

Mental health issues and psychological factors in athletes: detection, management, effect on performance and prevention: American Medical Society for Sports Medicine Position Statement—Executive Summary

Cindy Chang,¹ Margot Putukian ,^{2,3} Giselle Aerni,⁴ Alex Diamond,⁵ Gene Hong,⁶ Yvette Ingram,⁷ Claudia L Reardon,⁸ Andrew Wolanin⁹

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For numbered affiliations see end of article.

Correspondence to

Dr Margot Putukian, Athletic Medicine, Princeton University, Princeton, New Jersey, USA; putukian@princeton.edu

CC and MP are joint first authors.

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ABSTRACT

The American Medical Society for Sports Medicine convened a panel of experts to provide an evidence-based, best practices document to assist sports medicine physicians and other members of the athletic care network with the detection, treatment and prevention of mental health issues in competitive athletes. This statement discusses how members of the sports medicine team, including team physicians, athletic trainers and mental health providers, work together in providing comprehensive psychological care to athletes. It specifically addresses psychological factors in athletes including personality issues and the psychological response to injury and illness. The statement also examines the athletic culture and environmental factors that commonly impact mental health, including sexuality and gender issues, hazing, bullying, sexual misconduct and transition from sport. Specific mental health disorders in athletes, such as eating disorders/disordered eating, depression and suicide, anxiety and stress, overtraining, sleep disorders and attention-deficit/hyperactivity disorder, are reviewed with a focus on detection, management, the effect on performance and prevention. This document uses the Strength of Recommendation Taxonomy to grade level of evidence.

INTRODUCTION

Athlete mental health (MH) is receiving increased attention in the sports medicine community. While participation in athletics has many benefits, the very nature of competition can provoke, augment or expose psychological issues in athletes. Certain personality traits can aid in athletic success, yet these same traits can also be associated with MH disorders. Importantly, the athletic culture may have an impact on performance and psychological health through its effect on existing personality traits and MH disorders. Consensus or position statements have been published by a number of organisations with each society bringing its own focus and perspective.^{1–5} Sports medicine physicians are trained through their primary disciplines and sports medicine fellowships to provide comprehensive medical care to athletes, including the management of MH disorders. The team physician is often the coordinator of the athlete's overall healthcare

and may oversee MH screening and treatment, the prescribing of psychiatric medication and consultation with members of the MH care network.

The American Medical Society for Sports Medicine (AMSSM) convened a panel of experts to provide an evidence-based, best practices document to assist sports medicine physicians and other members of the athletic care network with the detection, treatment and prevention of MH issues in competitive athletes.⁶ This position statement focuses on the competitive athlete, from the youth and collegiate athlete to the Olympian and professional athlete and how team physicians, athletic trainers and MH care providers can assist with the detection and treatment of psychological issues in athletes. The unique signs and symptoms in athletes, prevalence of MH disorders in the athlete population and utilisation of available screening tools will be reviewed. Specific Diagnostic and Statistical Manual of Mental Disorders (DSM-5) diagnostic criteria and the pathophysiology of MH disorders will not be discussed. The discussion of management may include psychosocial approaches and pharmacological treatments, emphasising the selection of the most effective treatments with the fewest side effects of relevance for athletic performance. Last, this paper will present recommendations for prevention, including the identification and possible elimination of risk factors within the athlete environment.

This document provides an Executive Summary of key evidence-based findings. The full position statement provides a comprehensive review (box 1) and is accessible as an online supplementary file. While this statement is directed towards sports medicine physicians, it also may assist other physicians and healthcare professionals in the care of competitive athletes with psychological issues and MH disorders.

METHODS

The AMSSM Board of Directors appointed cochairs (CJC, MP) to assemble a writing group that was carefully selected to include a balanced panel of sports medicine physicians and other professionals experienced in managing MH issues in athletes, actively engaged in research and with demonstrated leadership in the topic. Important members of the



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panel included an athletic trainer, a clinical psychologist and a sport psychiatrist. The coauthors generated the outline and the writing group subsequently conducted an in-depth literature review using PubMed, SportDiscus and the Cochrane database for each topic. The writing group engaged in conference calls and written communications to discuss the evidence and compile the manuscript. The panel used the Strength of Recommendation Taxonomy (SORT) to grade level of evidence⁷ (table 1).

