

Anxiety Disorders in Athletes

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Disclosure statement: The authors have nothing to disclose.

Key words: anxiety, athletes, sport, performance anxiety, psychiatry, psychology, generalized anxiety, panic disorder, social anxiety disorder, obsessive-compulsive disorder, post-traumatic stress disorder, separation anxiety disorder, specific phobia

Key points

- Athletes experience many anxiety symptoms and disorders, including generalized anxiety disorder, panic disorder, and social anxiety disorder, at rates approximating those in the non-athlete population.
- Athletes may experience the anxiety-related disorders of obsessive-compulsive disorder and post-traumatic stress disorder at rates exceeding those in the non-athlete population.
- Sport- and non-sport factors may precipitate or worsen anxiety symptoms and disorders in athletes.
- Clinicians should take into account athletes' psychosocial context and physiology when treating athletes for anxiety symptoms and disorders.

Synopsis

Athletes and non-athletes experience many anxiety-related symptoms and disorders at comparable rates. Contributory factors may include pressure to perform, public scrutiny, sporting career dissatisfaction, injury, and harassment and abuse in sport. Anxiety may negatively impact sport performance. Specific types of anxiety may have unique presentations in athletes. It is important to rule out general medical and substance-related causes of anxiety symptoms. Psychotherapy and pharmacology treatment options should be considered, bearing in mind athletes' environmental circumstances and physiologies.

Introduction

Athletes experience a wide variety of mental health symptoms and disorders.¹ Among these are anxiety and related disorders, including generalized anxiety disorder (GAD), panic disorder, social anxiety disorder, obsessive-compulsive disorder (OCD), post-traumatic stress disorder (PTSD), separation anxiety disorder, specific phobia, and, while not specifically a diagnosis in the Diagnostic and Statistical Manual of Mental Disorders, competitive performance anxiety.¹ Anxiety disorders are among the most common mental health disorders around the world,² with earlier onsets than a majority of other mental health disorders.³ A multitude of biopsychosocial factors incite and perpetuate anxiety in this population.⁴ Athletes with anxiety symptoms and disorders may present differently than other cohorts such that there are important considerations when it comes to diagnosing these conditions in this group.¹ Treatment mandates careful consideration of relevant psychosocial and physiological factors as well. This paper provides a clinical review of GAD, panic disorder, social anxiety disorder, OCD, PTSD, separation anxiety disorder, specific phobia, and competitive performance anxiety in athletes across competitive levels.

Methods

An experienced academic librarian (MH) searched Cochrane, PsycINFO, PubMed, Scopus, and SportDiscus databases from inception until January 2023. Authors reviewed reference lists of the original articles for possible inclusion as well. They selected studies that were written in English and included clinical information on athletes and anxiety-related symptoms or disorders. Resources and manuscripts describing anxiety in non-athlete populations were included where sport-based research was unavailable.

Results

General information on anxiety in athletes

According to Schaal (2011), whose research involves a large sample of athletes with mental health disorders diagnosed by licensed clinicians, anxiety disorders across types affect athletes in a combined past 6-month prevalence of approximately 9%.⁵ This is comparable to rates reported in the general population (11-12%).⁶⁻⁷

Other research has examined comparative rates of anxiety in different categories of sports.

Individual sport athletes may be at relatively greater risk for anxiety than are *team* sport athletes.⁸⁻¹⁰ Starting at younger ages, motivations for athletes to join individual sports tend to include goal-oriented reasons such as winning scholarships or controlling weight.⁸ Conversely, athletes joining team sports tend to trace the origins of their participation to a desire to have fun with friends.⁸ The former reasons may be more associated with an underlying anxious temperament or may be more prone to contribute to the development of anxiety. Individual sport athletes may also be relatively more perfectionistic, set extreme personal goals, internalize failure after loss, experience less social support, train in a single sport throughout the year (increasingly common in childhood sports), and suffer injuries, all of which may lead to anxiety.¹¹⁻¹² Among specific individual sports, those in which judges score athletes (e.g., gymnastics, figure skating, diving) are most highly correlated with anxiety.⁵ These athletes experience pressure to distinguish themselves from their competition as they pursue flawlessness and judges' approval.⁵

Several other factors have been associated with higher risk for anxiety in athletes (Table 1).

Domain of factors associated with higher risk for anxiety in athletes	Specific factors
Sport-specific	<ul style="list-style-type: none"> • Sense of pressure to perform¹³ • Public scrutiny¹³ • Sporting career uncertainty or dissatisfaction¹⁴⁻¹⁵ • Injury¹⁶⁻¹⁸ (concussion and musculoskeletal injury reportedly equal risk)¹⁹ • Harassment and abuse in sport²⁰
Non-sport-specific	<ul style="list-style-type: none"> • Female^{4,9,21} • Younger age⁴ • Recent experience of adverse life events (e.g., recent death of a close friend or change in financial state)⁴ • Behavioral inhibition²² • Social withdrawal or avoidance²² • Rumination²² • Less religiosity²³

Table 1. Factors associated with higher risk for anxiety in athletes. Reprinted with permission in edited form from *Advances in Psychiatry and Behavioral Health*, Vol 1, Reardon CL, Gorczynski P, Hainline B, Hitchcock M, Purcell R, Rice S, Walton CC, *Anxiety disorders in athletes: a clinical review*, pages 149-160, Copyright Elsevier (2021).

