

Q. What is biofeedback?

A. Biofeedback is a technique with which individuals learn to voluntarily control physiological processes typically thought of as involuntary, such as heart rate, in order to improve their health (Frank, Khorshid, Kiffer, Moravec, & McKee, 2010). Trained biofeedback practitioners provide sensory cues (usually visual or auditory) and teach individuals to use that feedback to learn to regulate their physiology. Over time, individuals can generalize their learned self-regulation of physiology outside of the biofeedback sessions (Frank et al., 2010). Common types of biofeedback include surface electromyography (sEMG) feedback and electroencephalography (EEG). sEMG measures muscle activity and is used to relieve muscle-related issues such as tension headaches and chronic pain. EEG feedback, also known as neurofeedback, measures brain activity and is used to address neurological issues such as attention deficit hyperactivity disorder (ADHD) and epilepsy. Biofeedback can also be used to monitor physiological activity such as heart rate, respiration rate, skin conductance, and heart rate variability, with the goal of reducing sympathetic arousal and treating hypertension, anxiety and other disorders made worse by stress (Frank et al., 2010). Recently there has been interest in applying biofeedback to posttraumatic stress disorder (PTSD).

Q. What is the proposed mechanism underlying biofeedback for PTSD?

A. Though biofeedback is an established treatment for certain disorders, research on biofeedback for PTSD has been limited. Multiple types of biofeedback are being investigated for use in the treatment of PTSD, each with its own proposed mechanisms of action. For instance, heart rate variability biofeedback for PTSD is being studied in an attempt to improve autonomic nervous system imbalance (Orr, Meyerhoff, Edwards, & Pitman, 1998; Lande, Williams, Francis, Gragnani, & Morin, 2010; Chalmers, Quintana, Maree, Abbott, & Kemp, 2014; Dennis et al., 2016). EEG neurofeedback for modification of brain activity and connectivity is being explored with the goal of improving affect regulation (Ros et al., 2012; Kluetsch et al., 2014; van der Kolk et al., 2016). However, little research currently exists on the use of biofeedback mechanisms for addressing PTSD.

Q. Is biofeedback recommended in the Military Health System (MHS)?

A. **No.** Biofeedback is not recommended in the 2017 VA/DoD *Clinical Practice Guideline for the Management of Posttraumatic Stress Disorder and Acute Stress Disorder*, and has not met the burden of evidence required by the most recent VA/DoD publications.

The MHS relies on the Department of Veterans Affairs (VA)/Department of Defense (DoD) clinical practice guidelines (CPGs) to inform best clinical practices. The CPGs are developed under the purview of clinical experts and are derived through a transparent and systematic approach that includes, but is not limited to, systematic reviews of the literature on a given topic and development of recommendations using a graded system that takes into account the overall quality of the evidence and the magnitude of the net benefit of the recommendation. A further description of this process and CPGs on specific topics can be found on the VA clinical practice guidelines website.

Q. Do other guidelines and evidence reviews recommend biofeedback for PTSD?

A. **No.** Other authoritative reviews have not substantiated the use of biofeedback for treating PTSD.

Several other recognized organizations conduct systematic reviews and evidence syntheses on psychological health topics using similar grading systems as the VA/DoD CPGs. These include the Agency for Healthcare Research and Quality (AHRQ) and Cochrane.

- AHRQ: No reviews were found on biofeedback as treatment for PTSD.
- Cochrane: No reviews were found on biofeedback as treatment for PTSD.

Q. Is there any recent research on biofeedback as a treatment for PTSD?

A. A November 2017 literature search identified a 2014 systematic review of complementary and alternative interventions for PTSD that included one randomized controlled trial (RCT) of biofeedback eligible for inclusion. The evidence was graded as unclear or conflicting (Wahbeh, Senders, Neuendorf, & Cayton, 2014).

A 2016 RCT randomized 52 participants with chronic PTSD to either EEG neurofeedback plus treatment as usual (TAU) or a TAU wait-list group. At one month post-treatment, participants in the EEG neurofeedback plus TAU group showed significantly greater symptom improvement compared to the wait list group (van der Kolk et al., 2016). The small sample size, short follow-up, and waitlist comparator limited any strong conclusions that could be made about this treatment. Two randomized pilot studies in the literature were similarly restricted by extremely small sample sizes and associated methodological limitations (Polak, Witteveen, Denys, & Olf, 2015; Gapen et al., 2016).

Q. What conclusions can be drawn about the use of biofeedback as a treatment for PTSD in the MHS?

A. Based on the current evidence base, biofeedback for PTSD is not recommended as a treatment for PTSD in the MHS.

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