This AMSSM position statement is novel in several respects in its contribution to the topic, including:

- ▶ addressing topics not fully explored in previous publications about MH issues in athletes, including key personality issues, demographic and cultural variables and environmental conditions,
- ▶ discussing the interaction and impact of these variables both positively and negatively on competitive athletes and how to monitor the athletic environment that may precipitate or exacerbate MH issues and
- ▶ defining the level of evidence and the knowledge gaps in this rapidly expanding field.

KEY FINDINGS

Sports medicine physicians should be familiar with the psychological, cultural and environmental factors that influence MH in athletes as well as common MH disorders affecting the athletic population. Key findings and level of evidence for each topic are summarised below:

Table 1 Strength of Recommendation Taxonomy

Strength of recommendation	Basis for recommendation
A	Consistent, good-quality patient-oriented evidence
B	Inconsistent or limited-quality patient-oriented evidence
C	Consensus, disease-oriented evidence, usual practice, expert opinion or case series for studies of diagnosis, treatment, prevention or screening

Personality issues

1. High athletic identity is associated with both positive and negative health and performance outcomes. (SORT B)⁸
2. Personality traits and disorders deemed problematic for athletes may be best addressed via psychotherapy. (SORT C)⁹

Sexuality and gender issues

1. The creation of a strong supportive environment that is welcoming to sexual minorities is key to the MH of the athlete and the sports team. (SORT A)^{10 11}
2. Reducing the risk of negative health consequences for the sexual minority athlete starts with education of all stakeholders associated with athletic participation. (SORT C)^{12–14}

Hazing

1. Hazing leads to both short-term and long-term health ramifications that can affect an individual's athletic success and ability to participate in sport. (SORT C).¹⁵
2. The prevention and management of hazing requires a global investment from athletes, coaches, administrators and healthcare providers centred on a zero-tolerance policy for any form of maltreatment and a focus on positive team building activities that promote dignity and teamwork as opposed to victimisation. (SORT C)¹⁶

Bullying

1. Bullying in athletics can take on many different forms and be the actions of teammates or coaches. Signs and symptoms of being bullied may vary greatly. (SORT C)¹⁷
2. Preventing bullying is the responsibility of all the stakeholders in athletics. Educational programmes can be found on the NCAA website. (SORT C)¹⁷

Sexual misconduct

1. Authority figures are more often perpetrators of sexual abuse, but peer athletes are far more likely than coaches to be perpetrators of sexual harassment. (SORT C)^{18 19}
2. Populations at higher risk for sexual abuse in youth sports reflect trends in the general population. Those participating at higher levels of competition are also at an increased risk. Sport type, amount of touching or degree of clothing cover during participation do not appear to correlate with higher rates of abuse. (SORT C)^{20–23}

Transitioning from sport

1. Athletic departments, national governing bodies and professional leagues should assist athletes who are retiring from their sport with development of a comprehensive preretirement plan addressing issues surrounding their transition out of athletic participation. (SORT A)²⁴
2. Long-term psychological effects of career-ending injuries are common for many athletes. (SORT C)²⁵

Psychological response to injury and illness

1. Psychological and sociocultural factors have been raised as potential *risk factors* for injury. Stress consistently demonstrates a relationship with injury risk as well as the ability to rehabilitate from injury and return to sport (SORT B)^{25 26}
2. Cognitive, emotional and behavioural responses to injury are important in determining outcome. (SORT C).²⁷

Self-medication in response to injury/illness

1. Limited data exist on the use of self-medication by athletes as a coping mechanism. However, certain demographics of athletes are emerging as higher risk groups for medication misuse and for negative MH and other consequences of their use. (SORT C)^{28 29}
2. Targeted interventions that incorporate health and athletic performance considerations tend to be more successful for the athletic population and this includes addressing the underlying issues leading to substance use/self-medication. (SORT C)^{30–32}

