

The Role of Sleep on Sports Performance and Recovery

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Accreditation Statement

This activity has been planned and implemented in accordance with the accreditation requirements and policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint providership of The American Academy of Sleep Medicine and the Michigan Academy of Sleep Medicine. The American Academy of Sleep Medicine is accredited by the ACCME to provide continuing medical education for physicians.

Conflict of Interest Disclosures

Mike Popovich, MD has no relevant financial relationships with ineligible companies to disclose.

Learning Objectives

Upon completion of this course, attendees should be able to...

- Recognize sleep issues affecting athletes
- Understand the effects of sleep on sports performance, injury, and recovery
- Utilize management strategies for sleep in athletes

Applicability

- All levels of sport

- *Student athletes

 - High School

 - College

- *Elite athletes

 - Professional sports

 - Olympics

Sleep Issues Affecting Athletes

Sleep Issues Affecting Athletes

-Sleep deprivation

Sleep Issues Affecting Athletes

-Sleep deprivation

*39.1% of collegiate athletes self-reported <7 hours of sleep per weeknight.

Mah CD, Kezirian EJ, Marcello BM, Dement WC. Poor sleep quality and insufficient sleep of a collegiate student-athlete population. *Sleep Health*. 2018;60:251-257.

Sleep Issues Affecting Athletes

-Sleep deprivation

*Multiple studies have shown athletes average less sleep than non-athletes (average also <7 hours).

Leeder J, Glaister M, Pizzoferro K, et al. Sleep duration and quality in elite athletes measured using wristwatch actigraphy. *J Sports Sci.* 2012;30(6):541-545.

Lastella M, Roach GD, Halson SL, Sargent C. Sleep/wake behaviours of elite athletes from individual and team sports. *Eur J Sport Sci.* 2015;15(2):94-100.

Sargent C, Lastella M, Halson SL, Roach GD. The impact of training schedules on the sleep and fatigue of elite athletes. *Chronobiol Int.* 2014;31(10):1160-1168.

Sleep Issues Affecting Athletes

-Sleep deprivation

*Barriers to sufficient sleep include:

-Frequency/timing of games/practices

-Academics

-Travel

Sleep Issues Affecting Athletes

-Early morning training

*Significant reduction in sleep hours on nights before training mornings (6:08) compared to nights before non-training mornings (8:15)

Merfeld B, Mancosky A, Luedke J, et al. The impact of early morning training sessions on total sleep time in collegiate athletes. *Int J Exerc Sci.* 2022;15(6):423-433.

Sleep Issues Affecting Athletes

-Insomnia

Sleep Issues Affecting Athletes

-Insomnia

*64% of elite athletes reported worse sleep the night before competition

-related to thoughts about competition and nervousness

Sleep Issues Affecting Athletes

-Insomnia

*Tense mood associated with increased number of awakenings.

Sleep Issues Affecting Athletes

-Jet lag/Circadian rhythm disorders

Sleep Issues Affecting Athletes

-Jet lag/Circadian rhythm disorders

*Frequent travel, time zone changes

Sleep Issues Affecting Athletes

-Jet lag/Circadian rhythm disorders

*Best athletic performance typically in early evening

*Morning vs evening types

Sleep Issues Affecting Athletes

-Obstructive sleep apnea



Sleep Issues Affecting Athletes

-Obstructive sleep apnea

*High prevalence of OSA in retired NFL players, and SDB in active NFL players

Rogers AJ, Xia K, Soe K, et al. Obstructive sleep apnea among players in the national football league: a scoping review. *J Sleep Disord Ther.* 2017;6(5):278. doi:10.4172/2167-0277.1000278

Sports Performance

Sports Performance

-Detrimental effects of poor sleep on

- *Reaction time

- *Coordination

- *Attention

- *Decision-making

- *Memory

- *Mood

Sports Performance

*Higher physiologic demand for physical performance

Mougin F, Simon-Rigaud ML, Davenne D, et al. Effects of sleep disturbances on subsequent physical performance. *Eur J Appl Physiol.* 1991;63:77-82

Sports Performance

*Reduction in endurance, and perception of increased effort

-Decreased treadmill distance but similar perceived exertion after 30 hour sleep deprivation

Sports Performance

*Slower sprint times and decreased voluntary force/activation after 30 hours of sleep deprivation in male team sport athletes.

Skein M, Duffield R, Edge J, et al. Intermittent-sprint performance and muscle glycogen after 30 h of sleep deprivation. *Med Sci Sports Exerc.* 2011;43(7):1301-11.

