How Does Nightly Sleep and Strategic Napping Affect Cognitive and Physical Performance Of Elite Soccer Players?

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Abstract
This is a systematic review that examines the impact of nightly sleep quality and duration and the use of strategic naps on cognitive and physical performance. The review will compile and analyze existing studies to find the relationship between sleep related factors and performance measures. The metrics include physical ability, cognitive function, recovery, injury risk, and fatigue. By including research that objective sleep measurements and performance metrics (sprint times, scanning frequency, and fitness scores), the review aims to identify consistent patterns. The end goal of this review is to offer insights and recommendations on how optimizing sleep and daytime naps can be used to enhance performance for soccer players.

Introduction

In the United States, approximately 50% of the population have participated in competitive sports throughout high school, highlighting the relevance of optimizing athletic performance. As high performing athletes find ways to excel, one of the most frequently asked questions is: "What can I do off the field to improve my performance?" Physical training, nutrition, and mental preparation are the more well known components of athletic success, however recent research has shown an increasing emphasis on sleep duration and quality to achieve peak performance. High-quality sleep has been shown to contribute significantly to physical recovery, motor skills, decision-making, and emotional regulation, factors that are particularly crucial in soccer. Soccer performance also relies heavily on reaction time, sprint speed, agility, coordination, and sustained focus, all of which can be enhanced through adequate sleep and strategic napping. Furthermore, the benefits of sleep extend further than soccer performance. Numerous studies have linked sleep quality with academic success and emotional resilience, especially among teens who participate in competitive sports. This is relevant considering the growing pressure on young athletes to perform well both on the field and in academic settings. This paper will further explore and summarize the current scientific understanding of how sleep, specifically nighttime sleep and napping, affects soccer performance. Through an in-depth analysis of recent studies, this review aims to highlight the important role of sleep in enhancing athletic ability, recovery, and long-term athlete health and development.

Methodology

To create this review, information was compiled from a set of credible sources, including fifteen peer-reviewed studies, academic research papers, and journals relevant to the topic. These sources were selected using databases such as PubMed, Kaggle, and Google Scholar ensuring that each source directly addressed the research question. The data collection followed a consistent criteria to ensure reliability across datasets. The information that was gathered was compiled into a spreadsheet for analysis. The spreadsheet was used to make a series of graphs and visual representations to illustrate key trends, patterns, and correlations. The sources were split into 4 groups: Experimental Nap Intervention Studies, Observational & Monitoring Studies,

Systematic & Narrative Reviews and Survey-Based Behavioral Studies to fully encompass the key trends and data.

Experimental Nap Intervention Studies
These studies manipulated nap duration, timing, and conditions to determine their effects on athletic performance, cognitive function, and physiological responses. Most used randomized crossover designs, which reduce individual performance variability by having each participant experience all conditions. (Controlled Nap vs. No Nap Designs)

“Daytime Napping Benefits Passing Performance and Scanning Activity in Elite Soccer Players” by Masaki Nishida: National-level male soccer players (excluding goalkeepers) followed a standardized 3 day baseline sleep protocol (6–8 hours a night) and were denied caffeine/alcohol pre-experiment. Participants either napped for 40 minutes (14:00–14:40) in a dark, air-conditioned room (~77°F) or remained quietly awake. Post-nap, cognitive flexibility and attention were tested via Trail Making Test A/B (a test that assesses visual scanning and attention span), soccer passing ability was assessed using a modified Loughborough Soccer Passing Test (10 timed passes), and scanning activity (head turns) was visually counted. Nap verification used a smartphone sleep-tracking app called Sleep Meister.

“Impact of 30-minute and 90-minute Naps on Aerobic and Anaerobic Intermittent Performance in Collegiate Soccer Players” by Xu A: Twenty five male university soccer players (national-level, with 10 hrs a week of training) completed a randomized crossover of three nap conditions: no nap, 30-min nap (14:00–14:30), and 90-min nap (13:00–14:30). Naps were taken in a dark, quiet, climate-controlled room (68–74°F) in a semi reclined position, with a 1-hour post-nap recovery to minimize sleep inertia. Performance tests included the Running-Based Anaerobic Sprint Test (6 × 35 m sprints, 10s recovery) measuring peak/minimum/average power and fatigue index, and the 30–15 Intermittent Fitness Test to determine maximal running speed, (VIFT), heart rate, and perceived exertion.

