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Effect of Physical Exercise on E-sports Performance: A Systematic Review of Training Regimens and Outcomes

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I. Introduction

E-sports have evolved into a competitive industry with increasing recognition of the role physical exercise plays in enhancing player performance. Despite its importance, the impact of structured physical activity on esports performance has not been thoroughly standardised or evaluated.

II. Methods

This systematic review synthesizes studies published from 2010 to May 2025, focusing on physical training interventions (aerobic, resistance, HIIT, mobility, etc.) and their effects on esports performance metrics like reaction time, cognitive abilities, and psychological resilience. The review adheres to PRISMA 2020 guidelines and incorporates studies that meet predefined eligibility criteria.

III. Results and Discussion

This systematic review evaluated the impact of physical exercise on esports performance by examining various training regimens, including HIIT, strength training, and aerobic conditioning. The results indicate that physical exercise significantly improves cognitive and physical performance in esports athletes.

Acute exercise interventions, especially HIIT, have been shown to improve cognitive functions critical for esports, such as reaction time, decision-making, and accuracy. For example, de Las Heras et al. (2020) demonstrated that a 15-minute HIIT session improved accuracy by 75% in League of Legends. Similarly, Mancı et al. (2024) observed that sprint exercises enhanced cognitive control, specifically improving accuracy in Go/No-go tests.

Chronic exercise regimens, like six-week HIIT programmes, led to sustained performance improvements. [3] found that six weeks of HIIT increased flicking accuracy by 16.4% and improved decision-making by 10.5%, demonstrating the importance of consistent training for long-term cognitive and physical gains.

Physical exercise promotes neuroplasticity, enhancing cognitive functions. Studies reveal that exercise boosts the release of neurochemicals like BDNF, which support brain function [1]. These changes contribute to faster decision-making and improved reaction times, essential for esports success.

Exercise also enhances mental resilience, helping athletes manage stress and fatigue. [2] found that physical training improved focus under pressure, while [3] highlighted improvements in mental toughness and stress management after HIIT interventions. These psychological benefits are crucial for sustaining performance during intense gaming sessions.

While the evidence is promising, there is a lack of standardized training protocols and a predominance of short-term studies. Future research should focus on long-term interventions, use objective performance measures, and include more diverse sample populations to improve the applicability of findings across genders and esports disciplines.

IV. Conclusions

Physical exercise, particularly when integrated with mental training techniques, is a promising approach for optimizing esports performance. future research should focus on standardised training protocols, long-term studies, and exploring neurocognitive mechanisms.

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