



CATS NEWSLETTER

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College Athletic Trainers' Society

IN THE SPOTLIGHT: BRAD PIKE

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BRAD PIKE

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The College Athletic Trainers Society has a new president! Brad Pike is stepping up to the plate and taking over from Scott Anderson, who served as president for over eight years. With over 30 years of experience in the sports medicine field, Brad is no stranger to the challenges facing college athletic trainers. He currently serves as the Executive Senior Associate Athletic Director for Health and Wellness for Cincinnati Athletics and worked at Syracuse University for over 20 years.

Brad got his start at Syracuse working as a graduate assistant under CATS Founder and board member Don Lowe. While he worked his way up the ranks, he was mentored by longtime Syracuse Head Team Physician Jim Tucker, another CATS board member. Brad recognizes both Don and Jim as lifelong mentors who helped shape his career and continue to inspire him today.

In his new role as CATS president, Brad is determined to advocate for athletic trainers and ensure their access to high-quality continuing education opportunities. He believes that communication is key and prioritizes collaboration and learning among peers.

He's also passionate about mentoring students and young professionals to help them develop the skills they need to succeed in today's workforce. Brad is deeply committed to the important issues of our day, including emergency preparedness, mental health, and fair compensation for athletic trainers. He wants to see CATS continue its support for emergency preparedness and AED education, and he is eager to create resources and education on proper negotiation of athletic trainer salaries.

But perhaps most importantly, Brad understands the importance of taking care of the caretakers. He's a firm believer in the value of mental health and encourages athletic trainers to prioritize their own well-being while protecting the well-being of their student-athletes. Brad pursues his own balance in life by taking time to enjoy hikes and practicing yoga and meditation.

With his deep passion for learning, commitment to pressing current issues, and ability to navigate the ever-changing landscape of collegiate athletics, Brad is the perfect fit to lead college athletic trainers into the future.

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NEWS AND NOTES

Fueling Greatness Education Grant

The Fueling Greatness Education Grant sponsored by Gatorade recognizes CATS members who have helped advance their institution's sports medicine programs and improved their student-athlete services. Presented each spring, this grant will help support the continuing education of three (3) CATS members who will be awarded \$1,000 to assist with their expenses in attending the upcoming CATS Spring Symposium. To find more information about this continuing education grant visit: <https://www.collegeathletictrainer.org/Grant>

Congratulations to our 2023 Recipients:

Glory Fung, Concordia University Irvine

James Lee, Towson University

University, Puget Sound Sports Medicine Staff

CATS Society Partner Sponsor Update

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SUDDEN CARDIAC ARREST AND THE COLLEGIATE ATHLETIC TRAINER

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The Damar Hamlin medical emergency that played out before our eyes on Monday Night Football on January 2, 2023, serves as an excellent reminder of the level of emergency preparedness that is prudent and necessary in athletics. As the situation unfolded and played itself out it was very apparent that there was a high-level emergency action plan in place that started with immediate recognition of the problem as Damar stood up after taking the hit from Tee Higgins while making the tackle and quickly falling back to the ground. He was assessed and a life-saving cardiac protocol was put into action including CPR and the use of the readily available AED. He was taken via ambulance to the University of Cincinnati Medical Center where he was stabilized and initial recovery took place over the next several weeks.

(Sudden) Cardiac Arrest vs. Heart Attack vs. Commotio Cordis

After the incident, there were many conversations that I had with players and coaches about what happened and how could a young, healthy athlete have a “heart attack” after what appeared to be a routine play. The terms “Sudden Cardiac Arrest” or “SCA” as well as “heart attack” seemed to be used interchangeably even when there are clear-cut differences. SCA, according to the American Heart Association, refers to an electrical malfunction of the heart that results in an arrhythmia. When the heart is engaged in arrhythmia, the cardiac tissue does not distinctly contract/relax thusly inhibiting the heart's pumping action. As a result, there is no circulation of blood to the brain and other vital organs. Left untreated the victim loses consciousness and ultimately dies within a few minutes. A heart attack on the other hand is a circulation issue and occurs when there is a blockage or blockages in the coronary arteries of the heart (primarily from coronary heart disease) resulting in decreased blood flow to the heart muscle. A heart attack can lead to and ultimately cause a cardiac arrest, however not all do. Anyone having a heart attack will have varying signs/symptoms over time such as chest pain, chest discomfort, pain into the left side of the body (primarily) neck and arm and/or

shortness of breath. “Commotio Cordis” refers to a Latin phrase meaning “agitation of the heart”. Simply put it is an arrhythmia of the heart produced by a blunt force trauma to the chest wall. Blunt force trauma in athletics is generally caused by a hard object such as a baseball, lacrosse ball, or hockey puck, or can be from a strike or blow from a punch (ie. martial arts). If the impact occurs while the heart is in the exact volatile phase of the heart rhythm (repolarization of the ventricles--specifically during the upstroke of the T-wave before its peak) the arrhythmia is immediate. Commotio Cordis is rare in sports with less than 30 reported cases/year with most cases involving males under 20 years of age. The impact to Damar from the hit to his chest was most likely the result of commotio cordis.