Eating disorder/disordered eating

1. Annual preparticipation screening for eating disorders in athletes should be routine. (SORT C)^{33–39}
2. Eating disorder prevention programmes have benefit in reducing risk for eating disorders. (SORT B)^{33–36 39–42}
3. Cognitive behavioural therapy (CBT) and family therapy are recommended as treatments for eating disorders in athletes. (SORT B)^{33–36 40 43}

Depression and suicide

1. Athletes have unique risk factors for depression compared with non-athletes. Early recognition and appropriate management of depression in athletes lead to improved clinical and performance outcomes. (SORT C)⁴⁴
2. College student-athletes report depression symptoms at a higher prevalence than previously reported; these rates are comparable to non-athlete college students. (SORT B)⁴⁵
3. Suicide incidence in college student athletes is lower than in college student non-athletes. Football has the highest suicide rate by sport in college athletes. (SORT B)⁴⁶

Anxiety/stress

1. CBT for the treatment of anxiety is the optimal non-pharmacological intervention. CBT is an established and effective treatment method for many clinical populations with different types of anxiety disorders, but there are no randomised controlled trials of CBT interventions specifically within athletes. (SORT B)⁴⁷
2. While selective serotonin reuptake inhibitors may be considered, as-needed anxiolytics are not recommended for athletic performance anxiety. (SORT B)^{48 49}

Overtraining

1. A management approach to the athlete with overtraining syndrome should be individually developed and should include evaluation for MH stressors and relative or absolute rest depending on the clinical situation at the time. (SORT C)⁵⁰
2. Monitoring training loads, getting adequate rest periods and maintaining optimal nutrition and hydration status are all important in preventing the development of overtraining syndrome. (SORT C)⁵¹

Sleep

1. While not specific for athletes, insomnia-specific CBT is first-line treatment for sustained improvements in sleep in those with insomnia alone or insomnia comorbid with other MH disorders. (SORT A)^{52 53}
2. Benzodiazepine sedative hypnotics are not recommended for athletes because of their marked 'hangover' effect, which includes a negative impact on reaction time. (SORT A)^{54 55}

3. While melatonin has not been shown to improve sleep quality in athletes, short-term use is safe with no decrements in performance. (SORT A).^{56 57} Because melatonin is not regulated by the FDA, caution for the presence of impurity is necessary and it should be purchased as a single-ingredient product from a reputable company.

Attention deficit hyperactivity disorder (ADHD)

1. The optimal management approach for ADHD is individualised and may include behaviour therapies, academic accommodations, pharmacotherapy (eg, atomoxetine, amphetamine salts or methylphenidate formulations) and psychological interventions to manage associated features and comorbid diagnoses. (SORT C)^{58–61}
2. The risk of heat illness may be increased in athletes taking ADHD medications. Those taking stimulant medications have elevated core temperatures while exercising, although an increased incidence of exertional heat injury or heatstroke in these groups has not been reported. (SORT C)^{62–65}
3. Team physicians should be aware of and educate the athlete on regulations and requirements regarding medication treatment of ADHD. (SORT A)^{66–68}

CONCLUSION AND FUTURE DIRECTIONS

While sports participation provides many benefits to individual health and well-being, athletes are exposed to additional risk factors that may impact their MH. The sports medicine physician and other members of the athletic care network are uniquely positioned to detect MH issues early and intervene appropriately. Providers must have a full understanding of how issues commonly manifest in the athletic population, and importantly, an awareness of the relevant psychological, cultural and environmental influences. The primary goal of this AMSSM position statement is to assist the team physician and other members of the athletic care network with the detection, treatment and prevention of a select range of psychological issues and MH disorders in athletes. An important component of management is an understanding of pharmacological treatment options including those that may be the most effective with the fewest side effects. Critical insight is needed into key personality issues (eg, 'athlete identity'), demographic and cultural variables (eg, sexual orientation, gender identification) and environmental conditions (eg, hazing, bullying, sexual abuse) that can impact athletes and how interactions among these variables may contribute to MH issues. It is important for the athletic care network to be attuned to risk factors for MH disorders and to monitor athletic environments that may trigger or exacerbate psychological issues in athletes under their care.

