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Sleep Quality and Recovery in Football Players: A Narrative Review

Weronika Matyja, ORCID <https://orcid.org/0009-0002-1897-6338>

E-mail matyjaweronika7@gmail.com

Medical University of Silesia, Poniatowskiego 15, 40-055 Katowice, Poland

Aleksandra Syguda, ORCID <https://orcid.org/0009-0008-1314-7120>

E-mail aleksandra.syguda28@gmail.com

Medical University of Silesia, Poniatowskiego 15, 40-055 Katowice, Poland

Agnieszka Szcześniak, ORCID <https://orcid.org/0009-0009-7949-0383>

E-mail agnieszkaszczesniak05@gmail.com

Medical University of Silesia, Poniatowskiego 15, 40-055 Katowice, Poland

Kamila Tarnawska, ORCID <https://orcid.org/0009-0003-1146-7212>

E-mail kamilatarnawska79@gmail.com

Medical University of Silesia, Poniatowskiego 15, 40-055 Katowice, Poland

Anna Strózik, ORCID <https://orcid.org/0009-0009-3813-8770>

E-mail a.strozik01@gmail.com

Medical University of Silesia, Poniatowskiego 15, 40-055 Katowice, Poland

Corresponding Author

Weronika Matyja, E-mail matyjaweronika7@gmail.com

Abstract

Background. Sleep is essential for recovery, performance, and injury prevention in football players, but is often impaired by congested schedules, travel, and late-evening matches.

Aim. This narrative review synthesised current evidence on sleep quality and recovery in football players, focusing on performance, injury risk, and circadian regulation.

Materials and methods. PubMed, Scopus, and Google Scholar were searched for English-language studies published between 2015 and 2026. Twenty-nine studies involving football players of different ages, sexes, and competitive levels were included in a narrative synthesis.

Results. Poor sleep quality was common, with some studies reporting prevalence approaching 70%. Reduced sleep was associated with impaired recovery, lower performance, greater fatigue, and increased injury risk, particularly in younger players. Training load, match scheduling, and travel negatively affected sleep, partly through circadian disruption. Individualised sleep hygiene, planned napping, and melatonin improved selected recovery and performance outcomes.

Conclusions. Sleep is a central, modifiable factor influencing recovery and performance in football. Monitoring sleep and applying individualised, evidence-based interventions may improve player readiness, although further controlled research is needed, particularly in female and youth football populations.

Keywords: sleep; recovery; football; injury risk; circadian rhythm.

1. Introduction

Sleep is a fundamental physiological process that supports recovery, neuromuscular function, hormonal regulation, immune function, and cognitive readiness in competitive athletes. During sleep, several processes essential for athletic performance occur, including growth hormone secretion, muscle tissue repair, glycogen restoration, motor learning consolidation, and regulation of inflammatory responses. In football, characterised by repeated high-intensity actions, frequent travel, congested competition schedules, and evening matches, maintaining adequate sleep quality and quantity represents a significant challenge for player health and performance. Football-specific demands, including irregular match schedules, artificial light exposure during late fixtures, psychological arousal associated with competition, and frequent changes in daily routines, may interfere with normal sleep patterns [1]. These challenges are further compounded by common athlete behaviours, such as inconsistent sleep schedules, extensive electronic device use before bedtime, and repeated transitions between club, national team, and travel environments.

Evidence from elite football populations indicates that sleep disruption is common and may have meaningful consequences for recovery. Elite players have demonstrated reduced sleep duration and poorer perceived recovery following night matches compared with training days and daytime fixtures [2]. Furthermore, a high prevalence of poor sleep quality and sleep deficits has been reported across children, adolescents, and adult football players, suggesting that sleep-related problems are not restricted to professional athletes but may occur throughout the football development pathway [3]. However, sleep characteristics appear to vary according to sex, age, and competitive level, with female and youth players remaining comparatively underrepresented in the literature despite potentially distinct physiological and contextual challenges.

