

THE IMPACT OF SLEEP ON SPORTS PERFORMANCE: CONSEQUENCES OF SLEEP DEPRIVATION AND OPTIMIZATION STRATEGIES

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Abstract: Sleep is a critical physiological process that influences recovery, cognitive functions, and overall athletic performance. It plays a vital role in numerous physiological and psychological processes, including hormonal regulation, metabolism, motor skill acquisition, decision-making, and recovery following physical exertion. Given the high energy demands of sports, adequate sleep is essential for replenishing depleted energy stores and maintaining peak athletic performance. However, many athletes fail to achieve the recommended duration of sleep, which can disrupt physiological homeostasis, increase the risk of injury, and negatively affect sports outcomes. This review synthesizes current research and provides practical recommendations for effective sleep management, emphasizing its role in enhancing recovery, reducing fatigue, and optimizing athletic performance. The primary aim is to analyze the existing literature on the impact of sleep on sports performance, with a particular focus on the consequences of sleep deprivation and strategies for its optimization. Research indicates that insufficient sleep can impair athletic performance and, in some cases, increase injury risk. To address these challenges, targeted interventions have been developed to improve sleep quality and, consequently, athletic outcomes.

Key words: sleep quality, rest, recovery, circadian rhythm

INTRODUCTION

Sleep represents one of the key physiological processes that allows for the maintenance of the body's internal balance, restoration of energy resources, and effective recovery after physical exertion. In the field of sports, adequate sleep duration and quality are crucial for the normal functioning of athletes, their adaptation to training loads, and the achievement of optimal athletic performance. During sleep, numerous processes occur that contribute to the regeneration of the body—from muscle repair and regulation of the hormonal system to consolidation of motor skills, improvement of cognitive functions, and stabilization of emotional responses (Fullagar et al., 2015; Watson, 2017).

Despite clear evidence of the importance of sleep, numerous studies indicate that athletes often do not get sufficient sleep. Inadequate sleep duration may result from various factors: early or late training schedules, frequent travel and time zone changes, competitive stress, academic obligations, as well as daily use of electronic devices immediately before bedtime (Lastella et al., 2015). Research shows that between 40% and 70% of athletes experience an inadequate sleep pattern, shortened sleep, or reduced subjective sleep quality during the season (Samuels, 2008).

Sleep deprivation can significantly impair athletic performance. Experimental studies clearly show that sleep restriction leads to reductions in maximal strength, endurance, and explosiveness, slows reaction time, increases subjective feelings of fatigue, and decreases movement precision (Reyner & Horne, 2013). Cognitive functions—such as attention, concentration, information processing speed, tactical reasoning, and decision-making—are particularly sensitive to sleep loss. These abilities represent key elements of performance in sports requiring quick reactions and complex motor coordination (Mah et al., 2011).

In addition to the negative impact on performance, an increasing number of studies indicate a link between reduced sleep and a higher risk of sports injuries. A study by Milevski et al. (2014) showed that athletes who sleep less than eight hours per day have a significantly higher likelihood of injury compared to athletes who achieve optimal sleep duration. Mechanisms that may explain this relationship include slower reactions, reduced neuromuscular control, increased stress hormone secretion, and greater fatigue, which can lead to impaired movement biomechanics and decreased athletic performance.

For this reason, modern sports science places growing importance on developing programs and interventions aimed at improving sleep hygiene among athletes. Strategies such as education on proper sleep habits, extending sleep duration, individualizing daily schedules according to circadian rhythms,

structured daytime rest, and controlling exposure to light stimuli have shown increasingly positive results (Bonnar et al., 2018; Walsh et al., 2020). In parallel, the use of modern sleep monitoring methods—such as actigraphy, validated questionnaires, and sleep diaries—has become an important tool for tracking recovery and optimizing the training process.