“The Impact of Strategic Napping on Peak Expiratory Flow and Respiratory Function in Young Elite Athletes” by Ahmet Kurtoğlu: Twelve elite youth athletes (ages 12.5 years), competed in the high jump and sprint events with no nap, 25-min nap, and 45-min nap conditions. (14:00 start) The nap took place in a dark, quiet room, preceded by a 10-min acclimatization period and followed by a 5-min warm-up. Pulmonary function (lung health) was measured using a MIR spirometer (FVC, FEV, FEF25–75%, PEF). Heart rate monitoring was conducted using Fitbit Charge 3 devices.

“Physiological Response and Physical Performance After 40 min and 90 min Daytime Nap Opportunities” by Omar Boukhris: Sixteen male amateur athletes (soccer, rugby, handball) completed three conditions, no nap, 40-min nap, and 90-min nap, in a controlled environment. Performance was assessed through 5-meter shuttle runs for total and maximum distance. Body measures included resting and exercising heart rate, blood pressure, heart rate variability, perceived exertion (RPE), and body temperature.

“The Acute Effects of 25-Versus 60-Minute Naps on Agility and Vertical Jump Performance in Elite Youth Soccer Players: The Role of Individual Chronotype” by Ozgur Eken: Sixteen elite

U19 male soccer players underwent no nap, 25-min nap, and 60-min nap conditions, randomized with 48-hour rest between sessions. Tests included the Illinois Agility Test, a change-of-direction drill with a soccer ball, and countermovement jump (CMJ) for anaerobic power. Sleep quality and mood were assessed pre-and post-nap using the Morningness-Eveningness Questionnaire, Pittsburgh Sleep Quality Index, and Profile of Mood States Questionnaire.

Observational & Monitoring Studies
These studies did not alter nap behavior experimentally but tracked sleep and performance patterns using wearables, self-reports, or data collection during training and competition periods.

“Sleep Architecture of Elite Soccer Players Surrounding Match Days As Measured By WHOOP Straps” by Nicole Sanders: Six elite English Premier League players (average age 28) were monitored for two seasons using WHOOP wearable devices across 13 afternoon matches. Sleep metrics (total sleep time, efficiency, light/deep/REM stages, disturbances, onset/offset times) were recorded for the night before the match, the night after, and the subsequent night. External physical load was quantified using GPS tracking during matches.

“Elite Soccer Athlete's Sleep: A literature review” by Aldo C. Silva: Multiple observational studies assessed sleep duration, efficiency, and onset latency in soccer players, correlating these with anaerobic performance, muscle strength, sprinting ability, and injury incidence. Studies reported matchday sleep disruptions (especially after evening games and losses), reduced sleep during congested fixture periods, and significant associations between poor sleep efficiency and increased injury count, absence days, and severity.

“Relationships between Sleep, Athletic and Match Performance, Training Load, and Injuries: A Systematic Review of Soccer Players” by Filipe Manuel Clemente: A narrative synthesis identified common sleep disruptors in soccer, including evening training/matches, travel, and heavy match loads. It reviewed literature linking sleep deprivation to declines in anaerobic capacity, reaction time, and motor learning.

Systematic & Narrative Reviews
These works summarized existing experimental and observational soccer studies to draw broader conclusions and provide practical recommendations.

“Is Daytime Napping an Effective Strategy To Improve Sport-Related Cognitive and Physical Performance and Reduce Fatigue? A Systematic Review and Meta-Analysis of Randomised Controlled Trials” by Arthur Eumann Mesas: Systematic review of 37 athlete nap studies (ages ≥12) examining nap duration (20–90 min, occasionally 120 min), timing (13:00–16:00), and outcomes. Reported consistent benefits to sprinting, endurance, strength, jump ability, reaction time, attention, vigilance, and reduced perceived exertion, particularly under sleep deprivation.

“To Nap or Not to Nap? A Systematic Review Evaluating Napping Behavior in Athletes and the Impact on Various Measures of Athletic Performance” by Lastella M: Narrative review summarizing practical guidance for athletes: optimal nap length 20–90 min, best timing 13:00–16:00, and 30-min wake period before competition to dissipate sleep inertia.

“Sleep and Performance in Professional Athletes” by Jesse D Cook: Narrative review comparing sleep patterns of elite athletes with non-athletes, reporting shorter sleep durations, lower efficiency, longer sleep latency, and increased disturbances in athletes. It summarized intervention studies on sleep extension, jet lag effects, and Olympic-level performance improvements following targeted sleep programs.