Limited evidence is available that specifically addresses MH in athletes, and additional research is needed to define and validate the optimal strategies for the detection, management and prevention of MH disorders in competitive athletes. Recommended priorities are the development of validated assessment tools to improve early identification of MH issues in athletes and establishing effective interventions. We encourage readers to review the entire AMSSM Position Statement on Mental Health Issues and Psychological Factors in Athletes (online supplementary file 1) to gain in-depth information on the highlighted topics.

Author affiliations

¹Departments of Orthopaedics and Family & Community Medicine, University of California San Francisco, San Francisco, California, USA

²Athletic Medicine, Princeton University, Princeton, New Jersey, USA

³Department of Internal Medicine & Sports Medicine, Rutgers Robert Wood Johnson Medical School, Piscataway, New Jersey, USA

⁴Sports Medicine & Family Medicine, WellSpan Health, York, Pennsylvania, USA

⁵Department of Pediatrics and Orthopaedic Surgery, Vanderbilt University Medical Center, Nashville, Tennessee, USA

⁶Department of Orthopedics and Family Medicine, Medical University of South Carolina—College of Medicine, Charleston, South Carolina, USA

⁷Department of Health Science, Lock Haven University of Pennsylvania, Lock Haven, Pennsylvania, USA

⁸Department of Psychiatry, University of Wisconsin Madison School of Medicine and Public Health, Madison, Wisconsin, USA

⁹Wolanin Consulting and Assessment Inc, Bala Cynwyd, Philadelphia, Pennsylvania, USA