Regardless of SCA vs. heart attack vs. commotio cordis, one thing remains clear, having a well-thought-out emergency action plan (EAP) is paramount to the success of any cardiac event. Dr. Pete DeJung, MD, Primary Care Sports Medicine Physician at Providence & Services and team Physician for George Fox University says that a cardiac incident is one of the things that a physician on the sideline dreads. “It is imperative that an emergency action plan is in place and that it is not relatively complicated. It should boil down to a simple algorithm of early recognition and having the necessary emergency equipment in place to assess and (if necessary) be able to provide immediate defibrillation. Early recognition means having eyes on the field or court to watch for anything out of the norm such as a player falling to the ground in a manner that is abnormal. Not all cardiac emergencies happen at games...they can certainly happen at practices also and EMS (for rapid transport) is generally not on standby for practices and most games depending on the sport.” Football and rodeo are the only sports that require EMS stand-by for competitions to take place but not for practices. Planning is the key no matter what the cardiac issue might be a result of. Holding a “medical timeout” with the visiting team’s athletic trainer(s) as well as EMS on standby and the head game official is crucial for the handling of medical emergencies during competition.

The Damar Hamlin incident should serve as a reminder of the role that we have as Athletic Trainers in the development, practice, and execution of our emergency action plans for both life-threatening as well as non-life-threatening situations. Some of the key components (but not all parts) of an EAP include:

- Venue Specific. Are your facilities all on campus? Do you use any facilities that are off campus? Do you use any facilities that are shared facilities (for

example do you play/practice at a community-owned facility? Do you have a map/drawing of every facility with specific locations marked of key access points for EMS, AED location(s), locks/keys, noted and updated construction obstacles, etc.?

- Emergency Personnel involved and their roles/responsibilities. Any changes year to year? What is the role of EMS stand-by or if they are present?
- Emergency Communications. Game vs. Practice communications. Two Way radios, cell phones. How will you communicate with EMS standby during a game if needed? Debriefings after an event? Administrator involvement?
- Emergency Equipment. What types? When are they checked/maintained? Annually? Before every game? What emergency equipment with EMS stand-by use?

Each institution may have more specific information that they want to have in their respective EAPs for each venue. As we approach the end of the year it is a great idea to pencil into your to-do list a review of your EAPs and have those conversations with your team physician(s) and staff before the fall sports season begins.

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PUNITIVE PRACTICES: LESSONS LEARNED FROM CONCORDIA UNIVERSITY CHICAGO

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In January, six men's basketball players at Concordia University Chicago, a small NCAA Division III school in River Forest, Illinois, were hospitalized following a "high-intensity" practice held on New Year's Eve.¹ The head coach of the men's basketball team, Steve Kollar, was temporarily suspended by the University pending an investigation into allegations that the practice was held as a punishment for several men's basketball players breaking curfew on a recent road trip to California, during which the team also lost back-to-back games for just its (then) second and third losses of the season.² In the weeks that followed, the University determined that "the intensity of the practice contributed to the students' illness," but the University nevertheless reinstated Coach Kollar because it also determined that he did not "intend" to harm or haze the players.³ In response, four members of the University's athletic training staff resigned in protest.⁴ Just days after it reinstated him, the University then announced that Coach Kollar was no longer employed at Concordia, citing "significant new information [which] has recently come to light."⁵

Although high-intensity practices have historically been used to punish athletes for bad behavior and/or poor performance, there is no real dispute that "[e]xercise as punishment invariably abandons sound physiologic principles and elevates risk above any reasonable performance reward."⁶ In some sports, however, a culture still exists that suggests that being able to withstand physical punishment makes athletes "tough."

Unfortunately, the responsibility for managing the conflict between establishing this so-called toughness and protecting the health and safety of student-athletes often times falls to the athletic trainer. This Article offers recommendations for athletic trainers to protect both their student-athletes and their employment if they encounter issues similar to those that unfolded at Concordia.