Survey-Based Behavioral Studies
These studies used questionnaires to evaluate sleep quality, behaviors, and barriers to optimal rest among different athlete groups.

“Characterising and Comparing the Sleep Characteristics and Behaviours of Female and Male Soccer Players: A Cross-Sectional Survey of an Elite Soccer Club” by Nicole Sanders: Senior male, senior female, and U21 male soccer players completed the Athlete Sleep Screening Questionnaire (ASSQ) and Athlete Sleep Behaviour Questionnaire (ASBQ). Metrics included a Sleep Difficulty Score (SDS), global behavior scores, and individual behavior items. Comparisons revealed that senior female players reported the highest sleep difficulty, while U21 male players reported the lowest.

Results

Sleep Data:
Total Sleep Time (TST) Average Soccer Player:

- Night Before Match: 440 ± 37 min
- Night of Match: 393 ± 41 min
- Night After Match: 459 ± 36 min

General Sleep Statistics in Athletes:

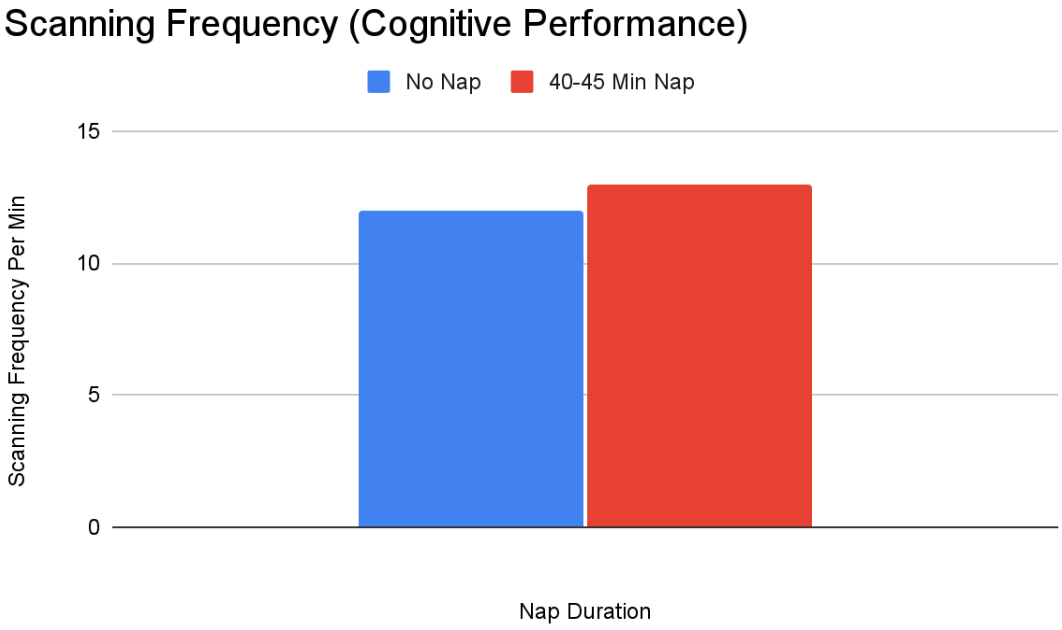
- Sleep latency (Time in bed until asleep) : 18 minutes (vs. 5 min in controls)
- Sleep efficiency: ~80.6% in athletes (vs. 88.7%)
- Resting HR during sleep: Pros: 52 bpm; Amateurs: 59 bpm

Recovery scores: Pros > Amateurs by 10%

Cognitive Performance

Napping athletes outperformed non-nappers by 6% in cognitive tasks in the Trail Making Test A/B (a test that assesses visual scanning and attention span) and scanning behavior during soccer passing drills. Although the p-value approached significance ($p < 0.06$), it still shows a meaningful trend that favors napping.

The 30-minute nap condition did not show significant cognitive improvements, while the 90-minute nap improved anaerobic metrics, suggesting that deeper sleep stages may be required for cognitive enhancement.