Twitter Margot Putukian @Mputukian

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ORCID iD

Margot Putukian <http://orcid.org/0000-0002-1478-8068>

REFERENCES

- Henriksen K, Schinke R, Moesch K, et al. Consensus statement on improving the mental health of high performance athletes. *Int J Sport Exerc Psychol* 2019.
- Moesch K, Kenttä G, Kleinert J, et al. FEPSAC position statement: mental health disorders in elite athletes and models of service provision. *Psychol Sport Exerc* 2018;38:61–71.
- Reardon CL, Hainline B, Aron CM, et al. Mental health in elite athletes: international Olympic Committee consensus statement (2019). *Br J Sports Med* 2019;53:667–99.
- Schinke R, Stambulova NB, Si G, et al. International society of sport psychology position stand: Athletes' mental health, performance, and development. *Int J Sport Exerc Psychol* 2017.
- Van Slingerland KJ, Durand-Bush N, Bradley L, et al. Canadian centre for mental health and sport (CCMHS) position statement: principles of mental health in competitive and high-performance sport. *Clin J Sport Med* 2019;29:173–80.
- Herring SA, Kibler WB, Putukian M, et al. Sideline preparedness for the team physician: a consensus statement-2012 update. *Med Sci Sports Exerc* 2012;44:2442–5.
- Ebell MH, Siwek J, Weiss BD, et al. Strength of recommendation taxonomy (SORT): a patient-centered approach to grading evidence in the medical literature. *Am Fam Physician* 2004;17:59–67.
- Brewer BW, Van Raalte JL, Linder DE. Athletic Identity - Hercules muscles or Achilles heel? *Int J Sport Psychol* 1993;24:237–54.
- Stillman MA, Ritvo EC, Glick ID. Psychotherapeutic treatment of athletes and their significant others. In: Baron DA, Reardon CL, Baron SH, eds. *Clinical sports psychiatry: an international perspective*. Oxford: Wiley-Blackwell, 2013: 117–23.
- Greenspan SB, Griffith C, Murtagh EF. LGBTQ youths' school athletic experiences: a 40-year content analysis in nine Flagship journals. *J LGBT Issues Couns* 2017;11:190–200.
- Lucas-Carr CB, Krane V. What Is the T in LGBT? Supporting Transgender Athletes through Sport Psychology. *Sport Psychol* 2011;25:532–48.
- National Collegiate Athletic Association. LGBTQ resources: NCAA inclusion initiative framework [Internet]. Available: www.ncaa.org/about/resources/inclusion/lgbtq-resources [Accessed 3 Feb 2018].
- National Collegiate Athletic Association. Champions of respect: inclusion of LGBTQ student-athletes and staff in NCAA programs [Internet]. Available: www.ncaapublications.com/p-4305-champions-of-respect-inclusion-of-lgbtq-student-athletes-and-staff-in-ncaa-programs.aspx [Accessed 2 Feb 2018].
- Championing LGBTQ issues in K-12 education since 1990 [Internet]. 1. Available: www.glsen.org/?gclid=Cj0KCQjAnuDTBRDUARIsAL41eDoyihj_zbftLrBbKOTm0360mP2BP4KqjOwCu6HkvNpcJwV3MT27AwaAViMEALw_wcB [Accessed 5 Feb 2018].
- Neal TL, Diamond AB, Goldman S, et al. Interassociation recommendations for developing a plan to recognize and refer student-athletes with psychological concerns at the secondary school level: a consensus statement. *J Athl Train* 2015;50:231–49.
- Wilfert M. *Building new traditions: hazing prevention in college athletics*. Indianapolis, IN: The National Collegiate Athletic Association, 2007.
- NCAA Sport Science Institute. Bystander intervention. Available: www.ncaa.org/sport-science-institute/topics/bystander-intervention [Accessed 14 Feb 2018].
- Mountjoy M, Brackenridge C, Arrington M, et al. International Olympic Committee consensus statement: harassment and abuse (non-accidental violence) in sport. *Br J Sports Med* 2016;50:1019–29.
- Brackenridge CH, Bishopp D, Moussalli S, et al. The characteristics of sexual abuse in sport: a multidimensional scaling analysis of events described in media reports. *Int J Sport Exerc Psychol* 2008;6:385–406.
- Brackenridge C, Fasting K, Kirby S, et al. *Protecting children from violence in sport: a review with a focus on industrialized countries*. United Nations Children's Fund (UNICEF), 2010.
- Vertommen T, Schipper-van Veldhoven NHMJ, Hartill MJ, et al. Sexual harassment and abuse in sport: the NOC*NSF helpline. *Int Rev Sociol Sport* 2015;50:822–39.
- Fasting K, Brackenridge C, Sundgot-Borgen J. Prevalence of sexual harassment among Norwegian female elite athletes in relation to sport type. *Int Rev Sociol Sport* 2004;39:373–86.
