

Sleep, Recovery, and Performance in Sports

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KEYWORDS

- Sleep deprivation • Sleep apnea • Insomnia • Jet lag • Circadian rhythm disorder
- Recovery • Hypersomnia • Concussion

KEY POINTS

- Poor duration, quality, and timing of sleep can lead to poor performance, slower recovery, and higher risk of injury in athletes.
- Although the exact prevalence is unknown, athletes commonly suffer from many sleep disorders, such as insomnia, insufficient sleep, jet lag, and obstructive sleep apnea.
- Improving sleep in athletes has been shown in some studies to improve performance on the field.
- Sleep symptoms are commonly seen after concussion and should be managed appropriately, as poor sleep can exacerbate or prolong any concussion symptoms.

Over the past several years, an increasing number of athletes and their medical teams have come to recognize the importance of adequate sleep duration and quality on athletic performance and recovery. Many professional sports teams have consulted sleep specialists to help their athletes who suffer from widespread sleep issues, such as sleep deprivation, insomnia, and jet lag. As sleep researchers and clinicians continue to learn more about the impact of sleep duration, timing, and quality on human performance and recovery, it is not surprising that athletes are quickly adopting these principles to attempt to gain an advantage over their opponents. Poor sleep not only puts athletes at risk for injury, but plays a vital role in recovery from injuries and procedures. Adequate sleep and sleep extension appear to improve on field performance. Sleep plays a prominent role in concussion management given that sleep complaints are commonly noted after mild traumatic brain injury, and may play a role in exacerbating other concussion symptoms and slowing recovery.

SLEEP DURATION

Recently, evidence-based consensus recommendations have been published stating that adults need at least 7 hours of sleep for optimal health.¹ Even more sleep is

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required for adolescents and children.² Insufficient sleep is prevalent in our society, with more than a third of the adult US population reporting sleep durations of less than the recommended 7 hours of sleep, and about 15% reporting sleep durations of less than 6 hours.³ This is also true of athletes, who many times have even more responsibilities and distractions to reduce the amount of time dedicated for sleep. Early morning practices, frequent travel, and in the case of student athletes, classes and studying, many times leave it impossible for athletes to obtain adequate sleep. One study of high school athletes demonstrated poor sleep quality in more than 80% of respondents using the Pittsburgh Sleep Quality Index, a validated self-reported questionnaire regarding sleep quality.⁴ Another study of professional rugby and cricket players showed poor sleep quality in 50% of respondents.⁵

Effects of Sleep Deprivation

Inadequate sleep affects overall human function and performance, ranging from neurocognitive function to immune function to life expectancy⁶ (**Box 1**). Sleep deprivation is associated with higher risks of motor vehicle crashes, work place accidents, and poor work performance. Sleep is needed to help with memory consolidation and learning, and sleep disruption may be associated with decreased ability to learn and improve skills necessary for team performance.⁷ There appears to be a dose-response relationship between hours of sleep deprivation and cognitive function. Human performance starts to decrease after even 17 hours of wakefulness. One group has shown that 17 to 19 hours of wakefulness was equivalent to reaction time and attention in a person with a blood alcohol concentration of 0.05%.⁸

Specifically with regard to athletes, important skills, such as decision making, reaction time, fine motor coordination, and imprinting memories and skills that were practiced, can be affected by inadequate amounts of sleep. There are only a few studies that have attempted to demonstrate decrements in function and performance with sleep deprivation in athletes. Interestingly, many of these studies have not consistently shown decrements with acute sleep deprivation when evaluating strength or endurance specifically. One explanation for the absence of an effect from sleep deprivation is that elite athletes react differently, and are “protected” from sleep deprivation. Individual variation is known to occur, as some individuals may be more or less likely to be affected by sleep deprivation. Another possible explanation is that other factors such as motivation or the adrenaline rush of performance can blunt the effects of sleep

Box 1

Effects of sleep deprivation

- Decreased reaction time
- Decreased alertness
- Impaired concentration
- Impaired memory and learning
- Higher motor vehicle crash rate
- Higher risk of depression and anxiety
- Decreased immune function
- Impaired glucose control
- Weight gain

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