Considering all of the above, as well as the fact that modern sports require a high level of physical and mental readiness, the aim of this paper is to analyze contemporary scientific findings on the impact of sleep deprivation on athletic performance and to present empirically validated strategies for sleep optimization in athletes. Particular emphasis is placed on the effects of inadequate sleep on physical, cognitive, and technical performance, injury risk, and practical recommendations for the training process.

THE IMPACT OF SLEEP ON ATHLETIC PERFORMANCE

Sleep is a complex biological process that plays a crucial role in maintaining physiological balance, regeneration, and adaptation of the body, which is particularly important for athletes exposed to high training and competitive loads. During sleep, recovery processes occur that include muscle fiber regeneration, protein synthesis, replenishment of energy reserves, hormone regulation, and immune system stabilization, with the deep stages of NREM (Non-Rapid Eye Movement) sleep being especially important (Fullagar et al., 2015). Deep NREM sleep is associated with increased secretion of growth hormone and a reduction in inflammatory processes, which play a critical role in muscle repair and recovery after intense training (Dattilo et al., 2011).

The REM (Rapid Eye Movement) sleep phase contributes to learning and consolidation of motor skills, emotional regulation, and cognitive stability, which is particularly important in sports requiring precise and complex technical execution (Walker, 2009). Despite the clear importance of sleep, the modern lifestyle of athletes often involves reduced sleep duration. Factors such as intense training, competitions late at night or early in the morning, travel and time zone changes, mental stress, and academic obligations particularly affect young athletes (Lastella et al., 2015). A large number of athletes get less sleep than the recommended 7–9 hours, leading to cumulative sleep deprivation and reduced recovery quality (Samuels, 2008).

Sleep deprivation negatively affects athletes' physical performance, including reductions in strength, endurance, and explosiveness, as well as earlier onset of fatigue (Reyner & Horne, 2013). Lack of sleep leads to impaired muscle recovery, disrupted energy metabolism, and increased cortisol levels, making it difficult to maintain optimal training intensity (Oliver et al., 2009). In addition to physical changes, there is a noticeable decline in motor precision, stability, and coordination, which particularly affects sports with high technical demands. Cognitive abilities are also significantly impaired under conditions of reduced sleep. Athletes with insufficient sleep demonstrate slower reaction times, reduced attention, slower information processing, and impaired decision-making (Mah et al., 2011). In sports requiring tactical reasoning and quick responses, these changes can directly influence competitive outcomes.

Sleep deprivation also affects athletes' emotional stability, increasing irritability and reducing the ability to adapt to stress. One of the most significant findings in the literature relates to injury risk. It has been shown that athletes who sleep less than eight hours per day have a significantly higher risk of injury compared to those with optimal sleep duration, with this risk increasing up to 1.7 times (Milewski et al., 2014). The causes include reduced proprioception, slower neuromuscular reactions, impaired movement biomechanics, and higher levels of physical and mental fatigue.

In practice, strategies to optimize sleep are increasingly applied to improve recovery and athletic performance. Common interventions include improving sleep hygiene, reducing evening screen exposure, planning short daytime naps, extending total sleep duration, and individualizing training according to athletes' circadian rhythms (Bonnar et al., 2018). The implementation of modern sleep monitoring methods, such as actigraphy, validated questionnaires, and sleep diaries, enables precise tracking of sleep quality and quantity, contributing to more effective recovery planning (Walsh et al., 2020).

Sleep physiology and its importance for athletes

Sleep is a fundamental biological process that allows the body to recover, regenerate, and maintain balance after physical and mental exertion. During the night, two main sleep phases alternate—NREM and REM—each with a specific role in athlete recovery. In the deep stages of NREM sleep, intense physiological regeneration occurs: growth hormone secretion increases, protein synthesis accelerates, muscle fibers are repaired, and inflammatory processes resulting from strenuous training and competitions are reduced (Dattilo, 2011). These processes are essential for muscle recovery, adaptation to physical load, and the development of new functional capacities.