Anxiety symptoms and disorders impact performance in sport. Anxiety affects attention, executive functioning, information selection, muscle tension, and stimulus processing—all of which are involved in sport.⁴ Elite athletes reporting higher anxiety experience more skill errors and negative performance outcomes.²⁴⁻²⁶ For example, anxiety impacts balance among youth and young adults participating in gymnastics and is associated with worse performance.²⁷

Additionally, an athlete’s interpretation of stress and anxiety pre-competition may mediate the functional impact on performance.²⁸ That is, if the athlete interprets the feelings as helpful in getting “pumped up” for competition, that may be functionally adaptive. However, if the athlete perceives the feelings as detrimental, then behavioral responses are unhelpfully avoidance-based,

and performance negatively affected.²⁹⁻³¹ Finally, anxiety in athletes is one of the factors most consistently associated with sport injury occurrence³¹⁻³² and severity.³³ After injury occurs, recovery from and return to sport can be negatively impacted by anxiety as well.³⁴ Notably, though, higher levels of satisfaction with social support received while injured are associated with *decreases* in post-injury anxiety symptoms.³⁵

Generalized anxiety disorder

While the above research described non-specific “anxiety” in athletes, some research has examined specific anxiety-related disorders. For example, GAD is characterized by persistent and excessive worry about a number of different topics.³⁶ GAD in athletes appears to occur at similar rates (6.0% per clinician diagnosis⁵ and 14.6% per self-report) as in the general population.³⁷ Like in non-athlete samples, female athletes report GAD more often than do male athletes.³⁸⁻⁴⁴ Aesthetic sports (e.g., artistic swimming, figure skating, gymnastics) across genders are associated with a higher risk for GAD among elite athletes.⁵ Athletes in these sports have described feeling a lack of control over the outcome of their performances, which are judged by others.⁴⁵ Conversely, “high risk sports”, which include aerial sports, motor sports, and sliding sports (e.g., luge), are associated with relatively lower risk for GAD among elite athletes.⁵ These sports have a relatively high risk of fatalities. Their athlete-participants have been described as “thrill seekers,”⁴⁶⁻⁴⁷ and they may cope better with stressful circumstances.⁴⁸ Other risk factors for GAD as reported in a study of collegiate athletes from China may include sport injury, attention-deficit/hyperactivity disorder, and a high level of fear of failure.⁴⁹ In that same population, satisfaction in sport was significantly protective against GAD.⁴⁹

Panic disorder

Panic disorder is characterized by unexpected and recurrent episodes of intense fear accompanied by other symptoms such as a racing heartbeat or shortness of breath, with fear of future such episodes.³⁶ 4.5% of athletes self-report panic disorder symptoms,⁵⁰ approximating rates in the general population.⁵¹ Exercise is known to be anxiolytic, but conversely, exercise can precipitate acute anxiety and panic attacks, with nearly one-third of patients with panic disorder and/or the related condition of agoraphobia (fear of open/crowded places, of leaving one's home, or of being in places from which escape is difficult) reporting increased anxiety while exercising.⁵² Consequently, panic disorder sufferers may avoid exercise.⁵³ The relationship between exercise and panic attacks may owe to the physical experiences of exercise (e.g., increased heart rate, shortness of breath, sweating), which resemble those of panic. The athlete with panic disorder may worry they are experiencing a panic attack, which perpetuates further panic symptoms.⁵⁴ Conversely, one study suggests that participation in adolescent sport might *decrease* the risk of panic disorder (more so than other anxiety disorders) in adulthood.⁵⁵ The authors of the latter hypothesize that sports participation acts as a form of exposure therapy such that youth learn not to fear symptoms such as increased heartbeat, rapid breathing, and sweating via desensitization to those symptoms.

Social anxiety disorder

Social anxiety disorder (social phobia) is characterized by fear of being judged or negatively evaluated in a social or performance situation.³⁶ Those with the disorder avoid such situations or endure them with significant distress. By self-report, symptoms of social anxiety disorder impact 14.7% of athletes,⁵⁰ which is similar to the rate of 13% in the general population.⁵¹

Significant fear of social evaluation, especially if extending to contexts beyond sport, warrants evaluation for this disorder.⁵⁶ It can be challenging in some cases to discern whether symptoms represent competitive performance anxiety or social anxiety disorder. In competitive performance anxiety, the symptoms are limited to sport participation, with fear of scrutiny by others not a driving factor, compared to social anxiety disorder, in which fears relate to negative evaluation by and interaction with others.⁵⁷ It is possible that encouragement of sports participation for socially reticent children and young adults may provide opportunities for repeated exposure to feared social situations, resulting in a reduction in social anxiety as they desensitize to these situations.⁵⁸ For others, pressure to perform in sports may perpetuate fears of being negatively evaluated in social settings.⁵⁸ The net “average” effect of sports participation on social anxiety is thus unknown.