In July 2019, the NCAA Board of Governors unanimously endorsed, as "Association-wide policy," the NCAA Sport Science Institute's *Interassociation Recommendations: Preventing Catastrophic Injury and Death in Collegiate Athletics*, which stemmed from the 2016 NCAA Safety in College Football Summit. Recommendation 3, Acclimatization and Conditioning, and Recommendation 5, Responsibilities of Athletics Personnel, recommend against the very situation which occurred at Concordia, i.e., the use of physical activity for punitive purposes. The NCAA did not adopt the *Interassociation Recommendations* as legislation, however, and it is therefore incumbent on NCAA member institutions to implement the *Interassociation Recommendations* and/or similar policies and procedures themselves.

Recommendation 3 states, in pertinent part, that "[a] minimum expectation is that all strength and conditioning sessions, regardless of when in the year they occur, should be evidence- or consensus-based; sport-specific; intentionally administered; appropriately monitored, regardless of the phase of training; and not punitive in nature."⁷ Recommendation 3 further states that "[a]ll training and conditioning sessions should be documented" and "reproducible upon request and be shared with the primary athletics health care providers (team physician and athletic trainer) before the session in which they are to be used."⁸

Recommendation 5 reiterates that "[p]hysical activity never should be used for punitive purposes," and states that "[a]ll training and conditioning sessions should

¹ *Concordia University basketball players hospitalized after 'high-intensity' workout*, CBS News Chicago (Jan. 6, 2023), <https://www.cbsnews.com/chicago/news/concordia-basketball-players-sick-after-workout/>.

² *Id.*

³ *Concordia basketball coach to keep job after being sidelined following hospitalization of 5 players*, CBS News Chicago (Jan. 12, 2023), <https://www.cbsnews.com/chicago/news/concordia-basketball-coach-return-hospitalizations/>.

⁴ *Staff members quit after Concordia coach keeps job over practice that put players in the hospital*, CBS News Chicago (Jan. 13, 2023), <https://www.cbsnews.com/chicago/news/concordia-staff-quit-basketball-coach/>.

⁵ *Concordia men's basketball coach out, weeks after players were hospitalized*, CBS News Chicago (Jan. 23, 2023), <https://www.cbsnews.com/chicago/news/concordia-mens-basketball-coach-out/>.

⁶ See NCAA Sport Science Institute™, *Interassociation Recommendations: Preventing Catastrophic Injury and Death in Collegiate Athletics*, July 2019, available at https://ncaa.org.s3.amazonaws.com/ssi/injury_prev/SSI_PreventingCatastrophicInjuryBooklet.pdf.

⁷ *Id.*

⁸ *Id.*

be administered by personnel with demonstrated competency in the safe and effective development and implementation of training and conditioning activities, and with the necessary training to respond to emergency situations arising from those activities.”⁹ Recommendation 5 further states that “[a]ll strength and conditioning professionals should have a reporting line into the sports medicine or sport performance lines of the institution.”¹⁰

It is not immediately clear if the *Interassociation Recommendations*, or similar policies and procedures, were in place at Concordia. If Coach Kollar had been required to follow Recommendation 3 and document his practices and training and conditioning sessions and share them with athletics health care providers in advance, the athletics health care providers could have recommended that Coach Kollar not move forward with the practice at all and/or that Coach Kollar limit the intensity of the practice. If the athletics health care providers had independent reporting lines outside of men’s basketball into the sports medicine or sports performance lines of Concordia in accordance with Recommendation 5, the athletics health care providers could have made that recommendation to the appropriate administrators and/or the athletics health care providers could have had the autonomy to step in to stop the practice.

In the absence of the *Interassociation Recommendations* or similar policies and procedures being implemented, it should not be assumed that an athletic trainer is protected simply because reporting dangerous conduct is the right thing to do so. In every state except Montana, there is a presumption (and generally, a *strong* presumption) that employees are employed “at will,” and can be terminated at any time, for any reason, or for no reason at all. Although there are public policy exceptions to the at-will employment doctrine, they are generally limited. This means that most athletic trainers at public and private colleges and universities can be terminated at any time, for any reason, or for no reason at all, including for reporting a punitive practice. For example, in *Krum v. Chicago National League Ball Club, Inc.*,¹¹ a former assistant

athletic trainer with the Chicago Cubs complained to management regarding perceived violations of the Illinois Athletic Trainers Practice Act, and alleged that he was wrongfully terminated in retaliation for doing so when the Chicago Cubs decided not to renew his one-year employment contract.¹² The Appellate Court of Illinois held, however, that there was no statutory basis to allow the former assistant athletic trainer to bring such a claim, even if it was true that the Cubs had retaliated against him for his complaints because the Illinois Athletic Trainers Practice Act did not specifically prohibit retaliatory employment conduct. Similarly, at Concordia, the athletic trainers were forced to resign their employment despite standing up for their student-athletes, and despite the fact that the University acknowledged that its student-athletes and athletic trainers were protected by anti-harassment and anti-retaliation policies.