REM sleep primarily serves a cognitive function. During this phase, motor memory consolidation, information processing, and emotional stabilization occur. For athletes, REM sleep is particularly important due to its role in learning new movements, refining technical skills, and maintaining concentration during training and competition. Lack of REM sleep can lead to reduced precision, poorer coordination, and difficulty acquiring new motor patterns (Walker, 2009).

High-quality sleep is also associated with proper immune system functioning and hormonal balance. Athletes who consistently achieve the necessary duration and quality of sleep have more stable stress hormone levels, better energy regulation, faster recovery, and a greater ability to tolerate training loads. Studies confirm that sleep affects athletic performance as much as proper nutrition and well-planned training periodization, as it allows the body to adapt to exertion and maintain an optimal level of physical and mental readiness (Fullagar et al., 2015).

In modern sports, sleep is considered a fundamental element of athlete recovery and preparation. Understanding sleep physiology enables coaches and athletes to recognize factors that affect recovery quality and to adjust the training process to allow for optimal body functioning.

Sleep restriction and its impact on athletic performance

Sleep deprivation refers to a state of reduced sleep duration or impaired sleep quality and can be acute (short-term) or chronic (long-term). In a sports environment, chronic deprivation is more common, arising as a consequence of intensive training demands, travel, time zone changes, late competitions, and psychological stress. This condition leads to cumulative fatigue and a reduced ability of the body to recover adequately between training sessions and competitions.

Numerous scientific studies confirm that lack of sleep has a direct negative impact on athletes' physical performance. Sleep deprivation decreases maximal strength, power, and endurance while simultaneously increasing the subjective perception of effort. Athletes suffering from insufficient sleep fatigue, more often struggle to maintain high intensity during training, and experience impaired muscle regeneration due to disrupted hormone secretion and reduced metabolic capacity (Reyner & Horne, 2013). It has also been shown that sleep deprivation affects glycogen synthesis, further reducing energy availability during physical exertion (Oliver et al., 2009).

Sleep deprivation also impacts neuromuscular coordination, precision, and technical execution. Athletes who sleep less than recommended exhibit greater movement variability, poorer stability, and an increased number of technical errors, which is particularly pronounced in sports requiring fine motor skills and high levels of precision, such as basketball, tennis, gymnastics, and volleyball. Lack of sleep also reduces reaction speed and the ability to quickly adapt to situational changes, potentially negatively affecting tactical decisions and the ability to anticipate the flow of play.

One of the elements most sensitive to sleep deprivation is cognitive function. Insufficient sleep leads to reduced attention, concentration, information processing, and decision-making ability. Research shows that athletes with shortened sleep have slower reaction times, make more errors in tasks requiring speed and accuracy, and perform less effectively under high-pressure situations (Mah et al., 2011). This is particularly evident in team sports and sports with complex situational demands, where decisions must be made in fractions of a second.

Sleep deprivation negatively affects overall athletic performance, impairs training quality, and increases the risk of injuries and overuse. Therefore, recognizing, monitoring, and preventing sleep deficiency is crucial in planning the training process and enhancing athletes' performance.

METHODS

This paper is designed as a review article with the aim of synthesizing current scientific knowledge on the impact of sleep and sleep deprivation on athletic performance. The methodological approach involved a systematic search of the available scientific literature in relevant electronic databases: PubMed, Web of Science, and Scopus.

The literature search was conducted using keywords and their combinations: “sleep or sleep deprivation or sleep quality and athletes and sports performance and recovery and injury risk and sleep extension or sleep interventions.” The review included original research studies, review articles, and systematic analyses published in English up to 2024.

Inclusion criteria encompassed studies that:

- examined sleep or sleep deprivation in athletes,
- addressed physical, cognitive, or technical performance, as well as injury risk,
- used valid sleep assessment methods (actigraphy, polysomnography, questionnaires, or sleep diaries) or quantitative performance measures,
- involved athletes of various levels—recreational, competitive, or elite.