There may be a correlation between social anxiety and avoidance of *individual* sports (where athletes may feel that they as an individual are being watched by many people), but not *team* sports (where spectator viewing is distributed across multiple athletes).⁵⁸ Athletes with social anxiety disorder may avoid meals and meetings with the team, media interviews, and rehabilitation exercises in the athletic training room where they may they are too much the center of attention. Some cases of social anxiety disorder, especially in youth, may be associated with selective mutism, where there is consistent failure to speak in specific social situations in which there is an expectation for speaking³⁶ (e.g., during team sports participation). In all of these situations, the athlete tends to be focused on self rather than sport-related task, with potential resultant negative impact of social anxiety on performance.⁵⁹

Obsessive-compulsive disorder

OCD is characterized by recurring, unwanted thoughts, ideas or sensations (obsessions) that make the person feel driven to do something repetitively (compulsions).³⁶ By self-report, OCD has been found to impact 5.2% of collegiate athletes across 13 sports,⁶⁰ which is higher than general population rates (2.3%).⁶¹ Moreover, in that same self-report study, nearly 35% of athletes endorsed OCD *symptoms* without meeting full OCD criteria,⁶⁰ compared to 28% in the general population.⁶² Similarly, a small study of professional tennis players carried out via self-report and clinical interview demonstrated rates of OCD symptoms higher in both active and retired players compared to controls.⁶³ In contrast, in the yearly psychiatric evaluations of French elite athletes, relatively fewer (1.6%) received an OCD diagnosis compared to the general population.⁵ Despite the somewhat conflicting findings, researchers have hypothesized that perfectionism and the compliance to strict daily routines that sport mandates,⁶³ along with superstitions and rituals that can be taken to extremes,⁶⁰ may confer athlete vulnerability to OCD.

Dysfunction from OCD can ensue in sport if intrusive thoughts interfere with present moment attention or if the athlete cannot stop the obsessive-compulsive rumination or routine to engage in sport performance.⁵⁹ For example, an endurance runner may log more miles than proscribed if they feel compelled to repeatedly run back to a certain spot in the road to confirm that they did not inadvertently kick a rock into the way of forthcoming runners. A swimmer may need to repeat a lap unnecessarily if it took an odd (versus even) number of seconds to complete it.

It is imperative not to over-diagnose OCD in athletes who may engage in superstitious rituals. Such rituals are common in sport,^{59-60,63} and seemingly peculiar routines in themselves do not

warrant a diagnosis of OCD if they do not cause significant distress or dysfunction.¹ These behaviors may serve to offer a sense of predictability and routine to athletes, for whom other aspects of their sport environment (e.g., how their opponent will perform, whether they become ill before competition, the weather, whether spectators will cheer or boo, how officials will call the competition) are unpredictable.⁵⁶ However, if rituals surrounding competition gradually become more time-consuming or extend beyond sport, clinicians should screen for OCD.⁵⁶ For example, if an athlete develops a routine of tying his shoelaces in a particular way before races, that may be a harmless and reassuring superstitious ritual. However, if it starts to take up increasing amounts of time before each race, to the point that warmups and actual races are missed because the shoelaces never feel “just right”, then OCD may be present. Ultimately, to be diagnosed as OCD, there is often an hour or more per day of obsessions and/or compulsions.³⁶

Post-traumatic stress disorder

PTSD is a disorder that may occur in someone who has experienced or witnessed a traumatic event and who then has intrusive thoughts and feelings and associated behavioral changes related to that event.³⁶ Rates of this disorder in athletes have been reported to be approximately 13%,⁶⁴ exceeding the 6-9% lifetime prevalence in the general population.⁶⁵⁻⁶⁶ Major injury during sports participation is increasingly described as an inciting traumatic event,⁶⁷ and devastating humiliation, bullying, or harassment/abuse are among other events in sports that may lead to trauma-related symptoms. Female athletes, adolescent athletes (i.e., those aged 15-21 as compared to younger athletes), and those who have a stronger athletic identity may experience greater emotional trauma following injury.⁶⁸ Athletes with pre-existing trauma exposure who then suffer traumatic sports injury may also be at greater risk for PTSD.⁶⁹

In athletes, symptoms of PTSD may include inconsistencies in athletic performance, increased somatic complaints, and avoidance symptoms specific to sport (e.g., avoidance of rehabilitation exercises, of a return to the site where an injury occurred, of engagement in the type of activity being done when an injury occurred, or of training to full intensity), particularly where the inciting event involved athletic participation.^{67,70} The common approach of encouraging the athlete to “toughen up and get back out there” is unlikely to help if the symptoms go clinically unaddressed.