The mechanisms linking sleep with athletic recovery and performance are increasingly recognised. Evening training and competition may alter circadian regulation through changes in melatonin secretion and light exposure, potentially affecting sleep onset and sleep quality [4]. Insufficient sleep has also been associated with impaired muscle recovery, altered metabolic responses, increased fatigue perception, and reduced cognitive function. These effects may be particularly relevant in football, where optimal neuromuscular coordination, decision-making, and reaction speed are required during repeated high-intensity actions. In addition to its influence on recovery and performance, sleep has emerged as a potential

modifiable risk factor for injury. Recent systematic reviews have identified consistent associations between poor sleep and increased injury or illness risk among football players [5,6], while highlighting chronotype as a potentially important but insufficiently explored moderating factor [5]. Proposed mechanisms include impaired neuromuscular control, slower reaction times, reduced proprioceptive accuracy, and diminished capacity to tolerate accumulated physical load.

Alongside observational research, increasing attention has been directed toward practical strategies aimed at improving sleep and supporting recovery in football environments. These strategies include sleep monitoring, structured napping, sleep hygiene interventions, circadian-informed scheduling, and the use of melatonin supplementation. However, findings remain heterogeneous, with substantial variation in study populations, intervention protocols, outcome measures, and implementation methods. Consequently, practitioners continue to face uncertainty regarding which strategies are most effective, for which athletes, and under what competitive circumstances.

Despite the expanding evidence base, research on sleep in football remains fragmented across several specialised areas, including injury prevention, performance enhancement, circadian regulation, and applied recovery monitoring. Previous reviews have provided valuable insights into individual aspects of this relationship; however, fewer studies have integrated these domains into a broader practical framework that considers the interaction between sleep, training demands, competition schedules, travel, and individual athlete characteristics. Furthermore, many investigations continue to focus primarily on elite male populations, limiting the generalisability of findings to female and youth football players. Direct comparisons between different intervention approaches, particularly individualised versus standardised sleep-support strategies, also remain limited.

Therefore, the aim of this narrative review is to synthesise current evidence regarding sleep quality and recovery in football players, with particular emphasis on the relationships between sleep, athletic performance, injury risk, circadian regulation, and practical interventions designed to optimise sleep-related outcomes. By integrating findings across different age groups, sexes, and competitive levels, this review seeks to provide a comprehensive overview of the current evidence and highlight practical considerations for researchers, coaches, and sports medicine practitioners.

2. Research materials and methods

2.1. Study design and eligibility criteria

This study was conducted as a narrative review aimed at synthesising current evidence regarding the relationship between sleep quality, recovery, athletic performance, injury risk, circadian rhythm, and sleep-related interventions in football players. A structured literature search and narrative synthesis were used to identify and summarise the available evidence.

Studies were considered eligible if they met the following criteria: (i) published in English; (ii) conducted in football (soccer) players; (iii) published between 2015 and 2026; and (iv) investigated at least one outcome related to sleep quality, recovery, athletic performance, injury risk, circadian rhythm, or sleep-related interventions.

No restrictions were applied regarding participants' age, sex, or competitive level in order to capture evidence across youth, amateur, and professional football populations.

Studies involving non-football athletes were considered only when they provided directly relevant mechanistic or comparative evidence unavailable in football-specific populations. Conference abstracts, animal studies, editorials, narrative commentaries, and articles without accessible full text were excluded.

2.2. Literature search strategy

A literature search was conducted using three electronic databases: PubMed, Scopus, and Google Scholar. The search was performed in July 2026 to identify studies investigating sleep and recovery in football players.

In addition to the database search, the reference lists of all eligible articles were manually screened to identify further relevant publications.

Duplicate records identified across databases were removed prior to the screening process.

2.3. Search terms

The search strategy combined terms related to sleep, football, recovery, athletic performance, injury, circadian rhythm, and sleep interventions. The following search string was applied:

("sleep" OR "sleep quality" OR "sleep hygiene" OR "chronotype" OR "melatonin") AND ("football" OR "soccer") AND ("recovery" OR "performance" OR "injury" OR "fatigue")

Search terms were adapted where necessary according to the requirements of each database.

2.4. Study selection process

The identified records were screened according to the predefined eligibility criteria. Titles and abstracts were assessed by the authors for relevance to the objectives of the review, followed by full-text evaluation of potentially eligible studies. Studies meeting the inclusion criteria were incorporated into the final narrative synthesis.

For each included study, data were extracted by the authors on study design, participant characteristics, competitive level, sleep-related exposure or intervention, outcome measures, and principal findings relevant to the objectives of this review.