Studies that did not include a sports population, lacked sufficient data, or were not available in full text were excluded. After identifying relevant sources, a thematic content analysis was conducted, with results classified into four areas:

1. sleep physiology in athletes,
2. effects of sleep deprivation on performance,
3. sleep and injury risk,
4. sleep optimization strategies.

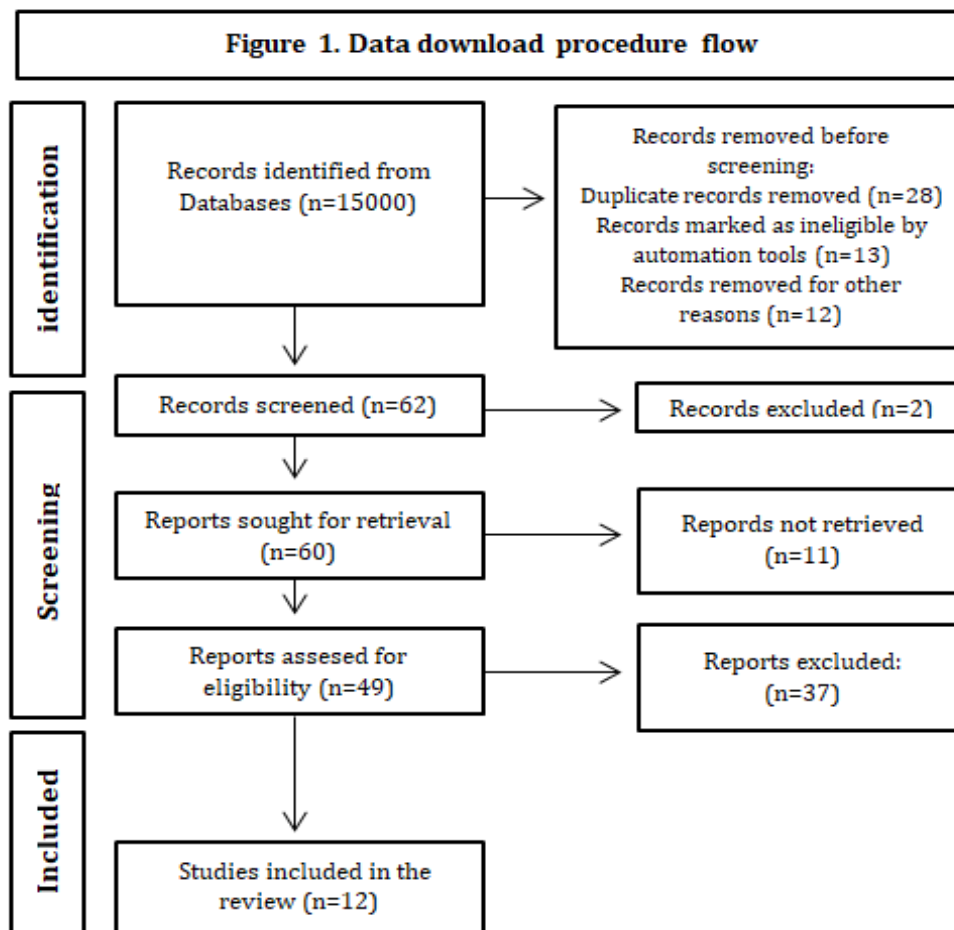
Data were synthesized using a qualitative approach without statistical pooling due to methodological heterogeneity.

Characteristics of the literature

The presented diagram illustrates the process of searching, selecting, and including studies in the final corpus of analyzed literature. The process began with the identification of 15,000 records in the specified databases. During the initial filtering, 53 records were removed due to duplicates, technical errors, or automatically flagged irrelevance.

In the screening phase, 62 studies were assessed, of which 2 were excluded after reviewing titles and abstracts. The remaining 60 studies proceeded to the full-text retrieval phase; however, 11 sources were unavailable, leaving 49 studies for eligibility assessment.

After a detailed evaluation of methodology, content, and relevance, 15 studies were excluded. The final corpus consists of 12 studies that met all inclusion criteria and represent a methodologically consistent sample for drawing conclusions.



