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Brief Review: Virtual Reality and Physical Exercise as Countermeasures of Coping the Space Missions

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1. Round 1

1.1 Reviewer 1

Date: 03 March 2024

Reviewer:

While the introduction effectively sets up the context for the study, it would benefit from a clearer articulation of the specific gaps in the current literature that this article aims to address. Suggest adding a sentence that directly states the novel contribution of combining VR with physical exercise for space mission training.

The review provides a comprehensive overview but could be improved by including recent meta-analyses or systematic reviews that evaluate the effectiveness of VR in rehabilitation settings. This would strengthen the argument for VR's applicability in space missions.

The methodology section could be enhanced by specifying the criteria used for selecting studies included in the literature review. Detailing inclusion and exclusion criteria would improve reproducibility and lend credibility to the review process.

When discussing the application of VR in space missions, it would be prudent to briefly acknowledge the technological limitations or challenges (e.g., latency issues, spatial disorientation) that could impact its effectiveness in training and rehabilitation scenarios.

The findings related to VR's impact on stress reduction are compelling. It would enhance the manuscript to provide more precise statistical measures (e.g., effect sizes, confidence intervals) that were observed in the cited studies, offering a more detailed understanding of VR's efficacy.

The conclusion adeptly summarizes the paper's scope and findings. To further elevate this section, consider adding short, concrete recommendations for future research directions, specifically regarding the integration of VR with physical exercise protocols for astronauts.

Ensure that all references are up-to-date and include any recent studies that have been published since the manuscript's preparation. This would demonstrate the article's relevance and situational awareness within the current research landscape.

Authors revised the manuscript and uploaded the updated document.

1.2 Reviewer 2

Date: 06 March 2024

Reviewer:

The abstract succinctly outlines the study's premise and importance. Adding a sentence summarizing the main conclusion or potential implications for space mission training could make it more informative to readers scanning through multiple abstracts.

While comprehensive, the literature review would benefit from a more coherent structure, possibly by organizing studies into themes or by the outcomes they investigated. This would facilitate easier navigation and comprehension of the current state of research.

The description of the analytical perspective adopted in the study is somewhat vague. Providing a more detailed explanation of the analysis methods (e.g., thematic analysis, meta-synthesis) would clarify how conclusions were drawn from the reviewed literature.

Where applicable, figures and tables should be revisited to ensure they are self-explanatory. Including brief legends or explanatory notes directly beneath each figure or table could aid in their interpretation without needing to cross-reference the text.

The discussion is insightful but could benefit from a more balanced presentation of VR's potential limitations and the challenges of physical exercise in microgravity. Acknowledging these elements would provide a more nuanced perspective.

Given the article's wide-ranging scope, it's crucial to ensure that all technical terms, acronyms, and abbreviations are clearly defined upon their first appearance in the text to make the article accessible to a broader readership.

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While the manuscript notes that "Ethics Considerations" are not applicable, it would be beneficial to briefly discuss the ethical considerations of using VR in training, especially regarding psychological impacts and consent, to preempt any concerns from reviewers or readers.

Authors revised the manuscript and uploaded the updated document.

2. Revised

Editor's decision after revisions: Accepted.

Editor in Chief's decision: Accepted.

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