

Original Research Reports

Ready, Set, Relax: Biofeedback-Assisted Relaxation Training (BART) in a Pediatric Psychiatry Consultation Service

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Objective: Biofeedback-assisted relaxation training (BART) can treat several common pediatric presentations, including chronic pain and anxiety. Its effectiveness, applicability to a variety of conditions, and equipment portability make it an ideal treatment approach for use in an inpatient pediatric consultation-liaison service. However, to date, there is a paucity of published research on the utility of BART in this setting. **Methods:** The participants were pediatric patients (≥ 8 y), medically-admitted to Boston Children's Hospital, and referred to the Psychiatry Consultation Service for assistance in managing pain, anxiety or both. The patients received at least 1 session of BART. In addition to heart rate variability and skin temperature data collection, participants completed the Wong-Baker FACES Pain Rating Scale and a brief mood/affective state rating scale (Youth Feelings Scale) before and after

the BART sessions. **Results:** A total of 152 sessions were conducted with 66 patients across 11 referring services. BART was successfully used 61% of the time on the medical floor with common barriers involving patient unavailability or refusal. The patients completed an average of 1.57 sessions per admission. The post-BART session pain and mood ratings significantly improved over the presession ratings. Patients with both pain and anxiety reported the greatest changes across sessions in comparison with those with only pain or anxiety. Higher heart rate variability was observed in the "pain-only" group. **Conclusions:** The use of BART in a consultation-liaison setting demonstrates promising utility in working with patients with pain, anxiety, or a combination of symptoms. BART was well-received by patients with subjective reports of benefit across sessions.

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INTRODUCTION

Biofeedback-assisted relaxation training (BART) has been used in the clinical setting for the past 40 years. The premise of BART is to use specialized equipment to monitor the physiologic changes that occur with thoughts, emotions, and behaviors. By providing this information to patients while they are practicing relaxation and changes in cognition, they are able to more directly visualize the desired effects of the

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intervention. Examples of the physiologic data that are collected include heart rate variability (HRV), skin temperature, galvanic skin response, electric muscle activity, and breathing rates. Improvements in relaxation, pain, and anxiety are the primary outcomes reported in the research. The goal of biofeedback training is to teach the individual how to eventually sustain these benefits without the need for equipment. In other words, biofeedback training allows the individual to become more attuned to his or her mind-body connection to optimize symptom management and quality of life.

Initially, biofeedback-based approaches were used primarily with the adult population owing to their required level of cognitive awareness. In 2008, Yucha and Montgomery provided efficacy ratings of biofeedback for a variety of conditions.¹ BART was rated as efficacious for anxiety, chronic pain, epilepsy, headache, hypertension, Raynaud disease, and temporomandibular disorder.

Given the notable benefits of BART among adult populations, clinicians and researchers began introducing biofeedback into clinical interventions with children and adolescents. One of the first and most beneficial applications demonstrated its utility for children and adolescents experiencing migraine and tension-type headaches.^{2,3} A meta-analysis of more than 50 studies on the use of BART in tension headaches found it to be more effective than the standard care of monitoring episodes (e.g., journaling) or use of basic relaxation strategies.⁴

Humphreys and Gevartz evaluated the efficacy of thermal biofeedback in children and adolescents aged 4–18 years with recurrent abdominal pain via a randomized-control trial.⁵ Their findings indicated that the addition of thermal biofeedback to the treatment modality significantly improved self-reported pain perception. Similar results have been found for children with other chronic gastrointestinal conditions, with greater reductions in pain intensity and frequency reported for children receiving biofeedback training than those who received standard medical intervention.⁶

Research also indicates that BART is useful in improving physiologic responses in children with anxiety disorders.⁷ The use of BART has been explored in youths who have witnessed and experienced trauma and present with heightened physiologic arousal, which has implications for patients admitted

to the hospital following serious accidents or injury.⁸ Therefore, BART could serve as a treatment to address both the psychologic and physical effects of an individual's medical condition on his or her overall functioning and quality of life.

In the United States, more than 6 million children are hospitalized annually and nearly 3 million children undergo surgical procedures.⁹ Hospitalization and surgery can be an emotionally threatening and psychologically traumatizing experience, especially for children.¹⁰ The prevalence of childhood surgical illness and injury requiring hospitalization suggests the need for implementation of an applied intervention to decrease the levels of pain and anxiety in these patients. Psychiatry consultation-liaison (C-L) services have become increasingly integrated into pediatric hospital settings and are well established to aid with psychiatric symptoms that present during hospitalizations and in individuals with long-standing medical conditions.^{11,12} High rates of co-morbidity between childhood psychiatric and physical disorders ensure that psychiatric issues present in the hospital setting, and if they are not adequately addressed, they can lead to long-term negative psychologic and medical consequences.^{8,13} In a study of holistic medicine consultation requests from an inpatient pediatric oncology unit, parental requests included mind-body therapies, such as hypnosis, guided imagery, and biofeedback, to assist with symptom management (pain, anxiety, and sleep) and aid in building up physical and immune system strength.¹⁴

Although incorporating evidence-based practice in the C-L setting to meet family-requested mind-body consultation requests will be beneficial, there is a recognized need for more information and research about the utilization of evidence-based practice in this pediatric setting.^{15,16} Although most studies have used an outpatient approach to biofeedback training, the portable and flexible nature of its applications across a variety of medical conditions lends itself to other uses as well, including inpatient medical and surgical settings. Current outpatient research suggests that the positive effects of biofeedback can be observed after 1 session, although treatment protocols range significantly in the number of sessions implemented.¹⁷ The use of BART on an inpatient C-L service would allow patients with a significant need for this intervention to receive it in a setting where it previously had limited availability and may be a beneficial short-term

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