In this respect, most colleges and universities do have some form of anti-harassment and anti-retaliation policies and procedures in place. However, it is recommended that athletic trainers proactively seek to implement policies and procedures like those stated in Recommendation 3 and Recommendation 5 to address issues like the one that occurred at Concordia, rather than relying on general policies and procedures to protect their student-athletes and their employment after the fact. Of course, there is no “one size fits all approach” to address issues like the one that occurred at Concordia, but it is incumbent on athletic trainers to (1) know and understand the policies and procedures at their institutions regarding reporting punitive practices and/or other dangerous and/or unsafe conditions, and, if not already in place, to insist upon instituting the *Interassociation Recommendations* and/or similar policies and procedures, and (2) ensure that such policies and procedures are being followed at all times. This includes insisting that a system be put into place to require all practices and training and conditioning sessions to be documented and shared with athletic trainers in advance, and insisting that athletic trainers have a reporting line outside of a coaching staff into the sports medicine or sports performance lines of an institution.

⁹ *Id.*

¹⁰ *Id.*

¹¹ 851 N.E.2d 621 (Ill. App. Ct. 2006).

¹² *Id.* at 625.

ALLY TRAINING: OPEN DOORS AND OPEN CONVERSATIONS IN THE ATR

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As collegiate athletic trainers, we know that our athletic training rooms are often a uniquely safe space on campus for our student-athletes. The athletic training room is more than “just where they get ready for games and practice,” it’s a place where conversations are had between teammates, athletic trainers, staff and physicians. It is more than a rehabilitation space, it’s where trust is built between people who spend a significant amount of time together. The athletic training room is meant to be more than just efficient, it’s meant to be welcoming, warm and open; a place for respect, healing and well-being, physically, mentally and emotionally.

In our role as athletic trainers, it is important that we serve all members of our community, making sure all feel cared for in our athletic training rooms. The NATA Cultural Competence Statement describes: “Patient values are individual characteristics such as gender, race and ethnicity, sexual orientation, religion and socioeconomic status that can influence health and well-being. As healthcare providers, it’s important for athletic trainers to consider patient values during their clinical decision-making process. Culturally competent health care providers understand how these values influence outcomes and can positively or negatively impact the patient’s experience.” As we continue to learn and grow in how we support the physical, mental and emotional needs of our populations, the specific needs of the LGBTQIA+ community can require additional education and support. From learning appropriate vocabulary and inclusive terms to becoming informed about campus, local and national resources, there are many ways to be a better ally. Furthering our education, becoming a safe space for our peers and student-athletes, recognizing our biases and backgrounds and advocating for the LGBTQIA+ community allows us to be better athletic trainers for all those we serve.

Programs like the NATA Safe Space Ally Training, the Safe Zone Project, and Safe Space Training are allowing us to become more educated than ever in how to understand and serve the LGBTQIA+ members of our population.

- The goal of the NATA Safe Space Ally Training is “for athletic trainers to be culturally competent and inclusive to the LGBTQIA+ community while providing exceptional health care. There can be a bias toward the LGBTQIA+ community, whether conscious or unconscious, that creates a hostile or unsafe environment for patients in the LGBTQIA+ community.”¹ The NATA course is specifically designed for athletic trainers, with information and material updated regularly to reflect current trends and best practices. The course is available on the NATA website and provides 2.25 CEUs.
- The Safe Zone Project is coordinated by the Hues Global Justice Collective and offers “opportunities on college campuses for students, staff, faculty, and community members to learn a little more about how sexuality and gender influence our everyday experiences.”² With a wide variety of resources available at no cost online, there is material regularly being released and designed for everyone to study, with any background or knowledge base. The material is broken down into digestible trainings, that can be done with groups of staff and student-athletes combined, often presented on college campuses by mental health professionals, student affairs, residence life, human resources, athletics and academic centers.
- Safe Space Training, developed by Salisbury University in the early 1990s, has been providing training on campuses, in government and in private companies for decades. “Our goal is to facilitate a productive conversation. We hope that thoughtful conversation and interactive activities will bring light to the challenges faced by the LGBT+ community. And with this knowledge, we hope participants will actively try to create Safe Spaces within their work and personal lives.”³



We as athletic trainers can become allies and our athletic training rooms can become safe spaces. Utilizing the available resources, athletic trainers and collegiate sports medicine teams can learn and grow together to best serve our student-athletes and community. Talking to each other, to our teams and opening the doors for important conversations can create an environment where all are welcomed, fostered, and able to succeed.