Sports Performance

*Reduction in serving accuracy in semi-pro tennis players on restricted vs normal sleep

-Caffeine did not improve performance

-Effects related to judgment and accuracy

Sports Injury Recovery

Sports Injury Recovery

*Decreased cortisol demonstrated during recovery period from exercise after reduced sleep

Mougin F, Bourdin H, Simon-Rigaud ML, et al. Hormonal responses to exercise after partial sleep deprivation and after a hypnotic drug-induced sleep. *J Sports Sci.* 2001;19(2):89-97.

Sports Injury Recovery

*Sleep deprivation associated with markers of physical and cognitive recovery following competition

Skein M, Duffield R, Minett GM, et al. The effect of overnight sleep deprivation after competitive rugby league matches on postmatch physiological and perceptual recovery. *Int J Sports Physiol Perform*. 2013;8:556-564.

Sports Injury Risk

Sports Injury Risk

-Insufficient sleep associated with increased risk of injury

*Greater odds of injury in elite adolescent athletes sleeping less than eight hours on weekdays

Von Rosen P, Frohm A, Kottorp A, et al. Too little sleep and an unhealthy diet could increase the risk of sustaining a new injury in adolescent elite athletes. *Scand J Med Sci Sports*. 2017;27:1364-1371

Sports Injury Risk

-Insufficient sleep associated with increased risk of injury

*Decreased sleep amount combined with increased training load/intensity

Von Rosen P, Frohm A, Kottorp A, et al. Multiple factors explain injury risk in adolescent elite athletes: applying a biopsychosocial perspective. *Scand J Med Sci Sports*. 2017;27(12):2059-2069.

Sports Injury Risk

-Insufficient sleep associated with increased risk of concussion

Raikes AC, Athey A, Alfonso-Miller P, et al. Insomnia and daytime sleepiness: risk factors for sports-related concussion. *Sleep Med.* 2019;58:66-74.

Concussion

Concussion

-Symptoms:

- *Fatigue or low energy
- *Drowsiness
- *Trouble falling asleep

- *Feeling slowed down
- *Feeling like “in a fog”
- *“Don’t feel right”

Concussion

-Recovery:

*Sleep-related symptoms of any severity associated with increased risk of persistent symptoms at initial clinic visit.

Concussion

-Recovery:

*Post-concussion sleep disturbance associated with 3- to 4-fold increase in recovery time.

Bramley H, Henson A, Lewis MM, et al. Sleep disturbance following concussion is a risk factor for a prolonged recovery. *Clin Pediatr (Phila)*. 2017;56(14):1280-1285.

Concussion

-Recovery:

*Shorter/less efficient sleep and subjectively poorer sleep quality associated with longer recovery.

Hoffman NL, O'Connor PJ, Schmidt MD, et al. Relationships between post-concussion sleep and symptom recovery: a preliminary study. *J Neurotrauma*. 2020;37:1029-1036.

Concussion

-Prevention:

*Insomnia and daytime sleepiness associated with increased risk of sport-related concussion.

Management

Management

-Education

Management

-Education

*NCAA Task Force:

For athletes/coaches:

- information on best sleep practices
- information about the role of sleep in optimizing athletic and academic performance and overall well-being
- strategies for addressing sleep barriers/to help optimize collegiate athlete sleep

Kroshus E, Wagner J, Wyrick D, et al. Wake up call for collegiate athlete sleep: narrative review and consensus recommendations from the NCAA Interassociation Task Force on Sleep and Wellness. *Br J Sports Med.* 2019;53:731-736.

Management

- Screening for sleep disorders

Management

-Screening for sleep disorders

*Athlete Sleep Screening Questionnaire (ASSQ)

-Sleep quantity, sleep quality, insomnia, chronotype, sleep disordered breathing, travel disturbance

Bender AM, Lawson, Werthner P, Samuels CH. The clinical validation of the athlete sleep screening questionnaire: an instrument to identify athletes that need further sleep assessment. *Sports Med. - Open.* 2018;4(1):23.

Management

-Screening for sleep disorders

*Athlete Sleep Behavior Questionnaire (ASBQ)

-Addition of sleep behavior practices

Diller MW, Mah CD, Halson SL. Development of the athlete sleep behavior questionnaire: a tool for identifying maladaptive sleep practices in elite athletes. *Sleep Sci.* 2018;11(1):37-44.

Management

-Planning

- *Timing of meetings/training/practice
- *Travel planning to minimize jet lag
- *Melatonin

Management

-Sleep extension

*Making up “sleep debt”

Management

*Sleep extension associated with sports performance improvements in college basketball players:

- faster timed sprint

- improved shooting accuracy

- improved ratings of physical/mental well-being in practices/games

Management

*Compared to various other interventions, sleep extension/naps most effective for improving sleep and performance.

