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SUMEJ
Sumatera Medical Journal
Journal homepage: https://talenta.usu.ac.id/smj

Research Article

Implementation of the IPK® Esports Method in a Professional League of Legends Team: A Pilot Study on Circadian Monitoring, Neurofunctional Recovery, and Cognitive Performance

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ARTICLE INFO

Article history:
Received 19 June 2025
Revised 6 April 2026
Accepted 7 April 2026
Available online 1 May 2026

E-ISSN: 2622-1357
P-ISSN: 2622-9234

How to cite:
Juan Carlos Andrade, Mikeldi Aguirre Berasategui, "Implementation of the IPK® Esports Method in a Professional League of Legends Team: A Pilot Study on Circadian Monitoring, Neurofunctional Recovery and Cognitive Performance", SUMEJ, Vol. 09, No. 02, May 2026.

https://doi.org/10.32734/sumej.v9i2.21428

ABSTRACT

Introduction: Esports athletes are exposed to neurophysiological stress, irregular sleep patterns, and cognitive overload, which can impair performance and health. The IPK Esports® Method integrates daily wellness tracking, circadian rhythm monitoring, and neurofunctional physiotherapy. **Objective:** To describe the implementation of the IPK Esports® Method in a professional League of Legends team, highlighting a one-time 7-day circadian rhythm assessment with Kronowise® and the application of individualized neurophysiological interventions. **Methods:** This descriptive study was conducted during the preparation and regular competitive season. Players completed daily wellness questionnaires. Weekly neurotraining sessions were implemented to enhance motor control and cognitive performance. A single 7-day assessment with Kronowise® recorded circadian parameters and estimated sleep. Post-training, players underwent reaction tests. Based on data, customized physiotherapy interventions were applied. **Results:** Circadian analysis showed delayed sleep onset, fragmented sleep, and high pre-sleep blue light exposure, informing targeted sleep hygiene strategies. Participants with higher circadian stability tended to have lower reaction time variability. Given the pilot sample (n=2), findings are exploratory, and no inferential analysis was conducted. **Conclusion:** The IPK Esports® Method enables a personalized, data-driven approach to optimize health, recovery, and performance in esports athletes.

Keywords: circadian rhythms, esports performance, neurotraining, physiotherapy, sleep monitoring

1. Introduction

The exponential growth of esports has transformed competitive gaming into a high-performance domain requiring not only technical skill but also physical, cognitive, and emotional resilience. Professional players are subjected to long training hours, high cognitive load, irregular routines, and often poor sleep hygiene, all of which compromise physiological recovery and performance sustainability. Recent studies have emphasized that esports athletes frequently experience disrupted circadian rhythms, particularly due to late-night exposure to blue light, sleep onset delays, and insufficient exposure to natural light. These alterations can impair neurocognitive performance, increase fatigue, and predispose players to stress-related injuries and burnout.

Despite these challenges, there remains a lack of standardized, integrative health protocols designed specifically for esports. In response, the IPK Esports® Method was developed as a multidisciplinary strategy that integrates subjective monitoring, objective physiological evaluation, cognitive-motor training, and personalized physiotherapeutic interventions.

Among its tools, circadian rhythm monitoring using Kronowise®, a non-invasive wearable system, provides valuable insights into sleep–wake cycles, temperature variations, and light exposure. When combined with daily wellness questionnaires and weekly neurotraining, the method allows for precise adaptation of interventions based on each player's real-time status. The aim of this study is to describe the implementation of the IPK Esports® Method in a professional League of Legends team during the preseason and regular season, highlighting the integration of a 7-day Kronowise® assessment and individualized neurophysiological recovery strategies.

2. Methods

2.1 Study Design and Context

This descriptive observational study was conducted during the preseason and regular season of a professional League of Legends team. The team, competing under the name Bisons Club, finished first in the 2023 Spring Split regular season of the Spanish LVP Superliga de League of Legends (https://superliga.lvp.global/). The study describes the implementation of the IPK Esports® Method, a multidisciplinary health and performance protocol specifically designed for esports athletes. The IPK Esports® Method is part of the IPK SYSTEM® Integral Personal Care, a multidisciplinary health strategy created in 2011 and officially registered as a mixed national trademark (Class 44, Nº 3532482) by the Spanish Patent and Trademark Office (OEPM). The renewal of this trademark was granted in 2025.

2.2 Daily Wellness Monitoring

Throughout the season, each player completed a five-item daily self-report form ("Wellness Questionnaire") evaluating sleep quality, fatigue, muscle soreness, emotional stress, and motivation. Responses were reviewed daily by the physiotherapy staff to guide individualized recovery or performance-enhancing interventions.

2.3 Circadian Rhythm Assessment (Kronowise®)

A 7-day circadian rhythm monitoring was conducted once during the preseason using Kronowise® 3.0. Although the device was assigned to all five players, only two athletes, identified as Esports03 and Esports04, met the compliance criteria. The remaining three were excluded due to improper or inconsistent use, or injury-related non-participation. Kronowise® was worn on the non-dominant wrist and recorded wrist skin temperature, triaxial acceleration, body position, and light exposure. Data were processed into 30-second epochs. The TAP composite (Temperature-Activity-Position) was used to infer sleep-wake states. Sleep and rhythm metrics included total sleep time (TST), sleep onset latency (SOL), wake after sleep onset (WASO), sleep efficiency (SE), interdaily stability (IS), intradaily variability or fragmentation of the rhythm (IV), normalized relative amplitude (NRA), and circadian health score (CHS).