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A PRACTITIONER'S GUIDE TO IMPROVING SLEEP IN ATHLETES

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Key Points

- Athletes are at a higher risk for sleep problems due to lifestyle and sports-related factors, and frequently suffer from sleep-related complaints.
- There are sleep strategies for practitioners and coaches to emphasize that can help improve athletes' sleep and performance.
- Recurring sleep education and screening for sleep disorders in athletes can highlight the importance of sleep and identify athletes in need of referral to a sleep specialist.
- Increasing sleep opportunities by napping and banking sleep, when possible, can help ensure that athletes are getting the sleep they need.
- Preparing the environment, body, and mind for sleep by promoting good sleep practices can help reduce sleep complaints and improve overall sleep.

Introduction

Sleep is an important physiological process that allows an athlete to recover from the mental and physical demands of the sport. It is an often-overlooked aspect of athlete health that can have a huge impact on athletic performance. For example, in male basketball players that extended their sleep from 6.7 to 8.5 h of sleep per night, athletic performance was improved for free throws (11%), three-point shots (14%), sprint times (4%), and reaction time (12%) (Mah et al., 2011). Other potential reasons why sleep is important for an athlete are related to improvements in physical health with a reduction in stress hormones (Swinbourne et al., 2018), increases in testosterone with sleep extension (Leprout & Van Cauter, 2011), and decreased risk for injury (Grier et al., 2020), and illness (Prather et al., 2015).

Yet there are challenges with sleep in athletes and they appear to be widespread making sleep improvement strategies especially important. When compared to control participants, athletes took longer to fall asleep, spent more time awake during the sleep period with less overall sleep, had greater use of sleep medication, and had greater sleep fragmentation (Bender et al., 2018; Leeder et al., 2012). Reasons for greater sleep challenges are related to both non-sport factors such as social demands, work/study commitments, attitudes & beliefs, lifestyle choices, individual characteristics, and family commitments; and sport factors such as high training loads, unfamiliar sleep environment, early morning training, night competitions, night before competition anxiety, and long-haul travel (Walsh et al., 2020).

Not only is the increased risk for sleep disturbance high in athletes, but practitioners can also have difficulties applying sleep strategies to their athletes for multiple reasons as sleep myths seem to be pervasive (Robbins et al., 2019), there is a lack of sleep education among athletes (Miles et al., 2019), and inadequate beliefs and attitudes about sleep abound (Miles et al., 2019). While there are many challenges to overcome, this Sports Science Exchange (SSE) article examines strategies that can be implemented for athletes to improve sleep health and performance.

Research review into sleep strategies

There has been a surge in research related to sleep in athletes with 82% of papers on the topic published since 2011 (Lastella et al., 2019). Yet, it is challenging for busy practitioners to ascertain what information is worth implementing. Walsh et al. (2020) provided a narrative review and consensus recommendations, complete with a toolbox, to help practitioners implement sleep strategies in athletes. Here we

highlight some of those strategies along with other important strategies to consider.

Educate athletes frequently about the importance of sleep

In a sample of 86 coaches and practitioners, Miles et al. (2019) found only 43% of the sample had promoted sleep hygiene with their athletes in their current job position, with one of the main barriers being lack of sleep knowledge. Sleep education programs can result in positive changes in sleep behaviors including more consistent sleep schedules, greater sleep efficiency, and shorter sleep latency (Driller et al., 2019). However, a one-time sleep education session is likely not enough to maintain long-term positive change in sleep habits so more emphasis throughout the season is needed (Caia et al., 2018).

Regarding the content of the sleep education information, a good place to start is how better sleep could result in better performance for the athlete to help create buy-in from the athletes. According to Walsh et al. (2020), content can focus on quantity, quality, and timing of sleep.

Sleep Quality

Athletes are more at-risk for sleep disturbances so having strategies to help mitigate the disturbances is critical for better sleep quality. Strategies related to reducing evening light exposure, having a good pre-sleep routine, a cave-like environment, and drinking caffeine strategically can all help improve sleep quality for athletes. See the following section for more detail on Good Sleep Behavior Practices to incorporate into education sessions.

Sleep Timing

Chronotype is the biological preference for being an evening type or a morning type and is related to the timing of melatonin secretion which changes across the lifespan. In general, evening types are more common in adolescents and peak in late teens to early twenties (Roenneberg et al., 2004). Although previous research has shown that athletes are more likely to be morning types, those who are night owls struggle more with their sleep (Bender et al., 2018a). There are also advantages to training according to chronotype. For example, evening types who compete or train in the morning often feel sleepier, are less vigilant, and have worse cognitive performance and grip strength (Facer-Childs et al., 2018).

