceptable adverse effects. In elite athletes, this same goal must be balanced with anti-doping compliance, training- and heat-related physiological stress, and stimulant misuse/diversion risk. In conclusion, the medication algorithm is largely the same, but the implementation is not.

In non-athletes NICE guidance recommends stimulant pharmacotherapy as a main evidence-based option for adults, commonly methylphenidate or lisdexamfetamine, with individualized choice based on response, tolerability and comorbidity [12]. In Poland, lisdexamfetamine remains a later-line option due to limited availability [13]. In tested athletes, a non-stimulant option, especially atomoxetine, may be the most practical choice when avoiding TUE paperwork is important or when frequent competitions make in-competition stimulant rules hard to follow. However, stimulants can still be used when medically necessary, as long as the athlete has an approved TUE and follows anti-doping regulations.

Compared with non-athletes, competitive sport participants may encounter distinctive misuse pressures (performance beliefs, peer sharing, weight-control motives). While this does not change first-line efficacy evidence, it does change clinical governance: clinicians should routinely assess misuse/diversion risk, consider long-acting formulations when appropriate, counsel on secure storage (especially during travel), and schedule closer follow-up during high-risk periods (competition blocks, exams, injury or rehab phases) [14].

3.3. Anti-doping and Therapeutic Use Exemption (TUE) requirements

For tested athletes, many stimulant medications used for ADHD fall under prohibited stimulant categories. TUE documentation should include clear diagnostic evidence (developmental history and impairment), clinical rationale, medication details (drug/formulation/dose/timing), and consistency between the prescription and submitted materials. Importantly, WADA's ADHD TUE checklist explicitly notes that methylphenidate and amphetamine derivatives are prohibited in-competition, and therefore a TUE is required when these are medically necessary for competition in tested sport [15].

3.4. Safety and monitoring in physically active adults

Safety monitoring for ADHD medication should be implemented with an explicit "sport lens," because elite athletes expose cardiovascular, thermoregulatory, and sleep systems to sustained stress. A baseline clinical assessment should include cardiovascular history (personal and family), symptoms suggestive of arrhythmia or exertional intolerance, and measurement of resting heart rate and blood pressure. During titration—especially with stimulants—follow-up assessments should capture not only HR/BP changes, but also training tolerance, perceived exertion, hydration-related symptoms, appetite and weight trends, and sleep quality. In sports conducted in heat or with high dehydration risk, clinicians should also counsel athletes on

adequate fluid/sodium strategies and monitor for symptoms that could be misattributed to training alone (e.g., palpitations, dizziness, heat intolerance).

Sleep and recovery are central performance determinants, and ADHD medications can meaningfully influence sleep latency, sleep quality, and fatigue. Because chronic sleep restriction and overreaching can mimic or worsen attentional symptoms, monitoring should explicitly track sleep patterns and signs of excessive training stress (persistent fatigue, mood lability, irritability, reduced motivation, increased injury frequency). A practical monitoring algorithm for elite athletes typically follows three checkpoints: (1) baseline (clinical history, HR/BP, weight/appetite, sleep screening), (2) post-titration (after each dose change, with short-interval follow-up), and (3) maintenance monitoring (periodic checks aligned with the competition calendar). This approach supports early identification of side effects that can compromise athlete health, regulatory compliance, or performance stability.

4. Discussion

4.1. Key findings and interpretation

Across the included literature, several consistent themes emerge. First, evidence-based ADHD pharmacotherapy principles appear broadly applicable to elite/competitive athletes: stimulant and non-stimulant medications can meaningfully reduce core symptoms and improve day-to-day functioning when appropriately titrated and monitored [16]. However, the athlete-specific evidence base remains comparatively limited - many recommendations for elite sport are extrapolated from general ADHD populations, with relatively few controlled studies conducted directly in elite athlete cohorts. Most of the studies consist of a small and unrepresentative cohort group that is limited by small samples and heterogeneous methods as in abstract-only reference of Feng W [17]. In high-performance settings, the clinical benefit–risk balance is shaped by sport-specific factors that are less prominent in non-athletes, including sleep disruption, travel schedules, energy availability, and the need for stable performance under pressure. Most studies suggest that traits associated with ADHD (e.g., impulsivity, high energy) may be beneficial in sports, potentially acting as a "hunter in a farming society" scenario [18]. The anti-doping context creates a distinct “implementation layer”: in tested sport, clinically appropriate stimulant use often intersects with prohibited-substance rules, making documentation, timing of medication changes, and TUE processes part of routine care rather than an administrative add-on [19]. Finally, the literature consistently highlights misuse/diversion risk as a relevant concern in young adult environments and athlete-adjacent contexts, supporting the need for proactive safeguards (education, secure storage, adherence monitoring) alongside symptom management [20]. Overall, the most defensible interpretation is that medication can be effective and appropriate in athletes, but the field still lacks robust, sport-specific comparative data on performance endpoints and long-term outcomes.