Separation anxiety disorder

Separation anxiety disorder is a relatively common anxiety disorder, particularly in youth, diagnosed when anxiety about separation from attachment figures is excessive for developmental age and interferes with school or other daily activities.³⁶ In affected athletes, the normal separation anxiety that exists in toddlers becomes *more* rather than *less* pervasive as the child becomes older. They often worry that harm will befall their attachment figure while they are separated.³⁶ This disorder has been little-researched in athletes. However, when present, it can make it difficult for athletes to separate from their caretakers in order to attend sports practices or competition. They may be distracted at practice (if caregivers do not remain on site), step out of practice to send texts or place calls to caregivers to make sure they are okay, or experience somatic symptoms such as headaches or stomachaches, worrying that something will happen to their caregivers during that time. Typically, there will be a generalization of separation anxiety to multiple settings (e.g., the athlete is fearful about leaving caregivers not only to attend sport-related activities but also to attend school, play dates, and birthday parties),³⁶ thereby distinguishing it from anxiety related to particular events happening in a single setting (e.g., bullying at sports practice).

Specific Phobia

Specific phobia involves marked fear or anxiety about a specific object or situation.³⁶ The phobic object or situation is actively avoided or endured with intense fear or anxiety. While rates of this condition in athletes are unknown, when present, it commonly develops prior to the age of 11.³⁶ Sport participation may present situations where specific phobias become particularly apparent, e.g., in the case of sport-related travel involving airplanes or elevators, both of which are common specific phobias.³⁶ Loud sounds and costumed characters (such as mascots) are additional relatively common specific phobias³⁶ that may manifest in sport contexts. Finally, fear of vomiting or choking—also frequent phobias³⁶—may result in insufficient dietary intake to support high levels of physical activity in sport.

Competitive performance anxiety

Competitive performance anxiety in sport is defined as fear an athlete has occurring around the time of sport participation, especially competition, that they will not be able to perform in the desired manner, that the situation will be too challenging, and/or that it will be dangerous or harmful.⁷¹ This results in physiological arousal, anxious cognitive appraisals, and/or anxious behavioral responses. It is important but often challenging to differentiate competitive performance anxiety, normal competition-induced hyperarousal, and full anxiety disorders.⁷¹ Clinicians can distinguish among these three possibilities via observation of patterns of symptom onset, source(s) of the worry, duration, and severity of symptoms (Table 2).⁷¹ Importantly, specific anxiety disorders such as GAD can co-exist and/or overlap with competitive

performance anxiety.^{24,71-72} Thus, suspicion for competitive performance anxiety should generate careful evaluation for overt anxiety disorders.

	Normal competition-induced hyperarousal	Competitive performance anxiety	Anxiety disorder (e.g., GAD)
Pattern of symptom onset	Mild hyperarousal symptoms (e.g., feeling mildly nervous) typically starting during the day before/of or during sport performance	Hyperarousal symptoms starting any time before or during sport performance	Anxiety symptoms present most days irrespective of performance times (though symptoms might become even worse before/during performance). In GAD, symptoms have been present at least 6 months. ³⁶
Source of worry	Performance in sport	Performance in sport	Worries that are often multiple (in the case of GAD) and that are not solely sport-related
Duration	Typically <24 hours	Variable; can be up to a week or more before performances	Ongoing
Severity	No negative impact on functioning or significant distress, and arousal to a certain degree may <i>improve</i> performance according to the “inverted-U” hypothesis ⁷³	Detrimental impact on sport performance and/or significant distress	Detrimental impact on life functioning outside of (and sometimes within) sport and/or significant distress

Table 2. Differentiation between normal competition-induced hyperarousal, competitive performance anxiety, and anxiety disorders.^{1,56,59,71} Reprinted with permission in edited form from *Advances in Psychiatry and Behavioral Health*, Vol 1, Reardon CL, Gorczynski P, Hainline B, Hitchcock M, Purcell R, Rice S, Walton CC, Anxiety disorders in athletes: a clinical review, pages 149-160, Copyright Elsevier (2021).