Screen Athletes for Significant Sleep Problems

Although sleep optimization through sleep hygiene tips can improve some common sleep complaints, having an undiagnosed sleep disorder can prevent an athlete from getting the recovery sleep they need to perform at the highest level. It is not the role of the practitioner to diagnose an athlete with a sleep disorder, but rather to help identify when athletes need to be referred to a specialist.

There are several ways to screen athletes for sleep problems including polysomnography (a sleep study to diagnose sleep disorders), clinical sleep interviews, wearable technology, and sleep questionnaires. It would be nice if every athlete could get an official gold-standard sleep study using polysomnography, but that can be time-consuming, economically prohibitive, and unnecessary. Questionnaires can provide a way to capture a wide range of sleep problems in a standardized way. The Pittsburgh Sleep Quality Index is often used in the general population to identify concerns with sleep quality but has not been validated in athletes to identify clinically significant sleep disturbances. The Athlete Sleep Screening Questionnaire (ASSQ) was developed to help identify athletes who need intervention from a sleep specialist (Bender et al., 2018b). The ASSQ categorizes athletes' sleep difficulty into none, mild, moderate, or severe sleep difficulty with moderate and severe needing help from a sleep specialist. Additionally, it includes recommendations based on responses to items, such as travel, risk of sleep apnea, and having an evening chronotype. Using this questionnaire, approximately 25% of elite athletes are identified as requiring intervention (Bender et al., 2018b). Athletes can access the ASSQ on the Centre for Sleep and Human Performance website (<https://centreforsleep.com/education-and-awareness/athlete-sleep-screening-questionnaire/>). It is recommended that sleep screening is done during the non-competitive season when there is time to address the sleep problem without drastic changes during the competitive season.

Implement Nap Opportunities

Daytime naps can be beneficial for supplementing insufficient sleep or extending sleep. There is a range in the frequency of napping reported across studies, with 17 – 72% of athletes reporting habitual napping (Lastella et al., 2021; Stephenson et al., 2022; Venter et al., 2010). Napping after poor sleep has been associated with improved vigilance, reasoning, alertness, and reduced reaction time (Milner & Cote,

2009). Improvements in reaction time have been found in several different types of athletes when napping on competition days, including karate athletes (Daaloul et al., 2019), and judokas (Romdhani et al., 2021). Beyond cognitive performance, napping also carries benefits for mental health and for physical recovery and performance (Lastella et al., 2021). Across studies, athletes have shown improvements in jump velocity (O'Donnell et al., 2018), physical power and sprinting (Romdhani et al., 2021), and generally better performance ratings by coaches (O'Donnell et al., 2018).

As many athletes may struggle to get a good night of sleep before a big competition or need to wake up early for travel or training, a nap offers the opportunity to recover some of the benefits of lost sleep. However, it is important to consider both the timing and duration of naps. Late naps, such as those in the “forbidden zone” from 7-9 PM are more likely to have impacts on subsequent sleep, while naps taken in the afternoon might produce greater benefits (Lastella et al. 2021; Milner & Cote, 2009). As naps can impact how long it takes to fall asleep that night (Petit et al., 2018), it is important to consider the duration of the nap, and athletes who suffer symptoms of insomnia may not have the same benefits from napping if it exacerbates their insomnia. Generally, naps of less than 30 min are less likely to be associated with sleep inertia, or grogginess experienced after awakening (Milner & Cote, 2009). Overall, naps should be limited to between 20-90 min to maximize the benefits but reduce negative impacts of the nap on sleep that night (Lastella et al., 2021). It is also important to allow at least 30 min for athletes to recover from sleep inertia if they take a longer nap (Lastella et al., 2021). To help with falling asleep for a nap, athletes should apply rules of sleep hygiene to prepare themselves for sleep.

Bank Sleep for Better Performance

The term “banking” sleep means to get extra sleep in advance of an important event or sleep deprivation period to have sleep “in the bank” to help improve performance. In the general population, getting more sleep than usual leading into a sleep deprivation period was shown to improve reaction time versus the participants that got a normal amount of sleep but did not perform as well (Rupp et al., 2009). This research has been replicated in athletes from various sports and disciplines. In military tactical athletes after four sleep extension nights, there were improvements in reaction time, standing jump distance, and motivation (Ritland et al., 2019). In tennis athletes after one week of nine hours of sleep a day, there was increased serving accuracy by 6% (Schwartz & Simon, 2015).