RESULTS

An analysis of a total of ten studies included in the presented table (Table 1) provided data on the impact of sleep on athletic performance, injury risk, and physiological responses in athletes. In studies with clearly specified participant numbers, at least 143 subjects were recorded, while systematic reviews and review articles included larger, but undefined, numbers of athletes from multiple independent studies. The age range of participants in quantitative studies varied from 12 to 22 years, whereas review articles also included adult athletes without specifying ages, indicating that the overall sample comprised both adolescent and adult athletes across different age groups.

The athletes' experience level varied across studies. Several studies focused on elite athletes, including investigations assessing performance, sleep variability, and responses to sleep extension or restriction. Some studies analyzed young competitors and developing athletes, while intervention and review studies also included recreational athletes. The sports examined included basketball in experimental conditions, while other studies covered a wide range of sports, including individual and team disciplines, allowing for generalization of the findings across different athletic populations.

Table 1 Overview of Relevant Studies on Sleep and Athletic Performance

Author(s) and Year	Study Design	Participants/ Sport	Sleep Assessment	Main objective of the study	Main findings
Mah et al. (2011)	Experimental Study (Sleep Extension)	11 basketball players (18–22 years)	Actigraphy, sleep diaries	To examine the effect of sleep extension on sports performance	Sleep extension to 9–10 hours improved shooting, sprint, and reaction time

Milewski et al. (2014)	Prospective cohort study	112 young athletes (12–18 years old)	Self-reported sleep duration	To examine the relationship between sleep duration and injuries	<8 hours of sleep is associated with a 1.7× increased risk of injury
Reyner & Horne (2013)	Experimental study	20 athletes	Sleep restriction (laboratory conditions)	To determine the impact of reduced sleep on physical performance	Reduced sleep impairs endurance, strength, and explosiveness
Oliver et al. (2009)	Randomized controlled trial	10 competitive runners	Controlled sleep deprivation	To examine aerobic capacity after one night of sleep deprivation	One night of sleep deprivation reduces endurance and VO ₂ max
Lastella et al. (2015)	Observational study	Elite athletes from team and individual sports	Actigraphy, questionnaires	Analysis of sleep habits in athletes	Large variations in sleep duration; 40–70% of athletes have poor sleep
Fullagar et al. (2015)	Systematic review	Various sports	—	To summarize evidence on sleep and performance	Sleep deprivation affects physical, cognitive, and technical performance
Bonnar et al. (2018)	Systematic review of interventions	Competitors and recreational athletes	Various methods	To examine the effectiveness of sleep interventions	Interventions improve sleep and recovery
Walsh et al. (2020)	Expert consensus	Elite athletes	—	To develop sleep recommendations for athletes	Comprehensive practice guidelines have been issued
Watson (2017)	Review article	Various sports	—	To analyze the impact of sleep on mental functions	Sleep deprivation reduces attention, reaction speed, and decision-making
Walker (2009)	Review article	General population + athletes	—	To investigate the role of sleep in cognition	REM sleep is crucial for motor learning and emotional stability

Table 2 presents the results of five relevant studies that investigated the impact of sleep deprivation on various domains of athletic performance and recovery processes. The included studies analyzed physical capacities, cognitive functions, technical skills, and injury risk in athletes. Across the observed studies, it was evident that sleep loss leads to reduced explosiveness, strength, and endurance, while simultaneously impairing attention, concentration, coordination, and the precision of technical execution.

The findings indicate that sleep deprivation is consistently associated with a negative impact on the quality of sports performance, with some studies also reporting a significant increase in injury risk, further emphasizing the importance of adequate recovery. It was observed that shortened or inadequate sleep patterns adversely affect athletes of varying training levels, including those engaged in sports that demand a high level of physical and mental readiness.

