A Virtual Reality Martial Arts-Based Intervention Modulates Pain and the Pain Neuro-Matrix in Patients With Opioid Use Disorder

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Purpose

Some individuals with opioid use disorder (OUD) report high levels of pain, anxiety, stress and drug craving that may occasion relapse, reduce adherence to treatment, and reduce quality of life.

This pilot study evaluated whether a novel martial arts-based intervention can lower self-reported and physiological markers of pain, anxiety, stress and opioid craving in individuals with OUD undergoing methadone maintenance treatment (MMT). Task-induced pain neuromatrix activation and connectivity was also monitored using functional magnetic resonance imaging (fMRI).

Methods

15 MMT patients (11 females) completed a 12-week 'Heroes Circle' intervention that involved twice-weekly 30-min sessions centering around martial arts-based breathing and meditative techniques using therapist-assisted virtual reality (VR).

Patients self-reported on five measures (pain, drug craving, anxiety, depression, anger) using a 0-10 scale before (pre) and after (post) each session. FMRI scans were conducted before and after the intervention to measure activity and resting-state functional connectivity of the pain neuromatrix.

Salivary markers of inflammation (C-reactive protein [CRP]) and stress (cortisol) were collected before and after several sessions (baseline, weeks 4, 8, and 12).

Results

After each intervention session (relative to pre-session), ratings of pain, opioid craving, anxiety and depression (but not anger) decreased.

Saliva cortisol (but not CRP) levels decreased from pre- to post-session.

From pre- to post-intervention fMRI assessments, pain task-related left postcentral gyrus (PCG) activation decreased.

Functional connectivity of the pain neuromatrix also decreased after the 12-week intervention.

Conclusions

These preliminary results suggest a VR-based, martial-arts meditative intervention is a promising approach for modulating the pain neuromatrix and reducing pain, opioid craving, affective symptoms cortisol levels among individuals with OUD. Future randomized, controlled trials should rigorously test these hypotheses.