Cunha LA, Costa JA, Marques EA, et al. The impact of sleep interventions on athletic performance: A systemic review. *Sports Med - Open*. 2023;9(1):58.

Management

-Careful use of medications/supplements

*Considerations include both safety/performance from side effects, and banned substances

Management

-Notable medication side effects of hypnotics:

- *Drowsiness

- *Fatigue

- *Cognitive

- *Cardiovascular

Management

-World Anti-Doping Agency prohibited list

*In-competition: stimulants, cannabinoids

Management

-NCAA banned drug list

*Stimulants (including high amounts of caffeine)

*Cannabinoids

Business Interests

- Professional sports

Business Interests

The screenshot shows the ESPN website interface. The main article is titled "Sleep tracking brings new info to athletes" by Zach McCann, dated June 1, 2012. The article discusses how athletes like Roger Federer and LeBron James sleep more than the average American, and how sleep tracking technology is being used to monitor performance. A photo of Andrew Ference is included, with a caption stating he feels healthier since tracking his sleep. A quote from Ference is also present: "I always knew some days I'd feel great and some days I wouldn't, but I wouldn't really know why," says Boston Bruins defenseman Andrew Ference, who now uses the Zeo personal sleep coach every night. "This has really confirmed how I felt some days, as some days I'll have great sleep scores and some days I won't."

LIVE Transfer Talk: Chelsea mull Neymar deal amid PSG drama
1m - ESPN

Fantasy baseball pitcher rankings, lineup advice for Tuesday's MLB games
7m - ESPN Fantasy

Fantasy women's basketball tips and WNBA betting picks for Tuesday
7m - Eric Moody and Liz Loza

Beterbiev-Smith title bout rebooked for Jan. 13
14m - Mike Coppinger

Premier League 2023-24 preview: One key stat, one troubling trend for all 20 teams
ESPN+ 22m - Ryan O'Hanlon and Bill Connelly

Coco Gauff's title, Casper Ruud's first pitch and more from the week in tennis
22m - D'Arcy Maine

Basketball Hall of Fame: Class of 2023 news, schedule and more
24m

Fantasy baseball: Why are you ignoring Chicago's closer?
ESPN+ 26m - Eric Karabell


Five takeaways from Team USA's exhibition vs. Puerto Rico
33m - Tim Bontemps

Sleep tracking brings new info to athletes

Zach McCann
Jun 1, 2012, 04:40 PM ET

No line of work requires more sleep than "professional athlete."

Roger Federer and LeBron James have said they sleep an average of 12 hours per day, compared to about 7 hours for the average American. Usain Bolt, Venus Williams, Maria Sharapova and Steve Nash sleep up to 10 hours per day. Most NBA players take naps every game day, sometimes for as long as 3 hours.



Andrew Ference feels healthier and more alert since he began tracking his sleep quality.
Joel Auerbach/Getty Images

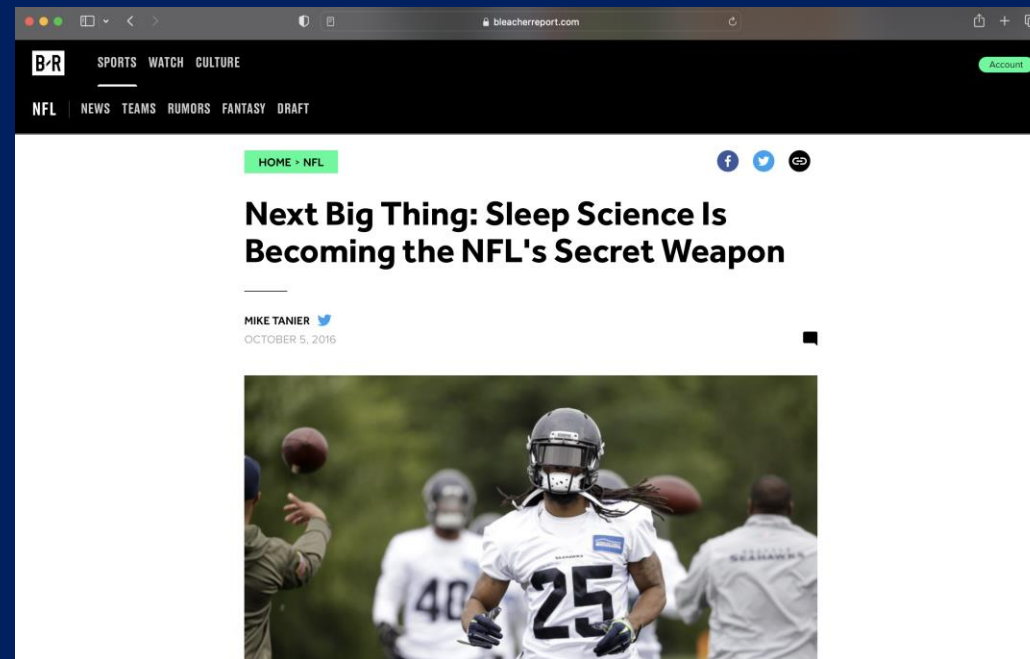
Sleep is important, equally as important as exercise and nutrition to athletes earning their living off their body's performance.