Anaerobic Power and Speed

Peak Power (Watts per kilogram, W/kg):

- No Nap (N0): 5.32
- 30-min Nap (N30): 5.56
- 90-min Nap (N90): 5.71

Significant improvement ($p = 0.007$)

Total Distance Ran in the Fitness Test (TD):

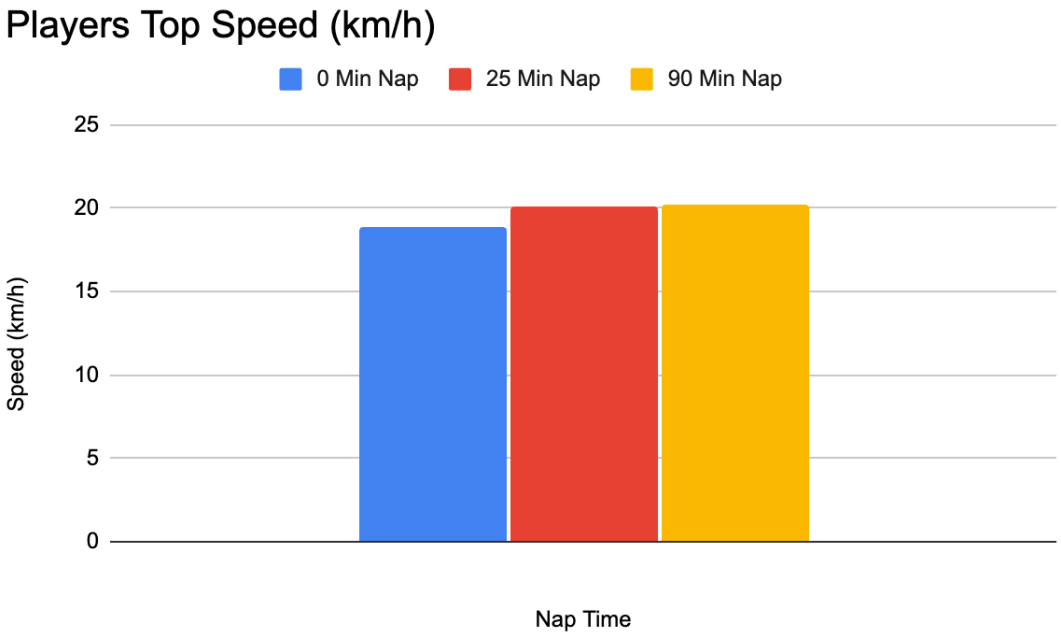
- N0: 846.3m
- N40: 871.7 m
- N90: 894.2 m

N90 significantly better than both N0 and N40 ($p < 0.001$)

Player Top Speed (km/h)

- N0: 18.9
- N25: 20.1
- N90: 20.2

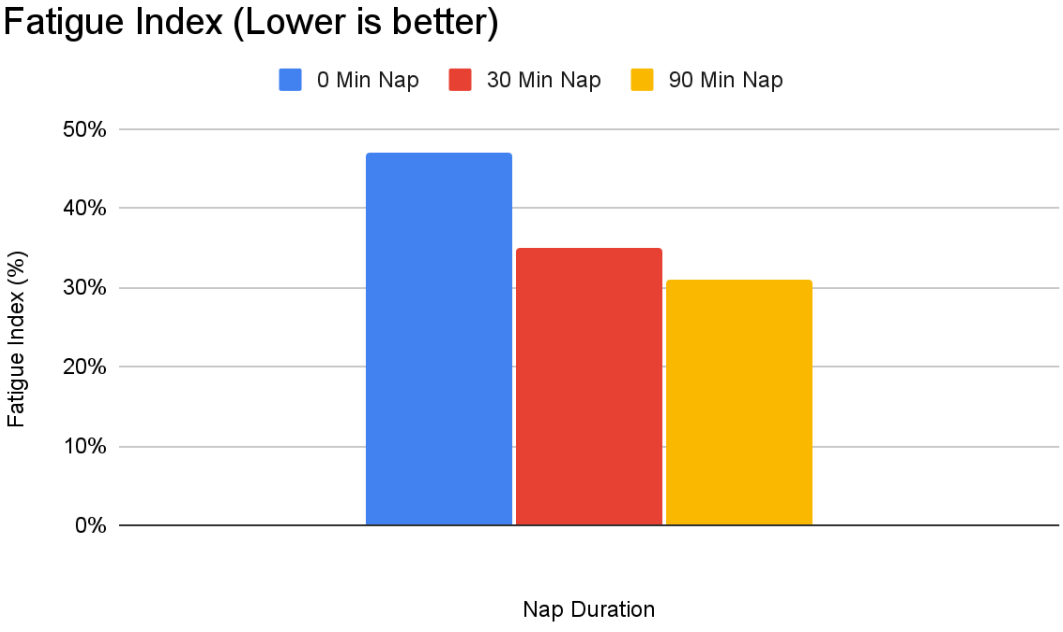
N25 shows significant improvement over N0