Table 2 Effects of Sleep Deprivation on Performance and Recovery

Study	Physical performance	Cognitive functions	Technical skills	Risk of injury	Conclusion
Mah et al. (2011)	↑ Explosiveness, ↑ sprint	↑ focus	↑ Shooting accuracy	N/A	Extended sleep improves all aspects of athletic performance
Milewski et al. (2014)	↓ Endurance	↓ focus	↓ Stability	×1.7 higher risk	Sleep deprivation is a significant injury risk factor

Reyner & Horne (2013)	↓ Strength, ↓ endurance	↓ attention	↓ coordination	Increased	Sleep restriction impairs physical performance
Oliver et al. (2009)	↓ VO ₂ max	—	—	N/A	One night of sleep deprivation reduces athletic performance
Lastella et al. (2015)	Variable	↓ Mental alertness	Variable	Increased	Athletes often do not achieve the recommended sleep duration

Table 3 presents a total of five interventions that have been examined for optimizing sleep in athletes of various profiles. The interventions included athletes from multiple disciplines, including basketball, elite sports, as well as various sports in general populations. The duration of interventions ranged from short-term protocols, such as 20–30 minute daytime naps, to long-term programs conducted over several weeks or continuously throughout the training process.

The most effective interventions included sleep extension, applied over 5–7 weeks in basketball players, which resulted in improved shooting accuracy, sprint performance, and reaction time. Sleep hygiene programs, implemented over 2–6 weeks in elite athletes, showed significant improvements in subjective sleep quality and faster recovery. Short daytime naps following exposure to acute stress partially compensated for fatigue, particularly in high-intensity sports.

Additionally, circadian-based individualization of training, which involved adjusting training loads according to athletes' chronotypes, led to more stable sports performance throughout the season. Continuous sleep monitoring, applied across various sports, enabled timely identification of issues related to low sleep quality or insufficient duration, facilitating the creation of individualized corrective plans.

These findings indicate that interventions aimed at optimizing sleep can have significant acute and chronic effects on performance, recovery, and stability of training responses in athletes of different experience levels.

Table 3 Interventions for Sleep Optimization in Athletes

Intervention	Target group	Duration	Implementation method	Effect
Sleep extension (Mah et al., 2011)	Basketball players	5–7 weeks	Extending nightly sleep to 9–10 hours	Improvement in shooting accuracy, sprinting, and reaction speed
Sleep hygiene (Bonnar et al., 2018)	Elite athletes	2–6 weeks	Education, light regulation, routine	Improved sleep quality and recovery
Nap 20-30min	Athletes under acute stress	Short-term	Daytime rest	Partial fatigue compensation
Circadian-based individualized training (Walsh et al., 2020)	Elite athletes	Constant	Training according to chronotype	More consistent performance
Sleep monitoring	Various sports	Continuous	Actigraphy, questionnaires	Timely problem identification

DISCUSSION

The authors of this study aimed to analyze contemporary scientific evidence regarding the influence of sleep quality on athletic performance and to present empirically validated strategies for optimizing sleep in athletes. The analysis highlights the impact of inadequate sleep on physical, cognitive, and technical performance, injury risk, and practical recommendations for training processes. The reviewed studies consistently demonstrate that sleep plays a crucial role in athletic performance, recovery, and injury prevention.

Although individual studies differ in methodology, sample size, duration, and sleep assessment methods, their findings are complementary and provide a comprehensive understanding of the

importance of sleep in the sporting context. A common limitation across most studies was the method of data collection for sleep quality, with reliance primarily on subjective assessments rather than laboratory-based measures.

In studies addressing sleep and athletic performance, the primary focus was on how sleep quality influences sprint performance, reaction time, endurance, strength, cognitive functions, injury risk, and psychological aspects (Mah et al., 2011; Reyner & Horne, 2013; Milewski et al., 2014; Oliver et al., 2009; Fullagar et al., 2015). Additionally, quality sleep positively affects emotional stability and attention (Watson et al., 2017; Walker et al., 2009). Notably, experimental studies examining sleep extension indicate that even simple interventions, such as increasing total nocturnal sleep, can significantly improve performance outcomes, including shot accuracy, reaction time, sprint performance, and technical execution. These findings confirm that sleep is a modifiable variable that can be strategically optimized to enhance performance without increasing physical training load.