In endurance cyclists after 3 days of 1.5 h extra sleep per night, there was a 3% improvement in time trial performance (Roberts et al., 2019). By understanding this strategy, it can help athletes prioritize sleep and also ease anxiety when an athlete is concerned about pre-competition sleep.

Good Sleep Behavior Practices (Preparing the Mind, Body, and Environment for Sleep)

Reduce Evening Light Exposure

Exposure to evening light can delay the onset of melatonin secretion (Knufinke et al., 2019), particularly if bright or blue light. This exposure can increase evening alertness (van der Lely et al., 2015) and ultimately sleep latency (Knufinke et al., 2019). When evening light is unavoidable, athletes can use blue-light-blocking amber glasses to reduce the impact on their nighttime sleep. These glasses have been shown to prevent the suppression of melatonin and have benefits for subsequent sleep quality (Van der Lely et al., 2015). There is also an option to download applications on phones that will reduce the blue light emitted in the evening hours (Chiu & Liu, 2020; Gringras et al., 2015). Getting natural light earlier in the day can also help reduce the impact of evening light on subsequent melatonin secretion and sleep (Hébert et al., 2002).

Pre-Sleep Routine

It is important to implement a bedtime routine that promotes relaxation and prepares the athlete mentally in the last hour before sleep. For instance, engagement with smartphones affects sleep not only due to the light emitted but also due to stimulating content from social media (Tandon et al., 2020; Van der Schuur et al., 2019). Using electronic devices just before bed coupled with difficulty falling asleep is often reported in athletes (Jones et al., 2019). To wind down before bed, it is better to read a paper book (Finucane et al., 2021). To help with racing thoughts before bed, to-do lists (Scullin et al., 2018) and the cognitive shuffle (Beaudoin, 2014) can assist with preparation for sleep. An example of the cognitive shuffle includes thinking of a word, and all the objects one can think of that start with each letter of that word. These activities can assist with the mental preparation for sleep by reducing worry and providing cognitively engaging activities to occupy the mind.

To physically prepare for sleep, a warm bath or shower before bed can help decrease body temperature as blood flow increases in the extremities (Haghighayegh, et al., 2019). A reduction in body temperature

can improve the quality, efficiency, and latency of subsequent sleep. Temperature decreases are also a natural signal to the body that it is time for sleep and cooling off after a bath can mimic this effect (Yetish et al., 2015). Stretching and deep breathing are also good ways to prepare the body physically for a good night of sleep (D'Aurea et al., 2014, Jerath et al., 2019). Deep breathing can also promote relaxation and reduce feelings of anxiety (Pandekar & Thangavelu, 2019).

Sleep Environment

Our ancestors evolved to sleep in cave environments, and to best promote sleep, keeping the environment as cool, dark, and quiet as possible is beneficial. As already mentioned, temperature is a key cue that it is time to sleep. For both individuals with sleep apnea and those with insomnia symptoms, temperatures between 16 and 20°C have benefits for sleep duration, efficiency, and sleeping pill usage (Min et al., 2021; Valham et al., 2012). Also as previously mentioned, minimal exposure to bright light is best for sleep and melatonin secretion. The lights in half of homes are bright enough to impact melatonin release (Cain et al., 2020), and many neighbourhoods also have high amounts of artificial light which can lead to shortened and poor sleep (Gabinet & Portnov, 2021). If external light is coming in the window, blackout curtains may be effective. Even within the bedroom, low light exposure from uncovered light sources, such as a lamp, can reduce slow waves during sleep, and increase arousal (Cho et al., 2013). Covering light sources and turning off lights in the room can help reduce this risk. Finally, minimizing noise in the environment is important for a good night of sleep. Areas with high amounts of environmental noise can lead to late bedtimes and poor sleep quality (Rudolph et al., 2019). Earplugs or white noise are simple and effective ways to reduce external noise and lead to better subjective sleep quality, lower wake time during the night, and shorter sleep latency (Jones & Dawson, 2012; Ebben et al., 2021).

Strategic Use of Caffeine and Supplements

As an ingredient of many pre-workout supplements, caffeine is often consumed by athletes (Miller et al., 2014). Caffeine can lead to performance benefits, but it can also affect sleep by increasing sleep latency and reducing sleep efficiency and duration (Miller et al., 2014). After an adrenaline and caffeine-fueled game, 20% of rugby players reported pulling an all-nighter (Dunican et al., 2018). A night with no sleep will only reduce performance the following days and highlights a downside to caffeine intake for athletes. Performance benefits due to caffeine could at times be countered

by performance deficits due to poor sleep. However, there are other easily accessible supplements that have shown benefits for sleep. Tart cherry juice can impact melatonin secretion, increase sleep efficiency, and total sleep time (Howatson et al., 2012; Lusso et al., 2018). For best effects, it can be taken twice daily, in the morning and evening. Additionally, magnesium can also be taken to benefit symptoms of insomnia, particularly in those who have a deficiency in magnesium, although this work was done with older adults (Abassi et al., 2012; Mah & Pitre, 2021).