Fatigue Index

Fatigue Index (Lower is better):

- N0: 30%
- N30: 26%
- N90: 25%

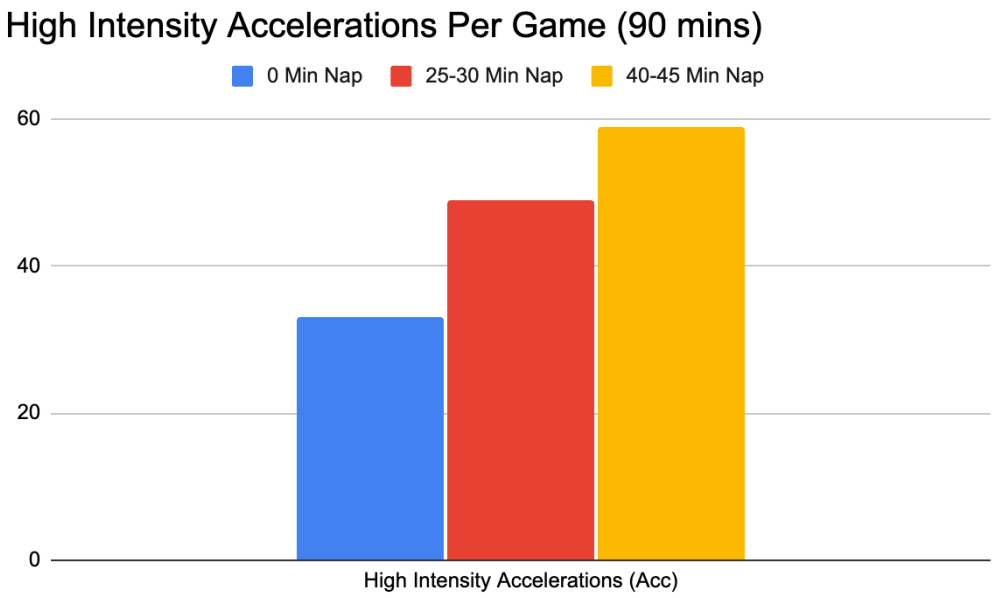


Agility Tests

Agility Test Times (seconds):

- No Nap: 16.3
- 25-min Nap: 16.1
- 60-min Nap: 15.7

Significant difference between N60 and other groups ($p < 0.05$)



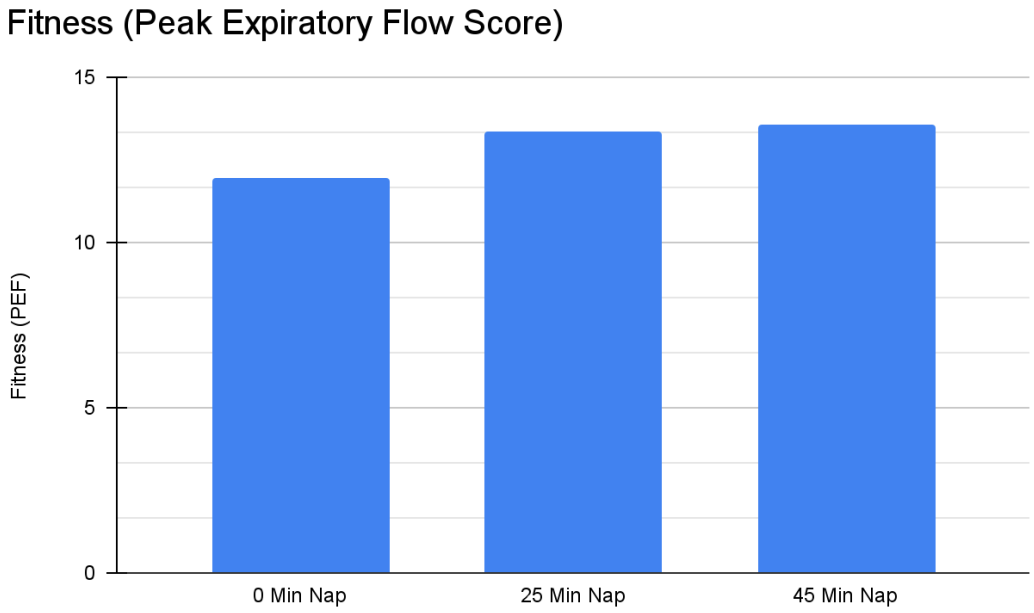
Jump Duration (milliseconds)