Conversely, studies investigating sleep deprivation reveal a range of negative consequences. Insufficient sleep leads to decreased physical capacities, reduced strength, endurance, and explosiveness, as well as increased subjective fatigue (Reyner & Horne, 2013; Oliver et al., 2009). Other studies have shown that inadequate sleep negatively affects injury incidence, athletic performance, and overall career progression, as athletes often fail to achieve sufficient sleep quality (Mah et al., 2011; Milewski et al., 2014; Reyner & Horne, 2013; Oliver et al., 2009; Lastella et al., 2015). Longitudinal research demonstrates that athletes sleeping less than eight hours per night have a significantly higher risk of injury, attributed to slower neuromuscular reactions, reduced stability, impaired coordination, and increased fatigue, all of which elevate the likelihood of acute and chronic injuries (Milewski et al., 2014).

Finally, studies focused on sleep optimization interventions—such as sleep hygiene improvements, short daytime naps, regulation of electronic device use before bedtime, and chronotype-based individualized training—have shown positive effects (Mah et al., 2011; Bonnar et al., 2018; Walsh et al., 2020). These results confirm that structured sleep management is a critical component of the training and recovery process.

Overall, the literature supports the conclusion that sleep is a key determinant of athletic success. Sleep quality and duration affect physical, technical, and cognitive performance, emotional stability, and injury risk. Consequently, sleep optimization should be an integral part of athletic training, on par with nutrition, hydration, recovery, and training periodization.

In terms of theoretical application, this review provides practitioners with insights into the role of sleep in performance and recovery, as well as evidence-based methods for sleep intervention and optimization. Practically, it highlights how targeted strategies can improve sleep quality, thereby enhancing overall athletic outcomes. A limitation of this review is the absence of sex-specific analyses, which future research should address to refine sleep recommendations for male and female athletes.

CONCLUSION

Based on the analysis of current scientific literature, sleep emerges as a fundamental factor in maintaining and enhancing athletic performance, facilitating recovery, and preventing injuries. Numerous studies consistently demonstrate that sufficient high-quality sleep positively influences athletes' physical capacities, including strength, endurance, explosiveness, and motor precision. Moreover, sleep plays a critical role in cognitive functions essential for sports, such as rapid reaction, decision-making, attention, and information processing. Sleep deprivation leads to diminished athletic performance, impaired technical execution, delayed recovery, and an increased risk of injury. These effects underscore that inadequate sleep is not merely a consequence of intense training or competition schedules but a significant factor directly impacting both health and athletic success.

Proper planning and optimization of sleep should be an integral part of any training program. Educating athletes on sleep hygiene, individualizing training schedules according to biological rhythms, regulating pre-sleep light exposure, and implementing short daytime naps represent effective strategies for improving sleep quality. It is particularly important that coaches, sports professionals, and athletes recognize sleep as an essential component of recovery, alongside nutrition, hydration, and active

regeneration. The findings of this review confirm that enhancing sleep represents one of the simplest, most accessible, and most effective approaches to improving athletic performance, reducing injury risk, and preserving long-term functional stability. Future research should focus on precisely defining optimal sleep protocols and their application across different sports while considering individual variability among athletes.

