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Biofeedback and Anxiety

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Considered a "fringe" therapy 25 years ago, biofeedback has matured today to a modality much closer to mainstream treatment. Its value is accepted by a growing number of professionals, and it is covered by Medicare for some conditions, as well as by most health insurers.

Applied psychophysiology has yet to fulfill early enthusiastic predictions of the benefits of learning and applying self-regulatory skills. However, the field has amassed sufficient research and clinical data to justify an important secondary role in treating a number of specific disorders. Fueled by advances in technology and increasing interest in alternative therapies, biofeedback remains a dynamic force that continues to tantalize with possible-though as yet unproved-applications.

Biofeedback, also referred to as *applied psychophysiological feedback,* is the process of displaying involuntary or subthreshold physiological processes, usually by electronic instrumentation, and learning to voluntarily influence those processes by making changes in cognition. It provides a visible and experiential demonstration of the mind-body connection. Biofeedback is also a therapeutic tool to facilitate learning self-regulation of autonomic functions for improving health.

In a quiet room, seated in a comfortable chair with sensors attached to the skin, the trainee (patient) views a monitor. Advances in hardware and software technologies allow simultaneous monitoring of multiple modalities and the flexible shaping of visual and sound feedback to reinforce desired physiological states. Extensive data can be collected for immediate display with automatic storage for research.

There are six commonly employed feedback modalities:
Electromyographic (EMG): Frontalis, masseter, trapezius and sternocleidomastoid are the most frequently monitored sites.
Skin Conductance Level (SCL): Also referred to as Galvanic Skin Response (GSR). Finger electrodes register sweat gland activity.
Thermal: Finger thermistors measure vasoconstriction by minute changes in peripheral blood flow.
Respiratory: Strain gauges measure abdominal and thoracic excursions; a capnometer monitors exhaled CO2.
Heart Rate (HR): Finger photoplethysmography registers rate and pulse volume.
Brainwave/Neurofeedback (EEG): Multichannel equipment with more sophisticated software and new treatment protocols have replaced the simple single channel alpha training of earlier decades.

Biofeedback Applications

Used alone as relaxation therapy, biofeedback is as efficacious as other forms of relaxation training, such as hypnosis, progressive muscle relaxation or transcendental meditation. However, most applications of biofeedback are used as adjuncts to other types of therapy, treating physiological as well as psychological disorders.

Physiological disorders with credible research to support the ancillary use of biofeedback include headaches, chronic pain, rheumatoid arthritis, asthma, temporomandibular joint disorders, dysmenorrhea, epilepsy, hypertension, irritable bowel syndrome, intestinal motility, motion sickness, neuromuscular rehabilitation, Raynaud's disease and fecal incontinence (Crabtree et al., 1995; Schwartz, 1995).

Biofeedback also seems to be a useful tool in the treatment of a broad range of problems commonly seen by psychiatrists. The adjunctive use of biofeedback is reasonably well-documented for the psychological disorders of anxiety and insomnia. Many forms of psychotherapy, including dynamic, behavioral and brief, appear to have enhanced efficacy when biofeedback-assisted. Both the patient and therapist benefit from a display of physiological responses, which can help identify resistance, denial and other defense mechanisms. Biofeedback monitoring can provide a uniquely vivid demonstration of the connection between thoughts and feelings. Brain wave feedback is showing promise in the treatment of attention-deficit/hyperactivity disorder, addictive disorders and posttraumatic stress disorder (PTSD).

Biofeedback and GAD

Anxiety in some form is a problem that all psychiatrists must deal with on a daily basis. It is one of the most frequently observed categories of emotional disorders in the American population and often seriously interferes with the quality of everyday life. All of the anxiety disorders are defined by the dual characteristics of physiologic hyperarousal and excessive emotional fear.

Biofeedback has demonstrated value for hyperarousal reduction training in generalized anxiety disorder (GAD) and exposure desensitization in panic disorder (PD) and PTSD.

Multimodal cognitive/behavioral therapy (CBT), which may include biofeedback, offers an equally effective alternative to medications, particularly for patients who do not respond well, who have a potential for dependency or who refuse prescription drugs. Optimum treatment outcome for GAD and PD is more likely to be achieved with a combination of pharmacotherapy and CBT.

Biofeedback is one of the most useful adjuncts in treating physiologic hyperarousal-both episodic and chronic-seen in anxiety disorders. It has also proved helpful for patients who are learning to reduce fearful anticipation triggers through cognitive/behavior therapies.

Biofeedback training is a part of the behavioral treatment, which includes relaxation training, because of its additional specificity. Biofeedback offers a nonpharmacological approach to direct symptom reduction and can be tailored to the individual patient's psychophysiological profile. Those patients experiencing symptoms of muscle tension have EMG sensors attached to muscle sites showing the highest activity. Patients with mainly autonomic symptoms generally receive thermal, GSR, heart rate and respiration feedback. EEG feedback may be useful when an assessment documents brain wave pattern dysregulation.