2.5. Data synthesis and analysis

Due to substantial heterogeneity among the included studies regarding participant characteristics, competitive level, sleep assessment methods, interventions, and outcome measures, quantitative meta-analysis was not considered appropriate. As this study was conducted as a narrative review, no formal risk-of-bias or methodological quality assessment of the included studies was performed.

Instead, findings were synthesised narratively and organised into the following four thematic categories:

1. Sleep quality and quantity in football players;
2. Sleep and injury risk;
3. Sleep and athletic performance/recovery;
4. Circadian rhythms, chronotype, and applied sleep interventions.

Within each thematic area, studies were compared to identify consistent findings, areas of uncertainty, methodological limitations, and implications for practical application in football environments.

3. Research results

3.1. Sleep quality and quantity in football players

Across the included studies, football players consistently demonstrated suboptimal sleep characteristics, with sleep quality and duration frequently affected by the demands of training, competition, and lifestyle factors. Although athletes often require greater sleep opportunity than the general population due to increased physiological demands, many football players fail to achieve sufficient and restorative sleep. This issue appears across different age groups and competitive levels, suggesting that sleep disruption represents a widespread challenge within football rather than a problem limited to elite professional environments.

High rates of poor sleep quality have been reported among football players. In a large cohort including children, adolescents, and adult soccer players, nearly half of participants demonstrated indicators of poor sleep quality, with evening chronotype, excessive daytime sleepiness, and later training termination times identified as factors associated with greater likelihood of sleep deficit [3]. Similarly, a high prevalence of poor sleep quality (68.5%) was reported among professional players in a Qatari league, indicating that clinically relevant sleep disturbances may affect a substantial proportion of elite athletes [7]. Furthermore, subjective sleep quality has been associated with physiological performance indicators, including maximal oxygen uptake ($\text{VO}_{2\text{max}}$) and resting heart rate, suggesting that perceived sleep quality may reflect meaningful differences in athletes' physical readiness and recovery status [9].

Sleep characteristics also appear to differ according to sex and competitive level. A comparison of elite senior male, senior female, and U21 male players demonstrated that senior female players reported greater sleep difficulties compared with both male groups, while senior players of both sexes displayed less favourable sleep-related behaviours, including greater exposure to travel demands and stimulant and alcohol use, and senior female players additionally reported greater pre-sleep cognitive arousal [8]. These findings suggest that sleep outcomes are influenced not only by training demands but also by broader lifestyle and environmental factors associated with elite sport participation.

Training load represents another important factor influencing sleep patterns. Among elite female football players, periods of elevated training load were associated with reduced time in

bed, lower total sleep duration, and alterations in sleep architecture, including changes in rapid eye movement (REM) sleep [10]. These findings indicate that sleep disruption may fluctuate dynamically throughout the season according to changes in physical demands rather than representing a stable individual characteristic. Consequently, monitoring sleep during periods of intensified training or congested competition schedules may provide valuable information for athlete management.

In youth football populations, sleep behaviour is influenced by factors extending beyond formal training exposure. High levels of sedentary activity outside training have been reported among young players, although off-training physical activity alone did not clearly differentiate sleep quality profiles, suggesting that academic demands, recreational screen use, and lifestyle habits may contribute substantially to sleep outcomes in developing athletes [11]. Conversely, structured competitive participation among adolescents, regardless of competitive level, has been associated with better sleep quality and quality of life compared with inactive or non-competitive peers, indicating that structured sporting participation may provide certain protective effects despite the additional demands imposed by competitive involvement [12].

Match demands also contribute to short-term fluctuations in sleep and recovery status. In highly trained female football players, competitive matches disrupted sleep duration and subjective wellness markers, including fatigue, muscle soreness, and perceived sleep quality, for up to two days following competition. Moderate associations were observed between sleep duration and external match-load indicators, including high-speed running distance, suggesting that greater physical demands may contribute to impaired post-match recovery [13].

Overall, current evidence indicates that sleep quality and quantity in football players are highly context-dependent and influenced by multiple interacting factors, including training load, competition schedules, travel demands, sex, age, and individual lifestyle behaviours. Rather than representing a fixed characteristic of football populations, sleep appears to fluctuate according to the combined effects of sporting demands and personal circumstances.