- Miller L, Buttell FP. Are NCAA division I athletes prepared for End-of-Athletic-Career transition? A literature review. *J Evid Inf Soc Work* 2018;15:52–70.
- Kleiber D, Greendorfer S, Blinde E, et al. Quality of exit from university sports and life satisfaction in early adulthood. *Sociol Sport J* 1987;4:28–36.
- Ivarsson A, Johnson U, Andersen MB, et al. Psychosocial factors and sport injuries: meta-analyses for prediction and prevention. *Sports Med* 2017;47:353–65.
- Wiese-Bjornstal DM. Psychology and socioculture affect injury risk, response, and recovery in high-intensity athletes: a consensus statement. *Scand J Med Sci Sports* 2010;20 Suppl 2:103–11.
- Forsdyke D, Smith A, Jones M, et al. Psychosocial factors associated with outcomes of sports injury rehabilitation in competitive athletes: a mixed studies systematic review. *Br J Sports Med* 2016;50:537–44.
- NCAA student-athlete substance use study: executive summary. Available: <http://www.ncaa.org/about/resources/research/ncaa-student-athlete-substance-use-study-executive-summary-august-2014> [Accessed 21 Jun 2018].
- Veliz P, Boyd CJ, McCabe SE. Nonmedical use of prescription opioids and heroin use among adolescents involved in competitive sports. *J Adolesc Health* 2017;60:346–9.
- Martens MP, Dams-O'Connor K, Beck NC. A systematic review of college student-athlete drinking: prevalence rates, sport-related factors, and interventions. *J Subst Abuse Treat* 2006;31:305–16.
- Gil F, de Andrade AG, Castaldelli-Maia JM, et al. Discussing prevalence, impacts, and treatment of substance use disorders in athletes. *Int Rev Psychiatry* 2016;28:572–8.
- Brisola-Santos MB, Gallinaro JGdME, Gil F, et al. Prevalence and correlates of cannabis use among athletes—a systematic review. *Am J Addict* 2016;25:18–28.
- Nattiv A, Loucks AB, Manore MM, et al. American College of sports medicine position stand. the female athlete triad. *Med Sci Sports Exerc* 2007;39:1867–82.
- Joy E, Kussman A, Nattiv A. 2016 update on eating disorders in athletes: a comprehensive narrative review with a focus on clinical assessment and management. *Br J Sports Med* 2016;50:154–62.
- De Souza MJ, Nattiv A, Joy E, et al. 2014 female athlete triad coalition consensus statement on treatment and return to play of the female athlete triad: 1st International Conference held in San Francisco, Ca, may 2012, and 2nd International Conference held in Indianapolis, in, may 2013. *Clin J Sport Med* 2014;24:96–119.
- Mountjoy M, Sundgot-Borgen J, Burke L, et al. The IOC consensus statement: beyond the female athlete triad—relative energy deficiency in sport (RED-S). *Br J Sports Med* 2014;48:491–7.
- Knapp J, Aerni G, Anderson J. Eating disorders in female athletes: use of screening tools. *Curr Sports Med Rep* 2014;13:214–8.
- American Academy of Family Physicians, American Academy of Pediatrics, American College of Sports Medicine, American Medical Society for Sports Medicine, American Orthopaedic Society for Sports Medicine, American Osteopathic Academy of Sports Medicine. *PPE Preparticipation physical evaluation*. 4th edn. Minneapolis, MN: McGraw-Hill, 2010.
- Bonci CM, Bonci LJ, Granger LR, et al. National athletic trainers' association position statement: preventing, detecting, and managing disordered eating in athletes. *J Athl Train* 2008;43:80–108.
- Loucas CE, Fairburn CG, Whittington C, et al. E-therapy in the treatment and prevention of eating disorders: a systematic review and meta-analysis. *Behav Res Ther* 2014;63:122–31.
- Martinsen M, Bahr R, Børresen R, et al. Preventing eating disorders among young elite athletes: a randomized controlled trial. *Med Sci Sports Exerc* 2014;46:435–47.
- Bar RJ, Cassin SE, Dionne MM. Eating disorder prevention initiatives for athletes: a review. *Eur J Sport Sci* 2016;16:325–35.
- Couturier J, Kimber M, Szatmari P. Efficacy of family-based treatment for adolescents with eating disorders: a systematic review and meta-analysis. *Int J Eat Disord* 2013;46:3–11.
- Wolanin A, Gross M, Hong E. Depression in athletes: prevalence and risk factors. *Curr Sports Med Rep* 2015;14:56–60.
- Wolanin A, Hong E, Marks D, et al. Prevalence of clinically elevated depressive symptoms in college athletes and differences by gender and sport. *Br J Sports Med* 2016;50:167–71.
- Rao AL, Asif IM, Drezner JA, et al. Suicide in national collegiate athletic association (NCAA) athletes: a 9-year analysis of the NCAA resolutions database. *Sports Health* 2015;7:452–7.

