

TITLE: Impact of Virtual-Reality-Guided Mindfulness on Focus Prior to High-Fidelity Simulation Debrief

PRESENTING AUTHOR: Garrett W. Burnett, M.D. (Assistant Professor; Department of Anesthesiology, Perioperative & Pain Medicine; Icahn School of Medicine at Mount Sinai)

CO-AUTHORS: Brett Weingart, B.A. (Medical Student; Department of Anesthesiology, Perioperative & Pain Medicine; Icahn School of Medicine at Mount Sinai), Daniel Katz M.D. (Associate Professor; Department of Anesthesiology, Perioperative & Pain Medicine; Icahn School of Medicine at Mount Sinai)

ABSTRACT BODY:

BACKGROUND: High-fidelity simulation (HFS) is commonly used to train anesthesiology learners in how to perform in high-stress situations.¹ Previous studies have shown physiologic stress responses during HFS may enhance performance during subsequent high-intensity scenarios², however this level of stress may hinder focus and knowledge retention during a post-HFS debrief session. Currently, the optimal mindset to maximize learning during the debrief is unknown and the ideal modality to create this mindset after a stressful learning session has not been determined. Virtual reality(VR)-based mindfulness exercises has previously been demonstrated to increase focus and reduce anxiety.^{3,4} This study aims to examine changes in focus, anxiety, and EEG patterns in anesthesia residents immediately after a guided meditation session, either with or without VR supplementation. We hypothesized that meditating with VR would lead to a more successful meditation and a larger increase in focus than meditating without VR.

METHODS: 26 anesthesiology PGY-2 residents completed twice-weekly HFS sessions. Immediately after the HFS session and before a standardized debrief, subjects completed a 5-minute guided mindfulness exercise. Half of the subjects wore a VR headset and meditated in a virtual forest environment, while the other half meditated with their eyes closed. Immediately before and after meditating, they completed a brief anxiety and focus questionnaire, then participated in a standardized debrief on the HFS session. All subjects wore a consumer-grade EEG headband to monitor frontal EEG waveforms. Changes in focus and anxiety after meditating (self-reported) were compared between the two groups, as well as a composite EEG scores (relating to calm or neutral states) between the two groups.

RESULTS: Analysis showed no significant differences between two groups regarding baseline anxiety levels or composite EEG scores. There were no significant differences in the amount focus and anxiety levels changed after meditating between the two groups. The only significant results were that, across all participants and regardless of VR supplementation, meditation reduced anxiety levels by about 19% ($p < 0.0001$). Focus levels remained constant after meditation.

CONCLUSION: The addition of VR had no effect on the quality of meditation or on changing the student's mental state. Meditation led to reduced anxiety levels across all groups, suggesting

that meditation of any form is useful before HFS debrief in reducing stress, but the addition of VR is not a necessity.

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