4.2. Clinical implications for sports medicine teams

For sports medicine teams, ADHD management works best as a coordinated pathway rather than isolated prescribing. In practice, this begins with structured screening and assessment, especially when athletes present with concentration problems, inconsistent performance, recurrent impulsive errors, sleep disruption, or repeated injuries. Because training fatigue, jet lag, overreaching, anxiety, and depression can mimic ADHD symptoms, diagnostic work should include careful developmental history and functional impairment across settings, ideally with collateral information when available. Once medication is initiated, optimal care requires close collaboration between a psychiatrist (or ADHD specialist) and the team/sports physician, so that titration and monitoring reflect the athlete’s training cycle and competition calendar. Monitoring should extend beyond symptom ratings to include sport-relevant domains: heart rate/blood pressure trends, sleep quality, appetite/weight changes, anxiety symptoms, hydration/heat tolerance, and subjective training tolerance. Teams should also plan for predictable “high-risk windows” (major competitions, intense training blocks, travel-heavy periods, injury rehabilitation) by minimizing last-minute regimen changes, reinforcing sleep and nutrition routines, and clarifying medication storage and dosing responsibility during travel. A practical team standard is a short, repeatable checklist at baseline, after each dose change, and during maintenance follow-up tied to season phases [21, 22].

4.3. Regulatory and ethical considerations

Elite sport introduces regulatory and ethical questions that are less central in routine community care. Clinicians must balance medical necessity and athlete welfare against the sport's expectations for fair play and compliance with prohibited-substance rules. When a stimulant is clinically indicated, the ethical priority remains appropriate treatment of a recognized disorder; however, regulatory systems may require formal justification via TUE, and clinicians should ensure that documentation is accurate, consistent, and reflects genuine clinical need rather than performance enhancement intent. Ethical care also includes attention to stigma and confidentiality. Athletes may fear reputational harm, selection bias, or misunderstanding by coaches and peers, which can reduce adherence or delay help-seeking; teams should therefore establish clear confidentiality practices and supportive communication. Another ethical dimension is safety: ADHD medications can affect cardiovascular parameters, sleep, and appetite, and these effects may interact with heat stress, dehydration risk, or heavy training loads. A defensible ethical stance in elite sport is thus "health first": treat ADHD when indicated, document thoroughly, respect privacy, and implement monitoring strong enough to protect the athlete while maintaining regulatory integrity.

4.4. Limitations of available evidence

The current evidence base has several important limitations. Most notably, there are few studies conducted specifically in elite athlete cohorts, and many sport-focused papers are narrative in nature or rely on non-elite samples (e.g., collegiate settings) that may not generalize to professional or national-team environments. Definitions of "elite athlete" vary across studies, and sport type, training load, and competition level are often insufficiently characterized [23]. Outcomes are also heterogeneous: many studies focus on symptom scales and general functioning rather than standardized sport-performance metrics, making cross-study comparison difficult. Where performance endpoints are reported, they may be influenced by confounders such as baseline fitness, sleep, anxiety, or concurrent coaching interventions. Finally, publication bias is plausible: studies with positive or "sport-relevant" findings may be more likely to be published, while null or negative performance effects may be underreported. Collectively, these limitations support cautious interpretation and reinforce the need for higher-quality prospective studies in well-defined elite athlete populations.

4.5. Limitations of this review

First, restricting searches to PubMed/MEDLINE may have excluded relevant sport psychiatry or sports medicine literature indexed in other databases. Second, a time restriction to the last twenty years improves currency but may omit influential earlier work, particularly on foundational concepts such as ADHD in sport settings, misuse epidemiology, and anti-doping policy evolution. Third, given heterogeneity in populations and outcomes, this review used a narrative synthesis and did not perform meta-analysis; therefore, it cannot provide pooled effect estimates or formal quantification of between-study variability. Finally, TUE and anti-doping considerations can vary by sport and jurisdiction, and while international standards provide a common framework, local implementation differences may limit direct applicability to every competitive context. These constraints should be considered when translating recommendations into practice and when designing future research to fill the most clinically important gaps.