- 47 Otte C. Cognitive behavioral therapy in anxiety disorders: current state of the evidence. *Dialogues Clin Neurosci* 2011;13:413–21.
- 48 Baron DA, Reardon CL, Baron SH, eds. *Clinical sports psychiatry: an international perspective*. John Wiley & Sons, 2013.
- 49 Patel DR, Omar H, Terry M. Sport-related performance anxiety in young female athletes. *J Pediatr Adolesc Gynecol* 2010;23:325–35.
- 50 Carfagno DG, Hendrix JC. Overtraining syndrome in the athlete: current clinical practice. *Curr Sports Med Rep* 2014;13:45–51.
- 51 Meeusen R, Duclos M, Foster C, et al. Prevention, diagnosis and treatment of the overtraining syndrome: joint consensus statement of the European College of sport science (ECSS) and the American College of sports medicine (ACSM). *Eur J Sport Sci* 2013;13:1–24.
- 52 Chiu H-Y, Chen P-Y, Chuang L-P, et al. Diagnostic accuracy of the Berlin questionnaire, Stop-Bang, stop, and Epworth Sleepiness scale in detecting obstructive sleep apnea: a bivariate meta-analysis. *Sleep Med Rev* 2017;36:57–70.
- 53 Carney CE, Edinger JD, Kuchibhatla M, et al. Cognitive behavioral insomnia therapy for those with insomnia and depression: a randomized controlled clinical trial. *Sleep* 2017;40.
- 54 Charles RB, Kirkham AJ, Guyatt AR, et al. Psychomotor, pulmonary and exercise responses to sleep medication. *Br J Clin Pharmacol* 1987;24:191–7.
- 55 Grobler LA, Schwellnus MP, Trichard C, et al. Comparative effects of zopiclone and loperazolam on psychomotor and physical performance in active individuals. *Clin J Sport Med* 2000;10:123–8.
- 56 Buscemi N, Vandermeer B, Hooton N, et al. The efficacy and safety of exogenous melatonin for primary sleep disorders a meta-analysis. *J Gen Intern Med* 2005;20:1151–8.
- 57 Atkinson G, Buckley P, Edwards B, et al. Are there hangover-effects on physical performance when melatonin is ingested by athletes before nocturnal sleep? *Int J Sports Med* 2001;22:232–4.
- 58 Putukian M, Kreher JB, Coppel DB, et al. Attention deficit hyperactivity disorder and the athlete: an American medical Society for sports medicine position statement. *Clin J Sport Med* 2011;21:392–400.
- 59 Clinical practice guideline: diagnosis and evaluation of the child with attention-deficit/hyperactivity disorder. American Academy of pediatrics. *Pediatrics* 2000;105:1158–70.
- 60 American Academy of Pediatrics. Subcommittee on Attention-Deficit/Hyperactivity Disorder and Committee on Quality Improvement. Clinical practice guideline: treatment of the school-aged child with attention-deficit/hyperactivity disorder. *Pediatrics* 2001;108:1033–44.
- 61 Pelham WE, Fabiano GA. Evidence-based psychosocial treatments for attention-deficit/hyperactivity disorder. *J Clin Child Adolesc Psychol* 2008;37:184–214.
- 62 Jacobs I, Bell DG. Effects of acute modafinil ingestion on exercise time to exhaustion. *Med Sci Sports Exerc* 2004;36:1078–82.
- 63 Roelands B, Hasegawa H, Watson P, et al. The effects of acute dopamine reuptake inhibition on performance. *Med Sci Sports Exerc* 2008;40:879–85.
- 64 Watson P, Hasegawa H, Roelands B, et al. Acute dopamine/noradrenaline reuptake inhibition enhances human exercise performance in warm, but not temperate conditions. *J Physiol* 2005;565:873–83.
- 65 McLellan TM, Ducharme MB, Canini F, et al. Effect of modafinil on core temperature during sustained wakefulness and exercise in a warm environment. *Aviat Space Environ Med* 2002;73:1079–88.
- 66 NCAA drug testing program. Available: <http://www.ncaa.org/sport-science-institute/ncaa-drug-testing-program> [Accessed 8 Aug 2018].
- 67 World anti-doping agency drug testing. Available: <https://www.wada-ama.org/> [Accessed 8 Aug 2018].
- 68 United States anti-doping agency website. Available: <https://www.usada.org/testing/> [Accessed 8 Aug 2018].