3.2. Sleep and injury risk

Sleep has increasingly been recognised as a relevant factor associated with injury risk in football players. Across the included studies, insufficient sleep quality and quantity have been

linked with a greater likelihood of injury or illness, although the mechanisms underlying this relationship remain multifactorial. Proposed explanations include impaired neuromuscular control, slower reaction time, reduced proprioceptive function, altered recovery processes, and decreased tolerance to accumulated physical load.

A systematic review of 18 studies identified a consistent association between poor sleep characteristics and increased injury or illness risk among soccer players, while also highlighting chronotype as a potentially important moderating factor requiring further investigation [5]. These findings support the growing recognition that sleep-related variables may contribute to injury risk assessment alongside traditional factors such as training load, previous injury history, and physical workload.

Recent evidence suggests that the relationship between sleep and injury risk may not be uniform across all athletes. Using quantile regression analysis, Li et al. demonstrated that the association between sleep quality and injury risk in adolescent football players was considerably stronger among athletes with a higher baseline susceptibility to injury [14]. This approach identified differences in risk distribution that may not be captured through conventional analyses based on average effects across an entire population. The findings are particularly relevant for youth players, where rapid growth and changes in neuromuscular control may temporarily increase vulnerability to injury.

The potential protective role of sleep quantity has also been investigated during periods of congested competition. In professional football players monitored across 38 matches, greater sleep duration during recovery nights following matches was associated with a lower relative risk of non-contact injury during demanding fixture periods [15]. Interestingly, this association was observed for sleep quantity rather than sleep quality or other commonly monitored recovery indicators, suggesting that obtaining sufficient sleep duration may represent an important and practical target within injury-prevention strategies.

Overall, current evidence indicates that sleep represents a potentially modifiable factor associated with injury risk in football players. However, further longitudinal research is required to clarify causal relationships and determine how sleep monitoring can best be integrated with existing injury prevention and workload management models.

3.3. Sleep and athletic performance/recovery

Sleep disruption has been consistently associated with impaired recovery and reduced performance outcomes in football players. Following night matches, elite players have demonstrated shorter sleep duration and poorer perceived recovery compared with training days and daytime fixtures, indicating that match timing represents an important factor affecting post-match recovery [2]. Experimental evidence further supports these observations, with sleep restriction shown to impair both anaerobic and aerobic performance in male soccer players. Although caffeine supplementation partially improved performance outcomes under sleep-restricted conditions, it did not fully compensate for the negative effects of insufficient sleep [16].

Beyond physical performance, sleep quality may also influence psychological readiness. In elite male Australian football players, poorer sleep quality was associated with greater mental fatigue across the competitive season, suggesting that sleep monitoring may provide relevant information regarding both physical and cognitive aspects of athlete readiness [18]. In practical settings, selecting appropriate monitoring tools remains important, as laboratory-based assessments are often impractical in team environments. A systematic review and meta-analysis identified several feasible sleep parameters for monitoring team-sport athletes, supporting the use of field-based approaches such as questionnaires and wearable-derived measures [17].

Strategic napping has emerged as a practical recovery strategy in football populations. A 90-minute nap improved time-motion performance and psychophysiological responses during small-sided games in professional players, suggesting potential benefits for both physical output and readiness [19]. Similarly, daytime napping improved agility and reduced perceived exertion in adolescent soccer players, although it did not enhance fatigue resistance during repeated-sprint performance [20]. The effectiveness of napping may depend on individual characteristics, as nap duration and performance responses have been shown to vary according to athlete chronotype, with different chronotype groups demonstrating different responses to 25- and 60-minute nap protocols [21].

Pharmacological approaches have also been investigated. Low-dose melatonin supplementation following exhaustive exercise was associated with increased sleep duration and improved resting heart rate stability in young male athletes, although no significant effects were observed for muscle damage markers such as creatine kinase [22]. These findings suggest potential benefits for selected recovery outcomes; however, further research is

required before clear recommendations regarding routine melatonin use in football populations can be established.

Overall, current evidence indicates that insufficient sleep negatively affects both physical and psychological readiness in football players. Practical strategies such as sleep monitoring and individualised napping protocols may provide useful approaches for supporting recovery, although their effectiveness appears dependent on appropriate implementation and athlete-specific characteristics.