5. Future research directions

Future research should prioritize prospective studies conducted directly in elite athlete cohorts, combining feasible pragmatic RCTs with real-world longitudinal designs across a full season. Studies should use standardized, objective outcomes (e.g., wearable-derived sleep and recovery metrics, reaction-time variability/executive function tasks, training-load indicators, and sport-appropriate performance proxies) and clearly report athlete level, sport type, travel, and heat exposure to improve comparability. A key gap is comparative effectiveness of stimulants versus non-stimulants (especially atomoxetine) in athletes, focusing on tolerability, sleep, appetite/energy availability, anxiety, cardiovascular responses under training load, and functional outcomes such as training adherence and competitive consistency. Finally, athlete-specific epidemiology and intervention studies are needed to quantify misuse/diversion risk and to test practical prevention strategies (education, controlled storage during travel, and structured monitoring models) without undermining appropriate medical treatment.

Table 1. Practical Recommendations for the Management of ADHD in Athletes [24]

No.	Recommendation	Practical Implementation
1	Know the sport setting	Determine whether the athlete competes in a tested sport (subject to anti-doping controls) or a non-tested sport. This distinction influences medication choices and regulatory requirements.
2	Stabilize treatment early	Avoid initiating new medications or making major dose adjustments shortly before important competitions. Establish a stable treatment regimen several weeks before key events to minimize performance variability and adverse effects.
3	Therapeutic Use Exemption (TUE) planning	If the athlete participates in a tested sport and uses stimulant medication, begin the TUE application process early. Maintain detailed documentation including diagnostic evaluation, developmental history, functional impairment, rationale for treatment, alternatives considered, and exact medication details (drug, formulation, dose, timing). Ensure the TUE application matches the current prescription.
4	Monitor essential clinical parameters	Regularly monitor heart rate, blood pressure, sleep patterns, appetite/weight, mood or anxiety symptoms, and tolerance to training load. Reassess after each medication adjustment and periodically throughout the competitive season.
5	Protect recovery capacity	Monitor for insomnia and appetite suppression, as these can impair recovery and increase the risk of overtraining or injury. Establish a consistent sleep routine and adequate fueling strategy, particularly during periods of intense training and travel.
6	Heat and hydration awareness	In hot environments or endurance sports, monitor for symptoms such as dizziness, palpitations, or heat intolerance. Implement a clear hydration and electrolyte replacement strategy.
7	Prevent misuse or diversion	Establish a simple treatment agreement covering safe storage, non-sharing of medication, and adherence expectations. Consider long-acting formulations when appropriate. Schedule closer follow-ups during high-risk periods (e.g., competition blocks, academic stress, injury or rehabilitation).
8	Medication storage during team activities and travel	Store medication securely and maintain a clear chain of custody, particularly during travel. Avoid open team storage systems. For younger athletes or minors, supervised dosing may be appropriate.
9	Athlete education (key points)	Provide brief education on medication purpose, expected effects, common side effects, and warning signs. Athletes should not self-adjust doses before competitions. Immediate reporting is required for symptoms such as chest pain, syncope, severe palpitations, extreme insomnia, or rapid weight loss.
10	Multidisciplinary coordination	Encourage collaboration between the psychiatrist or ADHD specialist and the sports medicine physician. Follow-up visits should align with training cycles, travel schedules, and competition calendars to ensure optimal management.

7. Conclusions

In accordance with evidence-based clinical guidelines, pharmacological treatment selection for ADHD in adults and adolescents is broadly similar in athletes and non-athletes; however, elite sport requires additional safeguards. These include intensified monitoring of cardiovascular parameters, sleep and energy availability under training load, proactive anti-doping/TUE planning for prohibited stimulants, and structured mitigation of misuse/diversion risk. WADA's ADHD-specific TUE guidance and ISTUE criteria provide the regulatory framework for medically necessary stimulant treatment in tested athletes.

All authors have read and agreed with the published version of the manuscript.

Funding Statement: Study did not receive special funding.

Conflict of Interest Statement: The authors of the paper report no conflicts of interest.

Declaration of generative AI and AI-assisted technologies in the writing process: In preparing this work, the authors used ChatGPT (OpenAI) for the purpose of language editing and clarity suggestions. After using this tool, the authors reviewed and edited the text as needed and accepted full responsibility for the substantive content of the publication.

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