# Exercising late at night can disrupt sleep quality, study finds



A recent study leveraging extensive data collected from the biometric wearable company Whoop has revealed new insights into the relationship between exercise timing and sleep quality. The research, published in Nature Communications by collaborators from Monash University and Harvard, found that exercising intensely or within four hours of bedtime can adversely affect sleep.

The study analysed data from 14,689 physically active individuals who wore Whoop bands over a full year. The findings indicated that workouts performed later in the evening, particularly those involving high strain, were associated with delayed sleep onset, reduced sleep duration, and diminished overall sleep quality. Additionally, these intense late sessions corresponded with physiological changes such as elevated nocturnal resting heart rate and decreased heart rate variability.

Given these findings, the researchers suggest that individuals aiming to maximise sleep quality might benefit from scheduling their workouts to end at least four hours before bedtime. For those who prefer high-intensity training, this timing adjustment may be particularly important. Alternatively, opting for lower-intensity sessions closer to bedtime could mitigate some of the negative impacts on sleep.

Dr Elise R. Facer-Childs, one of the authors of the study, highlighted the public health implications, particularly noting the prevalence of sleep problems. “Our novel and timely findings have significant implications for public health messaging around timing, duration and intensity of exercise and present a critical step towards improving population sleep health—an issue of central importance given two in three Australian adults report at least one sleep problem and one in five adults fail to achieve the recommended seven or more hours of sleep per night,” she said.

Will Ahmed, the founder and CEO of Whoop, emphasised the importance of exercise timing in addition to exercise type and intensity. Speaking to Athletech News, he said: “If you’re training hard but not sleeping well, when you work out may matter just as much as how you work out. This is one of the largest studies ever published on exercise and sleep—and it’s only possible because of continuous Whoop data and our commitment to research that improves human performance.”

Whoop, a Boston-based company specialising in human performance tracking, has a strong record of scientific collaboration aimed at advancing health and wellness. Among its recent partnerships is work with Solidcore, a boutique fitness brand, to monitor workout strain and intensity in their Reformer-based classes.

These new insights from one of the largest datasets studied to date could help inform strategies for athletes, fitness enthusiasts, and those experiencing sleep difficulties alike, providing evidence on how to optimise exercise routines to support better sleep outcomes.

Source: [Noah Wire Services](https://www.noahwire.com)

## Bibliography

1. <https://www.nature.com/articles/s41467-023-37462-0> - This is the original peer-reviewed study published in Nature Communications by Monash University and Harvard researchers, presenting the findings on how intense exercise or exercise within four hours of bedtime negatively impacts sleep quality.
2. <https://www.whoop.com/us/en/thelocker/fact-or-fiction-does-exercise-close-to-bedtime-harm-sleep-quality/> - Supports the claim regarding the association between exercise timing—particularly within four hours of bedtime—and reduced sleep efficiency, based on extensive WHOOP user data analysis.
3. <https://techarc.net/inside-whoops-sleep-study-lessons-for-smartwatches-and-sleep-science/> - Confirms the recommendation that workouts should ideally end at least four hours before typical sleep onset to avoid negative effects on sleep quality, and explains WHOOP's methodology and conclusions.
4. <https://www.whoop.com/us/en/thelocker/importance-of-sleep> - Supports the article's statements on the importance of sleep for recovery and overall health, and contextualizes why improving sleep quality via exercise timing is valuable for performance and public health.
5. <https://www.whoop.com/us/en/about/> - Provides background on Whoop as a Boston-based company specializing in biometric wearables focused on human performance tracking and its role in scientific collaborations.
6. <https://www.athletechnews.com/whoop-ceo-will-ahmed-comments-on-exercise-timing-and-sleep/> - Includes statements by Will Ahmed, Whoop’s founder and CEO, emphasizing the importance of exercise timing in addition to exercise intensity and type for optimizing sleep, corroborating his quoted remarks.
7. <https://news.google.com/rss/articles/CBMiigFBVV95cUxQT3Vzajd6OVVrc2l3SFl1MEZqVkluclQzbnBlb280QjQxalNiTlZLOWNvN1pHUU1CQ2tKZDFZSDF2M3ZTWk9EWm5hZFFsX09UMmxrbnJvajJOZHEzMHlLZDQ0RXdQeDdsZ0dRTkZHeXg0N2t5ZGhsWjU2WHFWUy0zRUZBck1xRTFzUHc?oc=5&hl=en-US&gl=US&ceid=US:en> - Please view link - unable to able to access data