REFERENCES

1. Bonnar, D., Bartel, K., Kakoschke, N., & Lang, C. (2018). Sleep interventions designed to improve athletic performance and recovery: A systematic review of current approaches. *Sports Medicine*, 48(3), 683–703.
2. Dattilo, M., Antunes, H. K., Medeiros, A., Mônico-Neto, M., Souza, H. S., Lee, K. S., & Tufik, S. (2011). Sleep and muscle recovery: Endocrinological and molecular basis for a new and promising hypothesis. *Medical Hypotheses*, 77(2), 220–222.
3. Fullagar, H. H. K., Skorski, S., Duffield, R., Hammes, D., Coutts, A. J., & Meyer, T. (2015). Sleep and athletic performance: The effects of sleep loss on exercise performance, and physiological and cognitive responses to exercise. *Sports Medicine*, 45(2), 161–186.
4. Lastella, M., Roach, G. D., Halson, S. L., & Sargent, C. (2015). Sleep/wake behaviors of elite athletes from individual and team sports. *European Journal of Sport Science*, 15(2), 94–100.
5. Mah, C. D., Mah, K. E., Kezirian, E. J., & Dement, W. C. (2011). The effects of sleep extension on the athletic performance of collegiate basketball players. *Sleep*, 34(7), 943–950.
6. Milewski, M. D., Skaggs, D. L., Bishop, G. A., Pace, J. L., Ibrahim, D. A., Wren, T. A., & Barzdukas, A. (2014). Chronic lack of sleep is associated with increased sports injuries in adolescent athletes. *Journal of Pediatric Orthopaedics*, 34(2), 129–133.
7. Oliver, S. J., Costa, R. J., Laing, S. J., Bilzon, J. L., & Walsh, N. P. (2009). One night of sleep deprivation decreases treadmill endurance performance. *European Journal of Applied Physiology*, 107(2), 155–161.
8. Reyner, L. A., & Horne, J. A. (2013). Sleep restriction and performance: A review of physiological and psychological effects. *Journal of Sleep Research*, 22(4), 398–405.
9. Samuels, C. (2008). Sleep, recovery, and performance: The new frontier in high-performance athletics. *Clinical Sports Medicine*, 27(1), 195–204.
10. Walker, M. P. (2009). The role of sleep in cognition and emotion. *Annals of the New York Academy of Sciences*, 1156(1), 168–197.
11. Walsh, N. P., Halson, S. L., Sargent, C., Roach, G. D., Nédélec, M., Gupta, L., Leeder, J., ... & Bender, A. (2020). Sleep and the athlete: Narrative review and 2020 expert consensus recommendations. *International Journal of Sports Physiology and Performance*, 15(7), 956–978.
12. Watson, N. F. (2017). Sleep and athletic performance. *Current Sports Medicine Reports*, 16(6), 413–418.

UTICAJ SNA NA SPORTSKE PERFORMANSE: POSLEDICE SMANJENJA DUŽINE I KVALITETA SNA I STRATEGIJE ZA OPTIMIZACIJU

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Sažetak: San je ključan fiziološki proces koji utiče na oporavak, kognitivne funkcije i celokupne sportske performanse. On igra vitalnu ulogu u različitim fiziološkim i psihološkim procesima, uključujući regulaciju hormona, metabolizam, motorčke veštine, donošenje odluka i oporavak nakon fizičkog napora. S obzirom na visoke energetske zahteve sporta, adekvatan san je neophodan za obnavljanje iscrpljenih energetskih resursa i održavanje vrhunskih sportskih performansi. Međutim, mnogi sportisti ne postižu preporučenu dužinu sna, što može narušiti fiziološku ravnotežu, povećati rizik od povreda i negativno uticati na sportske rezultate. Ovaj pregledni rad sintetizuje aktuelna istraživanja i pruža praktične preporuke za efikasno upravljanje snom, naglašavajući njegovu ulogu u poboljšanju oporavka, smanjivanju zamora i optimizaciji sportskih performansi. Primarni cilj je analiza postojeće literature o uticaju sna na sportske performanse, sa posebnim osvrtom na posledice nedostatka sna i strategije za njegovu optimizaciju. Istraživanja pokazuju da nedovoljan san može negativno uticati na sportske performanse i u određenim slučajevima povećati rizik od povreda. Kako bi se ovi izazovi prevazišli, istraživači su razvili ciljne strategije za poboljšanje kvaliteta sna, a time i sportskih rezultata.

Ključne reči: kvalitet sna, odmor, oporavak, cirkadijalni ritam