Competitive performance anxiety—like other types of anxiety--frequently brings with it several general physical symptoms. These symptoms include the typical “fight-flight-freeze” response symptoms such as dry mouth, flushed or pale skin, increased heart and respiratory rates,

shakiness, and sweaty hands.⁷¹ Additionally, numerous reports have been published describing how gastrointestinal disturbances including cramping, diarrhea, nausea, regurgitation/reflux, urges to defecate, and emesis are fairly common around times of competition and even training, especially among endurance athletes.⁷⁴ These disturbances may relate to competitive performance anxiety⁷⁴⁻⁷⁵ and/or trait (longstanding and not just situational) anxiety.⁷⁶

Competitive performance anxiety can be distressing and highly dysfunctional for athletes. This type of anxiety may contribute to a “slump” (an extended period of performance at a level less than capability) or a “choke” (acute performance—especially in high stakes circumstances—at a level less than capability).⁷⁷ “The yips” describe a variant of a choke in which there is an involuntary movement during a sport task, especially in sports that require fine motor control such as bowling, cricket, darts, golf, or shooting.⁷⁸ For example, a golfer may experience a problematic jerk, posture, or tremor during chipping, full swing, or putting.⁷⁹ Research on the yips is minimal, but it may be relatively common and underdiagnosed.⁷⁹ A spectrum of etiologies may exist for the yips, ranging from competitive performance anxiety to a focal dystonia, with a continuum between the two.⁷⁸⁻⁷⁹ The two etiologies may be distinguishable based on if the involuntary movement occurs in low-stakes settings (e.g., when the athlete is hitting the golf ball by themselves), with focal dystonia a more prominent factor if it occurs even in these low-key settings.⁷⁸ Another variant of the yips may be the “twisties”—a potentially dangerous phenomenon in which gymnasts lose their sense of control in the air; it has been minimally studied but reportedly sometimes considered a dissociative symptom and related to stress and anxiety.⁸⁰ Regardless of how competitive performance anxiety manifests in a particular athlete, it can result in losses that are important to this population,^{57,81} including loss of

continued sport participation, ability to progress to the next competitive level, financial/scholarship/sponsorship support, and medals/championships.

Risk factors for competitive performance anxiety in athletes have been reported to include female gender,⁸² younger age,⁸²⁻⁸³ lower athletic experience,⁸² away versus home competitions (exception being playing at home against nearby teams who are historic rivals),⁸² athlete perception of coaching behaviors as controlling versus autonomy-supporting,⁸⁴ a sport environment in which athletes perceive that they are being rewarded only for being the best performer (versus for personal learning and improvement),⁸⁵ and individual versus team sports.^{82,86} The reason younger age may be a risk is that athletes with greater experience appear to have more ability to control their distress and more effective coping strategies to deal with criticism from self and others.^{82,87} Additionally, social media use shortly before or during competition, especially if push notifications are activated, is associated with competitive performance anxiety.⁸⁸ This type of media use may be a marker for baseline anxious traits, may increase comparisons to others, and/or may interfere with mental preparation for (which is important for confidence during) competition.⁸⁸

Other anxiety-related disorders

We found no research on other anxiety or related disorders, including adjustment disorder with anxiety or obsessive-compulsive personality disorder, in athletes. Adjustment disorder with anxiety may be common in this population owing to many temporary, sport-related stressors such as injury or competitive failure⁸⁹

General principles of diagnosis and management

There are no known athlete-specific, comprehensive, validated screening tools for anxiety-related disorders. The International Olympic Committee (IOC) published its Sports Mental Health Assessment Tool 1 (SMHAT-1), which includes several screening tools presented together for use in athlete populations.⁹⁰ The SMHAT-1 incorporates the GAD-7—which appears to be an acceptable choice for athletes—as its general anxiety screening tool.⁹⁰ Clinicians may incorporate the entire SMHAT-1, or the GAD-7 if singularly wishing to screen for anxiety, into preparticipation physical examinations. Additionally, the IOC advises that screening with the SMHAT-1 be repeated after injury/illness or suspected harassment/abuse, if there are unexplained performance concerns, at the end of competitive cycles, during other adverse life events, and upon retirement from sport.⁹⁰ The Sport Anxiety Scale-2 may be used to screen specifically for competitive performance anxiety.⁹¹

Clinicians should always consider general medical and substance-related conditions that may contribute to anxiety symptoms (Table 3).^{56,71,92} In the presence of such conditions, it is imperative to address these underlying contributors, in addition to managing the manifesting anxiety symptoms.

General medical or substance-related condition	Signs/symptoms that may mimic anxiety in athletes	Relevance to athletes	Typical initial evaluation	Typical management
Anemia	<ul style="list-style-type: none"> • Shortness of breath • Tachycardia • Fatigue 	<ul style="list-style-type: none"> • Endurance athletes and athletes with unintentional underfueling 	<ul style="list-style-type: none"> • Hemoglobin and ferritin laboratory tests 	<ul style="list-style-type: none"> • Increased dietary iron intake