That's why many athletes are now using sleep-tracking technologies to monitor their sleep – not only *how much* sleep they're getting, but *how good* that sleep is.

"I always knew some days I'd feel great and some days I wouldn't, but I wouldn't really know why," says Boston Bruins defenseman Andrew Ference, who now uses the Zeo personal sleep coach every night. "This has really confirmed how I felt some days, as some days I'll have great sleep scores and some days I won't."

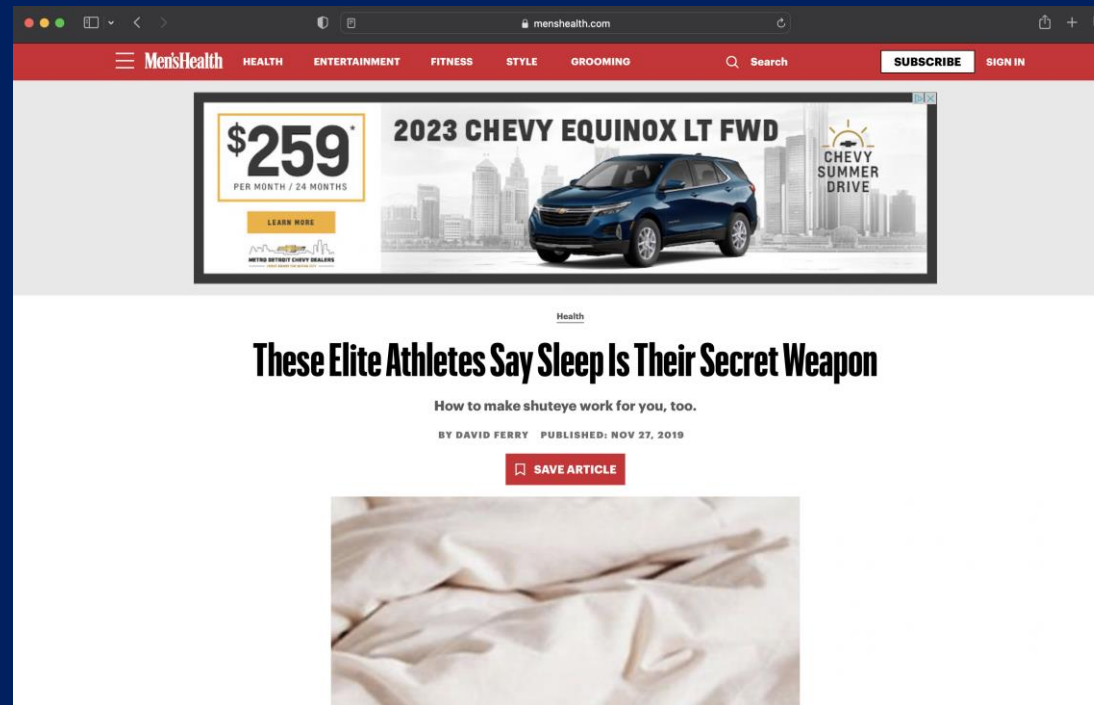
ESPN, 2012. Available: https://www.espn.com/blog/playbook/tech/post/_/id/797/sleep-tracking-brings-new-info-to-athletes

Business Interests



Bleacher Report, 2016. Available: <https://bleacherreport.com/articles/2650188-next-big-thing-sleep-science-is-becoming-the-nfls-secret-weapon>

Business Interests



Men's Health, 2019. Available: <https://www.menshealth.com/health/a29996698/elite-athletes-sleep-coaches-performance/>

Business Interests



Japan Forward, 2023. Available: <https://japan-forward.com/shohei-ohtani-how-dedication-to-quality-sleep-drives-success/>

Questions?

Thank You!

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