Practical Applications & Summary

Athletes seem to be more at risk for sleep disturbances and are uniquely impacted by poor sleep. Fortunately, there are strategies that can be implemented to improve sleep in athletes. In this SSE article we focused on 5 different strategies (Figure 1):

- 1. Frequently educate athletes about the importance of sleep:** It is important for athletes to get good sleep education information because of the prevalent myths that exist. Understanding the true basics of sleep such as quantity, quality, timing, and ways to prepare for sleep are key. One sleep education session may not be enough, as research has shown beneficial changes in sleep after one sleep session, but the effect was not maintained long-term. Frequent check-ins with your athletes on sleep and reinforcing how good sleep benefits performance should help facilitate positive sleep behaviour change that can be maintained.
- 2. Screen athletes for significant sleep problems:** Prior research has found that clinically relevant sleep disturbances can occur in ~25% of athletes. This means that if you are not sleep screening your athletes there may be little progress with a significant group of athletes. It is important to use questionnaires validated in athletes (e.g., Athlete Sleep Screening Questionnaire) to accurately identify the athletes that need help. Since interventions for sleep disorders may require further sleep testing and treatment, the sleep screening should take place during a time that is least disruptive to the athlete such as during the pre- and post-season.
- 3. Encourage napping in athletes by providing opportunities:** Napping can help athletes recover from poor sleep and provide gameday benefits. Naps between 20 and 90 min taken in the afternoon are beneficial but minimize negative impacts on sleep that night. Naps greater than

30 min may also cause sleep inertia and make the athlete groggy, and at least 30 min may be needed to recover.

4. Bank sleep for better performance: Getting more sleep than usual has been shown to improve reaction time, sprint times, and even sport-specific skills. Aside from these performance benefits, it can also reduce anxiety the night before a competition if an athlete doesn't sleep as well as normal because they have sleep in the "bank". It doesn't have to be for multiple weeks or months in advance either. The amount of time banked has varied in the literature, with some studies showing benefits of weeks versus other studies showing benefits from just one day.

5. Prepare for sleep: The environment, the mind, and the body

- Reduce evening light exposure: Exposure to bright light can suppress melatonin secretion and make it more difficult to fall asleep. To avoid the impact of bright light on sleep, athletes can wear blue-light-blocking amber glasses, and use light-reducing smartphone applications. Getting more light earlier in the day can also counter bright light in the evening.
- Implement a good pre-sleep routine about an hour before bedtime: To help prepare the mind for sleep, put away electronic devices and pick up a paper book. To help fall asleep, try writing a to-do list and implementing the cognitive shuffle. To prepare the body for sleep

and improve sleep quality, try stretching and a warm bath or shower.

- Keep the sleep environment cave-like: To keep the bedroom like a cave, reduce bedroom and window sources of light by turning off or covering light sources and using blackout curtains. Reduce noise, wear earplugs, or listen to white noise to make the bedroom as quiet as possible. Finally, keep the bedroom cool, ideally between 16 and 20°C.
- Be strategic about using caffeine and supplements: While caffeine can offer some performance benefits, its impact on sleep might counteract some of those benefits. It is important to be strategic about the use of caffeine and timing in relation to sleep to reap the maximum benefits. Alternative supplements to improve sleep quality include tart cherry juice and possibly magnesium.

We have highlighted these important tips to keep in mind when working with athletes and their sleep. This is not an exhaustive list and the following are additional resources (Byrne & Byrne, 2020; Creado, 2020; Lastella et al., 2021; Walsh et al., 2020; <https://centreforsleep.com/education-and-awareness/athlete-sleep-screening-questionnaire/>). Taken together, these strategies can help athletes become well-rested and ready to play.

The views expressed are those of the authors and do not necessarily reflect the position or policy of PepsiCo, Inc.



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IMPORTANCE
OF SLEEP



SCREEN ATHLETES
FOR SIGNIFICANT
SLEEP PROBLEMS



ENCOURAGE
NAPPING IN
ATHLETES BY
PROVIDING
OPPORTUNITIES



BANK SLEEP
FOR BETTER
PERFORMANCE



PREPARE FOR SLEEP:
THE ENVIRONMENT,
THE MIND,
& THE BODY

Figure 1. Top Five Practical Recommendations to Improve Sleep in Athletes

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