		or eating disorders may be at risk for anemia		<ul style="list-style-type: none"> • Iron supplementation
Asthma	<ul style="list-style-type: none"> • Shortness of breath that may contribute to a sense of anxiety, panic, or impending doom • Tachycardia 	<ul style="list-style-type: none"> • Asthma may be exercise-induced • Athletes in certain sports (e.g., swimming) may have relatively high rates of asthma⁹³ 	<ul style="list-style-type: none"> • Lung auscultation • Pulmonary function testing 	<ul style="list-style-type: none"> • Beta-agonists (some are prohibited at higher levels of competition without therapeutic use exemptions)⁹⁴ • Other daily controller medications
Caffeine use	<ul style="list-style-type: none"> • Nervousness • Restlessness • Jitteriness • Insomnia • Tachycardia 	<ul style="list-style-type: none"> • Athletes may use caffeine to increase energy or enhance performance⁹⁵⁻⁹⁶ 	<ul style="list-style-type: none"> • Clinical interview 	<ul style="list-style-type: none"> • If caffeine is causing problems, taper it (athletes consuming large doses may experience short-term withdrawal effects that may temporarily exacerbate anxiety)
Concussion ⁹⁷	<ul style="list-style-type: none"> • Nervousness • Irritability • Trouble concentrating 	<ul style="list-style-type: none"> • Athletes experience sport-related concussion (SRC) 	<ul style="list-style-type: none"> • Immediate clinical neurologic assessment • Serial symptom assessment 	<ul style="list-style-type: none"> • Gradual return-to-sport and return-to-learn protocols. Having an

	<ul style="list-style-type: none"> • Insomnia • Fatigue 	<ul style="list-style-type: none"> • Anxiety symptoms may be multifactorial post-SRC • Athletes who have an anxious profile at baseline are likely to experience greater concussion symptom burden following SRC.⁹⁸ • Negative, anxiety-related perceptions about concussions are prevalent in collegiate athletes⁹⁹ 	<ul style="list-style-type: none"> • Possible neuropsychological testing • Possible neuroimaging 	<p>accurate understanding of baseline anxiety levels for these athletes may help to inform return-to-learn and return-to-play decisions and may prevent athletes from being withheld from activity unduly.¹⁰⁰</p> <ul style="list-style-type: none"> • Symptom-targeted pharmacology as needed • Psychotherapy if mental health symptoms are persistent or severe
Exercise-induced laryngeal obstruction (EILO) ¹⁰¹	<ul style="list-style-type: none"> • Episodic shortness of breath that can lead to acute anxiety/panic 	<ul style="list-style-type: none"> • Symptoms occur during exercise, resolve within minutes of stopping exercise, and are especially common in adolescent female athletes 	<ul style="list-style-type: none"> • Referral to otolaryngology • Spirometry before/after bronchodilator and bronchoprovocation challenge, with confirmation via continuous laryngoscopy during exercise 	<ul style="list-style-type: none"> • Behavioral management with speech-language pathologist • Management of psychosocial stressors related to EILO episodes

<p>Hypoglycemia¹⁰²</p>	<ul style="list-style-type: none"> • Acute episodes of nervousness, jitteriness, irritability, and/or sweating 	<ul style="list-style-type: none"> • High training demands with insufficient or poorly timed caloric intake may occur in athletes • Unintentional underfueling or eating disorders may be associated with hypoglycemia 	<ul style="list-style-type: none"> • Glucose laboratory test while symptomatic 	<ul style="list-style-type: none"> • Improved timing and composition of meals and snacks
<p>Thyroid dysfunction¹⁰³</p>	<ul style="list-style-type: none"> • Palpitations • Tremors • Restlessness • Insomnia • Fatigue 	<ul style="list-style-type: none"> • Overtraining in female athletes is associated with thyroid dysfunction • Iron deficiency (common in some athlete populations) is commonly comorbid with hypothyroidism • Athletes may use exogenous thyroid hormone to attempt to improve performance 	<ul style="list-style-type: none"> • Thyroid function laboratory tests 	<ul style="list-style-type: none"> • Medication • Sometimes radioactive thyroid ablation or thyroidectomy

Table 3. Common general medical and substance-related conditions that may contribute to anxiety symptoms in athletes.^{56,71,92} Reprinted with permission in edited form from *Advances in Psychiatry and Behavioral Health*, Vol 1, Reardon CL, Gorczynski P, Hainline B, Hitchcock M, Purcell R, Rice S, Walton CC, *Anxiety disorders in athletes: a clinical review*, pages 149-160, Copyright Elsevier (2021).

The primary treatment for mild to moderate anxiety in athletes—just as in the general population—is often psychotherapy.^{1,104-105} Athletes may be more wary than non-athletes of potential medication side effects, thereby further leading them to psychotherapy as the first treatment option.¹ Psychotherapy providers who are familiar with the psychosocial context of sport are usually most equipped to meet athletes' needs and preferences.¹⁰⁶