- No Nap: 55
- 25-min Nap: 57
- 60-min Nap: 56

No significant improvement in jump height or power across nap conditions ($p > 0.05$)

Respiratory Metrics

Peak Expiratory Flow (PEF):
No Nap: 6.25 L/s
25-min Nap: 6.31 L/s
45-min Nap: 6.68 L/s



Subjective Sleep Measures

Perceived Exertion (Method for rating the intensity of physical activity) (RPE Scale 6–20):
RPE Scores (Post-Exercise):

- N0: 15.4 ± 1.2
- N40: 13.8 ± 1.0
- N90: 12.9 ± 0.8

Mood & Sleep Quality:
- Post-nap mood increased in N60 group by ~12%
- Sleepiness (Karolinska Sleepiness Scale): decreased by 2.3 points post-nap

Napping Trends
- Optimal nap duration: 20–60 minutes
- Best timing: 1:00 PM – 4:00 PM
- 90-minute naps yielded the greatest improvements in:
    - Reaction time (~8–11% faster)
    - Shooting accuracy (~9–15% better in elite athletes)
    - Mental vigilance (fewer errors in concentration tasks)

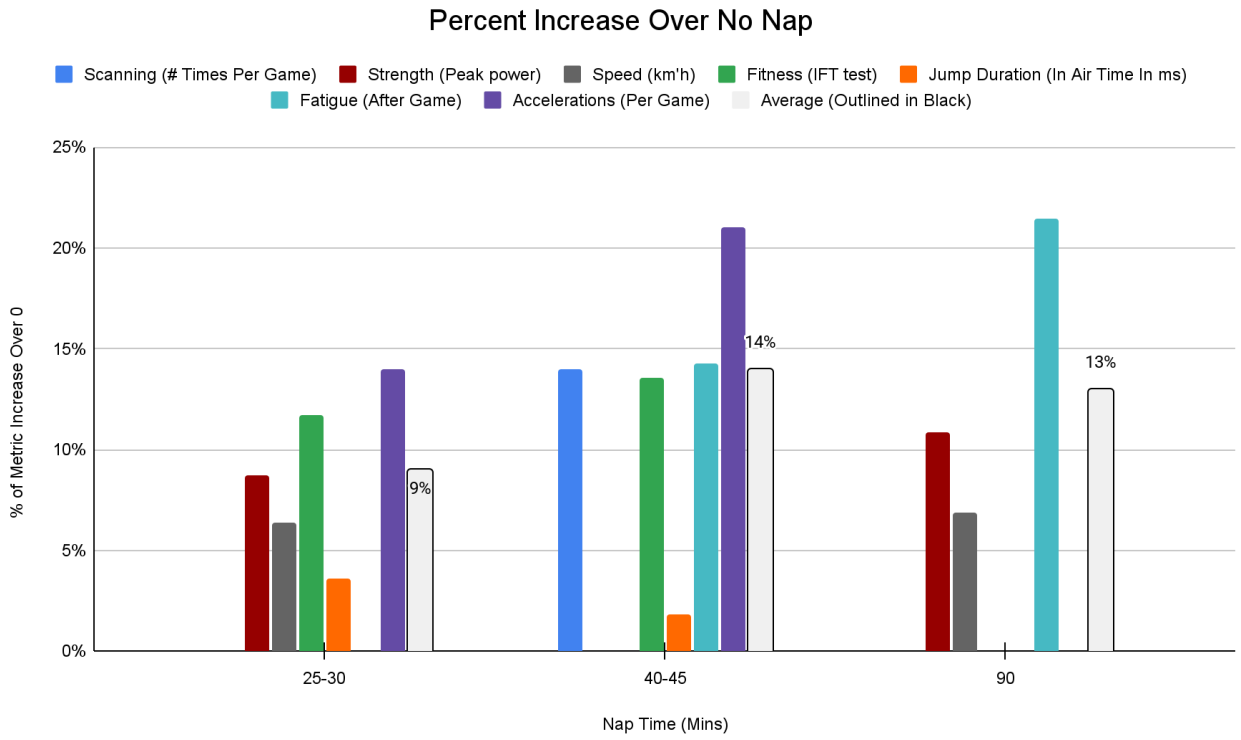


Figure 6. Averaged results of percent increase over no nap. Figure shows the metric percent increase over 0 nap in the key physical and cognitive pillars of the game. For example, speed (in grey) increases by 6% after a 25-30 minute nap.