3.4. Circadian rhythms, chronotype, and applied interventions

Circadian regulation represents an important factor influencing sleep outcomes in football players, particularly in relation to training timing, evening competition, and international travel. Evening training sessions have been associated with alterations in melatonin secretion and reduced sleep quality compared with morning training, suggesting that exercise timing may influence circadian alignment and subsequent recovery [4]. In contrast, late-evening high-intensity physical activity has not been found to significantly affect objective or subjective sleep quality among players without a clearly defined morning or evening chronotype, suggesting that the disruptive effect of evening training on sleep may itself depend on chronotype [23].

Recent field-based research has further demonstrated the importance of considering individual circadian characteristics. In elite female football players, salivary melatonin assessments revealed that physiological markers of circadian timing may provide additional information beyond self-reported chronotype. A greater phase angle between melatonin onset and sleep onset was associated with longer sleep duration, whereas signs of circadian misalignment were related to poorer subjective well-being [24].

Travel demands represent another major challenge for maintaining normal sleep patterns in football. Players travelling across multiple time zones have reported greater jet lag, fatigue, and sleep disruption, with the magnitude of these effects influenced by travel duration, departure timing, and direction of travel [25]. Furthermore, post-match travel combined with high match loads has been associated with poorer recovery outcomes, with eastward travel and later departures following competition identified as particularly disruptive factors [26].

Intervention studies indicate that the effectiveness of sleep hygiene strategies depends strongly on implementation and individualisation. Individualised, media-based sleep education delivered through personalised messages improved sleep efficiency and sleep latency in professional female football players, with behavioural improvements maintained after the intervention period [27]. Similarly, a structured sleep hygiene programme improved sleep quality, sleep duration, and match-running performance in male university-level players during a competitive tournament [28]. In contrast, standardised written recommendations provided without individual support produced smaller and less consistent effects on sleep, fatigue, and cognitive outcomes among student-athletes [29].

Overall, current evidence suggests that sleep management in football should incorporate circadian considerations, travel demands, and athlete-specific responses. Interventions supported by regular monitoring and individualised feedback appear more effective than generic recommendations delivered without ongoing support.

4. Discussion

The findings synthesised in this narrative review indicate that sleep quality and quantity represent important and modifiable factors associated with recovery, performance, and injury risk in football players. Across different age groups, sexes, and competitive levels, the available evidence demonstrates a consistent pattern: football players frequently experience insufficient or disrupted sleep, and these disturbances are associated with measurable consequences for physical readiness, cognitive function, and athlete availability. Although the included studies differed substantially in methodology and populations, the overall direction of evidence supports the integration of sleep management into broader athlete monitoring and performance systems.

A central finding of this review is that sleep disruption in football should be considered a dynamic response to sporting demands rather than an isolated individual characteristic. Training load, match timing, travel demands, and lifestyle factors appear to interact in determining sleep outcomes throughout the season. This suggests that sleep monitoring may be particularly valuable during periods of intensified competition, congested schedules, or increased travel demands, when the risk of inadequate recovery is likely to be elevated. Importantly, these findings support a shift from viewing sleep as a passive recovery behaviour

to recognising it as a variable that can be actively monitored and managed within football environments.

The relationship between sleep and injury risk represents one of the most practically relevant findings of the current evidence base. Although causality cannot yet be established, the repeated association between poor sleep and increased injury risk suggests that sleep may represent an additional factor within comprehensive injury-prevention models. The stronger relationship observed among high-risk adolescent athletes further indicates that population-level averages may underestimate the impact of sleep disturbance in vulnerable groups. This highlights the importance of considering individual risk profiles rather than applying identical recovery expectations across all players.

The reviewed evidence also expands the role of sleep beyond traditional physical recovery outcomes. Sleep restriction and post-match sleep disruption appear to negatively affect both physiological performance and psychological readiness, including mental fatigue. In modern football environments, where decision-making, concentration, and tactical awareness are essential components of performance, the cognitive consequences of insufficient sleep may be as relevant as reductions in physical capacity. Therefore, sleep monitoring may provide valuable information not only for conditioning staff but also for practitioners responsible for managing athlete well-being and performance availability.

Applied interventions targeting sleep improvement show promising but heterogeneous results. Napping strategies appear to provide a practical recovery option, although responses depend on factors such as duration, timing, and individual characteristics, including chronotype. Similarly, sleep hygiene interventions appear more effective when delivered through individualised and actively supported approaches rather than generic educational materials. This suggests that the effectiveness of sleep interventions may depend less on the recommendation itself and more on the process through which behavioural change is implemented.