Behavioral treatment may also include cognitive interventions to identify negative thinking, and to develop more appropriate assessment of life events. Where specific fears can be identified, behavioral

fear reduction techniques, such as desensitization, modeling or flooding, may be used. Concomitant use of biofeedback may enhance the therapeutic effectiveness of these techniques. Like most behavioral treatments, biofeedback is most effective with patients willing to assume an active role in the treatment process, including home practice.

Most studies document improvement and significant symptom reduction in six to 12 sessions of biofeedback training, with more complex or chronic patients requiring more sessions. For instance, in 1993 Rice et al. studied 45 GAD subjects (38 of whom met the *DSM-III* criteria). The study subjects were randomized to four treatment groups: frontal EMG biofeedback, EEG alpha enhancement biofeedback, EEG alpha suppression biofeedback or a pseudomeditation control. Results were compared against wait-list controls. All treated subjects showed significant reductions in STAI-Trait Anxiety and psychophysiological symptoms on the Psychosomatic Symptom Checklist. Decreased self-report of anxiety was maintained at six weeks posttreatment.

CBT, Biofeedback and Panic

David H. Barlow, Ph.D., developed a comprehensive model of panic disorder in which he explained that panics were sustained in patients because they developed a fear of bodily sensations associated with panic attacks (1988). Anxious apprehension causes chronic increased autonomic arousal, which increases vigilance with heightened sensitivity to evermore minute body sensations. A vicious cycle of apprehension and physiological activation results in panic disorder.

By allowing heightened internal awareness, low arousal relaxation training may actually precipitate increased anxiety in some patients with panic disorder. This relaxation-induced anxiety is less likely to occur with biofeedback than other general relaxation procedures.

Diagnostic accuracy increases when biofeedback is used to monitor physiological reactions to questions about anxiety. EMG, SCL, HR, temperature and respiration are measured. The treatment of PD with CBT has four components, each of which may be more effective with biofeedback. Three focus on managing panic; the fourth aims to eliminate it.

Educational, Informational: Patients learn the causes of panic, the "fear of fear" cycle and the rationale for treatment. Various biofeedback modalities help in experiencing and understanding on a gut level the relationship between thoughts, feelings, images, bodily sensations and the actual body responses. "Biofeedback information seems to help patients 'get it' a lot faster," noted Hugh Baras, Ph.D., reporting on a study of biofeedback and panic disorder presented at the recent 24th Annual Conference of the Biofeedback Society of California in Monterey, Calif.

Somatic Management Strategies: Patients use these techniques to manage anxious apprehension. They include diaphragmatic breathing retraining, slow breathing and muscle relaxation. "Biofeedback-assisted breathing retraining and biofeedback-assisted muscle relaxation can be very helpful in providing motivation for patients and in providing the experience of mastery over their panic reactions," reported Baras.

Cognitive Restructuring: This technique provides instruction and practice in constructive self-talk to reduce fears of anxiety sensations. Exaggerated fears of somatic symptoms or the probability of negative reactions and adverse outcomes are replaced with more realistic attitudes. Trainees are often surprised to see the biofeedback equipment demonstrate a striking difference between the responses from their fearful thoughts as compared to responses as a result of their restructured thoughts.

Fear Exposure Strategies: The aim of these strategies is to eliminate the experience of panic. They are also the nonpharmacological treatment of choice for specific phobias, including agoraphobia and obsessive-compulsive disorder. In a systematic and controlled way, exposure therapy elicits the physical sensations that trigger anxiety. The goal-fear extinction-is to break the associations between increased body sensations and panic reactions. There are two types of fear exposure:

1. Brief and graduated (systematic desensitization): The arousal-provoking event is presented for about a minute, spaced with intervals of relaxation. The intensity of arousal is gradually increased, creating the experience of anxiety mastery.

2. Prolonged and intense (flooding): Ten to 15 minutes of repeated exposure to maximal intensity stimulus demonstrates to the patient that the feared negative consequences do not occur. This results in fear extinction. Exercises to help induce flooding include rapid head movements, breath holding, restricted breathing, hyperventilation and muscle tensing.

Substantial research data support the value of using cognitive restructuring and fear exposure in preventing relapse. Like a pilot turning on the radar, exposure therapy is more effective when therapist and patient have immediate autonomic feedback to guide the process. The advantages of biofeedback-assisted CBT for PD include increased awareness and control of the stress response, increased motivation for treatment and willingness to practice home assignments, and heightened self-confidence.

Biofeedback for Children

There are several controlled studies showing the efficacy of using biofeedback to reduce anxiety in children. In 1996, Wenck et al. studied 150 seventh- and eighth-graders identified as anxious by their teachers. The students were randomly assigned to biofeedback intervention, which included six sessions each of EMG and thermal biofeedback, or control groups. The researchers found that the biofeedback group had significantly lower posttest states and trait anxiety.

Referrals and Certification

Biofeedback therapy is commonly performed by clinical psychologists, or by a biofeedback trainer under the direct supervision of a psychologist or psychiatrist. The Biofeedback Certification Institute of America has a written/practicum certification process. The Association for Applied Psychophysiology and Biofeedback in Wheat Ridge, Colo., sponsors an annual conference and provides information and referrals. Larger states have biofeedback societies for local referrals.

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