Discussion

This section analyzes results across the cognitive, physical, and recovery areas to determine how nightly sleep and strategic naps influence soccer players' abilities. The data was put together by compiling the results from all studies into a spreadsheet and creating graphs to help analyze. These graphs displayed performance improvements in nap duration (0 min, 25–30 min, 40–45 min, 60 min, and 90 min). By averaging the percentage gains across physical and cognitive metrics, the graphs made it clear that performance was consistently the highest in the 40–45 minute nap range, leading to the conclusion that a 45 min nap provides the best balance between restfulness and readiness before a game.

Cognitive Performance

The cognitive analysis focused on visual scanning, attention span, and decision-making speed. The graph shows cognitive test scores in nap durations (0 min, 30 min, 90 min) and showed an upward trend, with nappers outperforming non-nappers by around 6%. While the p-value ($p < 0.06$) was small, the direction of improvement across studies indicates a substantial benefit.

Longer 90 minute naps provided slightly better cognitive performance because of deeper sleep stages such as slow-wave and REM sleep, which support memory function and problem-solving. However, these extended naps also increase post-nap grogginess or “sleep inertia,” which lowers short-term alertness. The graph revealed that 40–45 minute naps produced similar cognitive benefits to the 90-minute naps but with reduced inertia effects. This supported the conclusion that moderate-length naps taken 1–2 hours before competition are the most practical for improving mental readiness, reaction time, and focus during matches.

Physical Performance

To evaluate physical effects, data on peak power, sprint speed, total distance, agility, and fatigue index were compiled. The graphs highlighted clear progressions with increasing nap length up to 90 minutes. Average peak power improved from 5.32 W/kg (no nap) to 5.71 W/kg (90-min nap), while top speed in fitness tests increased from 18.9km/h to 20.1 km/h. Similarly, the fatigue index dropped by 7%, showing greater energy efficiency and endurance.

When graphing these metrics, the biggest improvement happened between the no-nap and 40–45-minute nap, suggesting that the performance gain is present within this midrange nap window. Agility tests mildly supported this pattern, with jump times improving from 55ms (no nap) to 57ms (60-min nap). These results, when averaged across all physical tests, showed that short to moderate naps enhanced explosive movements, speed, and coordination,

Recovery and Physiological Readiness

Recovery metrics, including perceived exertion (RPE), resting heart rate, mood, and respiratory performance, were important in determining overall readiness. The RPE scores and mood charts showed downward and upward trends, showing that athletes felt less fatigued and more alert following naps. For example, perceived exertion dropped from 15.4 (no nap) to 12.9 (90-min nap), while mood scores increased by approximately 12% in the 60-minute nap group.

Peak expiratory flow (respiratory strength and recovery) rose from 11.94 L/s (no nap) to 13.34 L/s (45-min nap), which supports the idea that short to moderate naps restore the body. When combining all of the recovery metrics, graphs revealed an average of 14% increase over the no-nap group which is consistent with the same optimal nap window in the cognitive and physical areas.

Determining the Optimal Nap Strategy

By summarizing all graph data onto a single chart, a clear trend emerged. While 90-minute naps occasionally provided the highest individual scores, the most balanced improvements across all metrics occurred within the 40–45-minute range. This duration offers sufficient time to enter restorative sleep stages without entering deep slow-wave sleep, which can cause post-nap grogginess.

Additionally, the timing of these naps (between 1:00 and 4:00 PM) also aligns with the circadian dip in alertness, making it the best period for recovery before late afternoon or evening matches. Based on these consistent trends, the data support the conclusion that a 40–45-minute nap taken two hours before kickoff maximizes cognitive sharpness, physical performance, and recovery without negative effects.

Conclusion

This systematic review examined how nightly sleep and strategic napping affect the cognitive and physical performance of elite soccer players. Across fifteen studies, the evidence showed that optimal sleep quality and properly timed naps at 40-45 minutes enhance reaction time, agility, endurance, and mental focus. These benefits occurred without disrupting nighttime sleep, indicating that daytime napping can be an effective and sustainable performance strategy.