Compliance Criteria:

Compliance was defined as continuous device wear for at least 20 hours per day across a minimum of 6 out of the 7 monitoring days, without removal during nocturnal sleep periods. Data sets were excluded if daily recording time was below this threshold or if nocturnal temperature and activity signals were incomplete or inconsistent with validated TAP processing standards. The Kronowise® device was worn on the non-dominant wrist, following manufacturer recommendations for ambulatory circadian monitoring. Although validated for TAP analysis, wrist-based monitoring may present ergonomic limitations in professional Esports athletes due to prolonged high-precision mouse and keyboard use.

2.4 Weekly Neurotraining and Reaction Testing

Weekly sessions focused on motor control, sensorimotor coordination, and cognitive flexibility. Post-session, players completed a reaction time test using the mobile app "Reaction Training – Reflex Test" (NixGames, available on Android OS): https://play.google.com/store/apps/details?id=com.nixgames.reaction. Three configurations were tested: right hand, left hand, and both hands simultaneously. Reaction times (in milliseconds) were recorded manually from the app output and tracked week by week to identify trends and guide interventions.

2.5 Personalized Neurophysiological Interventions

Based on daily and weekly data, the IPK clinical team applied individualized neurophysiological techniques (TNNFG IPK®), including active mobility, manual therapy, cryotherapy, electrotherapy, HRV biofeedback, VR-based relaxation, and sleep hygiene protocols. Each intervention session lasted approximately 20–30 minutes and was scheduled 2–3 times per week, depending on individual physiological and cognitive status.

3. Results

Analysis of Esports03 and Esports04 revealed delayed sleep phases, fragmented sleep, and excessive nighttime blue light exposure. Both athletes showed reduced light exposure during the day and low circadian robustness (low IS, high IV, suboptimal CHSCFI). Across the season, players showed progressive improvement in reaction times. Esports03 maintained stable responses (mean ~322ms, SD ±18), while Esports04 showed greater variability (mean ~320ms, SD ±43), potentially reflecting the impact of sleep quality on cognitive performance. The case of Esports04, who showed fragmented sleep and reaction time variability, supports the hypothesis that poor circadian regulation correlates with reduced cognitive consistency. In contrast, Esports03, with milder circadian disruption, exhibited more stable neurocognitive responses.

Exploratory Association Between Wellness Scores and Reaction Time

Daily wellness questionnaire data (sleep quality, perceived fatigue, and stress) were descriptively compared with weekly reaction time results. Sessions preceded by lower self-reported sleep quality and higher fatigue scores coincided with increased intra-session variability in reaction times.

Although no formal statistical correlation was conducted due to the limited sample size, this descriptive alignment supports the feasibility of integrating subjective wellness monitoring with objective performance metrics in future larger-scale studies.

4. Discussion

A major limitation of this pilot study was the exclusion of 3 out of 5 players (60%) due to insufficient adherence to the 7-day Kronowise® monitoring protocol. In this professional Esports context, wrist-worn wearable devices may interfere with fine motor control, tactile sensitivity, and perceived comfort during extended gaming sessions requiring high-precision mouse movements. Several participants reported discomfort or performance-related concerns associated with continuous wrist wear, leading to intermittent device removal and incomplete circadian data sets.

This finding highlights a population-specific methodological challenge: monitoring tools, validated in general or athletic populations, may not be fully compatible with the ergonomic demands of Esports athletes. Future chronobiological research in Esports may benefit from alternative non-intrusive monitoring strategies, including textile-integrated sensors, non-wrist body placements, or contactless environmental circadian assessment systems.

5. Conclusion

The IPK Esports® Method offers a practical and scalable framework for monitoring and supporting esports athletes' health and performance. The integration of objective and subjective data enables precise, personalized interventions. Future studies should aim to validate these findings with larger samples and repeated circadian assessments.

6. Data Availability Statement

The original contributions presented in the study are included in the article. Additional data (reaction time measurements and raw Kronowise® outputs) are available from the corresponding author upon reasonable request due to privacy considerations.

7. Ethical Statement

The study was conducted in accordance with ethical principles for observational research. All participants provided informed consent for the use of their anonymized data for scientific publication. No personal identifiers were collected. Ethical clearance was obtained from the internal ethics board of the IPK Esports® Research Unit (Protocol No. IPK-ES-2025-02).

8. Author Contributions

Juan Carlos Andrade conceptualized and directed the pilot study, designed the IPK® Esports Method, supervised all interventions, and led manuscript preparation and editing. Mikeldi Agirre Berasategi is leading the team's physical and cognitive training sessions during the competitive season, and Iker Junquera Landeta is coordinating field logistics and supporting the technical organization and collection of reaction test data.

9. Funding
This research was conducted independently with no external funding. No grants or institutional sponsorships were received.

10. Acknowledgements
The authors express their gratitude to the professional esports team who voluntarily participated in this study and to the clinical and performance staff of the IPK Esports® program for their support during the entire season. Special thanks to the team of researchers and chronobiologists from Kronohealth who contributed to the interpretation of the Kronowise® data and circadian analysis. We also thank Kronohealth and the Chronobiology Laboratory of the University of Murcia for providing access to the Kronowise® 3.0 device. This collaboration enabled the first-ever circadian rhythm monitoring of professional esports athletes in the Spanish LVP Superliga, marking a milestone in applied sleep and performance research in esports.

The authors would also like to acknowledge Guillermo Venturini, manager, and the players of the BISONS esports team for their active collaboration, commitment, and logistical support during the sample collection, monitoring, and scheduling throughout the preseason and regular split of the 2023 summer season. We would like to recognize the key support of Mikeldi Agirre Berasategi for leading the team's physical and cognitive training sessions during the competitive season, and Iker Junquera Landeta for coordinating field logistics and supporting the technical organization and collection of reaction test data.

11. Conflict of Interest
Authors declares no conflict of interest.

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