There is a dearth of empirical evidence on the effectiveness of psychotherapeutic interventions for most mental health symptoms and disorders, including anxiety, in athletes.¹⁰⁷ Studies on therapeutic approaches have generally focused on performance enhancement rather than treatment of psychopathology, and between-subject designs and healthy athlete samples have disproportionately been included.¹⁰⁷ However, athletes with anxiety may do well with cognitive-behavioral therapy (CBT), given its structural components that are similar to sport: completion of homework, following of rules, and receiving instruction.¹⁰⁴ Elements may include arousal reduction for GAD or panic disorder, graded exposure and behavioral experimentation for social anxiety, separation anxiety, PTSD, and specific phobia, and response prevention for OCD.¹⁰⁸ For panic attacks exacerbated by general physical sensations during exercise, treating the panic symptoms via exposure--and discouraging phobic avoidance of exercise--is the recommended course.⁵⁶ Specific mental factors that are deemed important for success in sport—affect regulation, healthy coping mechanisms, maintenance of motivation and of supportive

relationships, and self-confidence, ^{4,109}—simultaneously help in anxiety management.² Thus, focus on these factors can be high yield.

Other therapies may be beneficial as well. Mindfulness-based programs have demonstrated efficacy for anxiety symptoms in the general population,¹¹⁰ and are increasingly popular among athletes.¹¹¹ A systematic review and meta-analysis demonstrated reduced symptoms of anxiety in elite athletes participating in these programs, though adequately powered trials are required in the future.¹¹² Nutritional support may be helpful for athletes experiencing gastrointestinal manifestations of anxiety during sport.⁷⁵ Finally, a meta-analysis has demonstrated an anxiolytic effect of exercise for people with anxiety and related disorders.¹¹³ While presumably athletes are getting adequate exercise such that there would be no room for anxiolytic gain in this regard, it is one factor (of many) to consider if their anxiety increases during times of break from sport. Moreover, location of exercise matters regarding degree of anxiolytic (possibly moreso than for antidepressant) impact.¹¹⁴ Outdoor exercise appears more beneficial than indoor exercise, and specifically a systematic review and meta-analysis that included 16 studies reporting outcomes for anxiety has demonstrated that exercise undertaken in outdoor *green natural* environments versus outdoor *urban* environments is significantly more anxiolytic.¹¹⁴

Medications may be necessary to treat anxiety in athletes--either as monotherapy or added to psychotherapy--especially when symptoms are moderate to severe.¹ However, prescribers should be aware of side effects that could compromise sport performance or safety.¹¹⁵ Selective-serotonin reuptake inhibitors (SSRIs) are antidepressants that tend to be first choice of medications for athletes across anxiety disorders.¹¹⁶ Specifically, a survey study has shown that

the top choices of sports psychiatrists for anxiety in athletes are escitalopram, sertraline, and fluoxetine.¹¹⁶ Of these, fluoxetine has received modest study in exercising subjects and has not been found to have a negative performance impact.¹¹⁷⁻¹¹⁸ However, performance measures that may not be fully translatable to competitive sport, short study duration, lack of subject diversity, and small sample size were limitations in these studies. Escitalopram and sertraline have not been studied in athletes, but anecdotally they are frequently used in this population.¹¹⁶ Tricyclic antidepressants (TCAs) are also used for anxiety-related disorders (especially clomipramine for OCD) in general populations, but they have been even less studied in athletes than have SSRIs. Clinicians should monitor blood levels of these medications in anyone taking them, as blood levels that are too high can be dangerous and cause severe side effects.¹ This may be especially important for athletes, as cardiac consequences of toxic blood levels may be especially dire in this heavily exercising cohort. Furthermore, eating disorders are generally considered contraindications to use of TCAs, and given the overrepresentation of eating disorders among athletes, this is another reason that these medications would not be used in this population.¹¹⁹

Another medication, buspirone, is a partial agonist of serotonin receptors that is used for its anxiolytic effects. One small study suggested impaired performance in recreational athletes.¹²⁰ However, only a single 45 mg dose was tested—far from duration and dose used in the real world—such that translation to use in actual athletes is not possible.¹²⁰

Medications are rarely indicated for competitive performance anxiety.¹ Benzodiazepines, which can be used as fast-acting, as-needed options for acute anxiety in the general population, are prone to impair sport performance. They may cause sedation or muscle relaxation and decrease

reaction time.^{121-123,57} Propranolol and other beta-blockers may decrease cardiopulmonary capacity¹²⁴ and lower blood pressure (and thus cause dizziness) in athletes who may already have low blood pressure.¹ Additionally, the World Anti-Doping Agency prohibits beta-blockers both *out-of-competition* and *in-competition* in archery and shooting, and *in-competition* in automobile, billiards, darts, golf, some skiing/snowboarding, and some underwater sports.⁹⁴ The National Collegiate Athletic Association prohibits beta-blockers in rifle.¹²⁵ In these sports, beta-blockers may be performance enhancing by reducing physiologic tremor and thus improving fine motor control.¹ As a result, psychotherapy is the preferred choice for management of competitive performance anxiety,⁵⁷ and it has been demonstrated to be effective per meta-analysis and systematic review.¹²⁶ Athletes need practice in modulating and interpreting the feelings of being “psyched up” during competition just as they need practice in the other physical aspects of sport. Additionally, while sometimes used, pharmacological options including benzodiazepines and botulinum toxin have been minimally studied in the treatment of the yips.⁷⁹ Behavioral approaches to address the yips, depending on sport, may include development of a new biomechanical sequence while engaging in the problematic motion, change in grip technique or length/type of golf club or other implement used, or hypnosis.⁷⁹ For the twisties, training on soft surfaces until the problem passes has been suggested, but none of these strategies have been rigorously evaluated.⁸⁰