However, several biases were present in the data. Most studies used small, male-only samples from elite or collegiate players, limiting generalization to other groups. Many experiments took place in controlled lab settings rather than real match environments and focused on short-term effects instead of long-term outcomes. Additionally, the reliance on self-reported sleep measures and wearable data could present some inaccuracies.

The findings of this research extend beyond soccer. Optimizing sleep and rest can improve focus, recovery, and resilience in other fields such as medicine, education, and military. Future studies should include more diverse participants, examine long-term effects, and use advanced monitoring tools for greater accuracy. In conclusion, sleep and strategic napping are not just forms of rest but important tools for enhancing performance, recovery, and well-being in athletes and the broader population.

Works Cited

Aldo C., Adriana S. Amaral, Renato Guerreiro, Andressa Silva, Marco T. deMello, Sergio G. daSilva, Leandro Rechenchosky, Wilson Rinaldi. Elite soccer athlete's sleep: A literature review. Apunts Sports Medicine, Volume 57, Issue 213, 2022, 100373, ISSN 2666-5069. https://doi.org/10.1016/j.apunsm.2021.100373

Boukhris, O., Trabelsi, K., Hill, D. W., Hsouna, H., Abdessalem, R., Ammar, A., … Chtourou, H. (2022). Physiological response and physical performance after 40 min and 90 min daytime nap opportunities. Research in Sports Medicine, 31(6), 881–894. https://doi.org/10.1080/15438627.2022.2079979

Clemente, Filipe Manuel et al. “Relationships between Sleep, Athletic and Match Performance, Training Load, and Injuries: A Systematic Review of Soccer Players.” Healthcare (Basel, Switzerland) vol. 9,7 808. 26 Jun. 2021. doi:10.3390/healthcare9070808

Cook, Jesse D, and Jonathan Charest. “Sleep and Performance in Professional Athletes.” Current Sleep Medicine Reports vol. 9,1 (2023): 56-81. doi:10.1007/s40675-022-00243-4

Eken, Ö.; Öncü, M.; Kurtoğlu, A.; Bozkurt, O.; Türkmen, M.; Aldhahi, M.I. The Acute Effects of 25- Versus 60-Minute Naps on Agility and Vertical Jump Performance in Elite Youth Soccer Players: The Role of Individual Chronotype. Life 2025, 15, 422. https://doi.org/10.3390/life15030422

Kurtoğlu, A., Eken, Ö., Aydın, E. et al. The impact of strategic napping on peak expiratory flow and respiratory function in young elite athletes. BMC Sports Sci Med Rehabil 16, 41 (2024). https://doi.org/10.1186/s13102-024-00842-4

Lastella M, Halson SL, Vitale JA, Memon AR, Vincent GE. To Nap or Not to Nap? A Systematic Review Evaluating Napping Behavior in Athletes and the Impact on Various Measures of Athletic Performance. Nat Sci Sleep. 2021;13:841-862. https://doi.org/10.2147/NSS.S315556

Mesas AE, Núñez de Arenas-Arroyo S, Martinez-Vizcaino V, et al. Is daytime napping an effective strategy to improve sport-related cognitive and physical performance and reduce fatigue? A systematic review and meta-analysis of randomised controlled trials. British Journal of Sports Medicine 2023;57:417-426.

Nishida M, Okano S, Ichinose A, Suyama S, Youn S. Daytime Napping Benefits Passing Performance and Scanning Activity in Elite Soccer Players. J Sports Sci Med. 2023 Mar 1;22(1):75-83. doi: 10.52082/jssm.2023.75. PMID: 36876185; PMCID: PMC9982537.

Sanders, N., Randell, R. K., Thomas, C., Bailey, S. J., & Clifford, T. (2024). Sleep architecture of elite soccer players surrounding match days as measured by WHOOP straps. Chronobiology International, 41(4), 539–547. https://doi.org/10.1080/07420528.2024.2325022

Sanders, N.; Randell, R.K.; Thomas, C.; Bailey, S.J.; Clifford, T. Characterising and Comparing the Sleep Characteristics and Behaviours of Female and Male Soccer Players: A Cross-Sectional Survey of an Elite Soccer Club. Sports 2025, 13, 189. https://doi.org/10.3390/sports13060189

Xu A, Wang N, Gao Y, Li X. Impact of 30-minute and 90-minute Naps on Aerobic and Anaerobic Intermittent Performance in Collegiate Soccer Players. Nat Sci Sleep. 2025;17:621-630. https://doi.org/10.2147/NSS.S498173