Circadian regulation represents another important consideration for football organisations. Evening matches, late training sessions, artificial light exposure, and international travel may contribute to circadian disruption, potentially reducing recovery quality during already demanding periods of the season. Incorporating circadian principles into scheduling decisions may therefore represent a practical opportunity to minimise avoidable sleep disruption,

although further research is required to determine how these approaches can best be implemented in real-world football settings.

Overall, the evidence indicates that sleep should be regarded as an integrated component of football performance management rather than an isolated recovery behaviour. Sleep interacts with training load, injury risk, physical performance, cognitive readiness, and long-term athlete availability. Consequently, clubs and practitioners should consider sleep monitoring and targeted interventions as complementary elements of comprehensive athlete management strategies.

Practical implications

The findings of this review support several practical recommendations. First, routine sleep monitoring using validated questionnaires or wearable technologies may assist practitioners in identifying periods of increased recovery risk. Second, sleep interventions should prioritise individualisation, regular feedback, and active athlete engagement rather than relying exclusively on standardised recommendations. Third, strategic napping may represent a feasible and low-cost recovery strategy, although protocols should account for individual responses and chronotype differences. Finally, training and travel planning should incorporate circadian considerations, particularly during periods involving evening competition and international travel.

Limitations and future directions

Several limitations should be considered when interpreting the findings of this review. The included studies demonstrated substantial heterogeneity in participant characteristics, competitive level, sleep assessment methods, and outcome measures, limiting direct comparisons between investigations. In addition, many studies employed observational designs, meaning that associations between sleep, performance, and injury outcomes should not be interpreted as evidence of direct causation. Poor sleep may contribute to reduced recovery and increased injury risk, but it may also reflect underlying factors such as accumulated fatigue, psychological stress, or excessive training demands.

As a narrative review, this review provides a qualitative synthesis of current evidence rather than pooled effect estimates. Future research should prioritise standardised sleep assessment approaches, larger controlled intervention trials, and greater inclusion of female and youth

football populations. Further investigation into individual sleep responses, chronotype, and comparative effectiveness of different intervention delivery models will be important for developing more precise and practical recommendations for football practitioners.

5. Conclusions

This narrative review indicates that sleep quality and quantity are important factors associated with recovery, performance, and injury risk in football players. Sleep disturbances appear to be common across different age groups and competitive levels, with potential consequences including impaired post-match recovery, reduced physical and cognitive readiness, increased mental fatigue, and greater injury susceptibility, particularly among more vulnerable groups such as younger athletes.

The available evidence suggests that sleep should be considered an integral component of athlete management rather than an isolated recovery behaviour. Training load, match scheduling, evening competition, and international travel represent important modifiable factors influencing sleep through mechanisms related to circadian regulation and melatonin secretion.

Practical strategies, including routine sleep monitoring, individualised sleep interventions, structured napping, and consideration of circadian principles in training and travel planning, may support athlete readiness and long-term availability. However, the effectiveness of these approaches appears to depend on appropriate implementation, with personalised and actively supported interventions showing greater potential than generic recommendations.

Future research should focus on standardised sleep assessment methods, controlled intervention studies, and greater representation of female and youth football populations. Further comparisons between different intervention approaches, particularly individualised and standardised strategies, are needed to establish more precise recommendations for practitioners working in football environments.

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Author Contributions

Conceptualisation: Weronika Matyja and Aleksandra Syguda; methodology: Weronika Matyja; validation: Aleksandra Syguda and Agnieszka Szcześniak; formal analysis: Weronika Matyja and Kamila Tarnawska; investigation: Weronika Matyja, Kamila Tarnawska, and Anna Strózik; resources: Agnieszka Szcześniak; data curation: Kamila Tarnawska; writing, original draft preparation: Weronika Matyja; writing, review and editing: Aleksandra Syguda, Agnieszka Szcześniak, Kamila Tarnawska, and Anna Strózik; visualisation: Weronika Matyja; supervision: Aleksandra Syguda; project administration: Weronika Matyja; funding acquisition: Weronika Matyja. All authors have read and agreed to the published version of the manuscript.

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The authors declare no conflict of interest.

Declaration of the Use of Generative AI and AI-Assisted Technologies in the Writing Process

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