Athletes at higher levels of competition (especially collegiate and beyond) must exercise caution if using any non-regulated supplements to manage anxiety. Athletes sometimes prefer “natural” products, but high levels of competition enforce strict prohibitions of certain substances.^{94,125} There is no regulatory body that approves the accuracy of supplement labels or the safety of

supplement contents before they are sold. Dietary supplements may thus be contaminated—unbeknownst to the athlete—with prohibited substances.¹ Inaccurate labeling of supplements or ignorance of ingredients are not recognized as valid excuses for adverse analytical findings on drug tests.¹ Therefore, if supplements are taken, they should be obtained from a reputable company and ideally certified by a third-party program that tests for substances prohibited in sport.¹ Beyond the concern about contamination, several supplements marketed for anxiety (e.g., kava, valerian) may cause sedation,⁹² which could impact sports performance. Recently, cannabidiol (CBD) has been marketed to athletes as helpful for anxiety, among other conditions, but there is inadequate research to encourage its use for this purpose.¹²⁷ Moreover, athletes consuming CBD risk ingesting a relatively small amount of associated tetrahydrocannabinol (THC), which is prohibited by several governing bodies.^{94,125} In the rare instance athletes are included as the target population when looking at the impact of supplements on anxiety, sample sizes have generally been low.¹²⁸

Discussion

Athletes may suffer from the full complement of anxiety symptoms and disorders that manifest in the general population, albeit often with nuanced precipitating and perpetuating factors and symptom presentations. If providers are aware of the risk factors and sometimes subtle presentations of anxiety in this population, they can intervene sooner. For example, the athlete in an individual, aesthetic, judged sport who is suffering from an injury, has a known eating disorder, and receives much pressure from family to maintain full scholarship support is likely at high risk for anxiety, and screening for such disorders should be undertaken liberally.

Intervention as soon as possible may help prevent progression from mild symptoms to full, disabling disorders that make continued participation in sport—and life—difficult.

Clinicians should consider athletes' unique biopsychosocial contexts when making treatment recommendations. Anecdotally, athletes sometimes worry that treatment of anxiety might negatively impact sport performance via lessening of their anxiety-driven conscientiousness and strong work ethic; however, the authors found no evidence to justify this concern. On the contrary, there is ample evidence that ongoing anxiety negatively impacts sport performance in a variety of ways. Nonetheless, clinicians should be aware of the potential relevance of medication side effects in sport. Preliminary research on performance impacts of daily SSRI controller medication is reassuring, but limitations in study methods are substantial. Clinicians should thus solicit input from individual athletes about how they perceive medications to be impacting them and should take such reports seriously, as athletes are generally highly attuned to any changes in how their bodies are functioning.

Clinicians who provide mental health care to athletes who are suffering from anxiety ideally should be well-versed in the anxiogenic aspects of sport culture. They should not need their athlete-patients to educate them about the stressors unique to life as an athlete. Their providers should not glamorize or idolize their athlete-patients; on the converse, they should appreciate that the reality of their lives is demanding and full of pressures from many angles. At the same time, athletes do not necessarily want to be advised by their psychotherapist that their sport is too stressful and that they should simply quit. Clinicians should strive to find an adequate balance between being alert for problematic circumstances in sport (e.g., abuse, playing through severe

pain or injury) that warrant intervention (and possibly help exiting that particular sport context), while not rushing to a stance of, “Well then just quit if it’s so bad.” Additionally, clinicians should be aware of the relative mental health benefits of sport when pursued for the enjoyment it affords, versus the more negative impacts when associated with demanding, pressure-filled, lonely pursuits of individual perfection. It may be appropriate to help an athlete develop insight into their anxious tendencies, how their chosen sport may perpetuate those tendencies, and how such tendencies can be managed.

Summary

Athletes are susceptible to the full spectrum of anxiety symptoms and disorders. Manifestations of such symptoms are varied, and there should be a low index of suspicion for their presence. Effective treatment should be employed promptly to optimize functioning in sport and in life.

Clinics Care Points

- Clinicians should ask all athletes if they spend a lot of time feeling anxious or worried, with use of more formal screening if possible.
- If a clinician suspects an anxiety-related disorder in an athlete, they should seek to confirm the diagnosis, discuss treatment (specifically psychotherapy and medications) and referral options with the athlete, and make an intervention promptly.

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