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## BIOFEEDBACK THERAPY

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**Definition:** Biofeedback therapy (BFT) helps people learn to regulate their physiological processes linked to emotional and cognitive states in order to improve performance.

**Elements:** Subjects see measures of one or more of their physiological processes such as brain waves, cardiac function, respiration, muscle tension, and/or skin temperature in order to get accurate feedback about those processes. Getting such biofeedback, often plus cognitive, emotional, and behavioral modification, enhances the desired physiological changes which can eventually continue even without making physiological measures. BFT has 3 phases. Patients:

A. 1) learn to recognize acoustic and/or visual signals - done by showing patients the signal/s they chose; 2) accurately link their emotions to psychophysiological responses, done by asking them to connect variations in signals from BF devices e.g. when a rise in arousal raises the acoustic-feedback tone and when a reduction in arousal reduces the acoustic-feedback tone; 3) these show their psychophysiological profile from stress - the simultaneous recording of several physiological signals: electrical activity of muscles (EMG), skin conductance (SC), temperature, heart rate (HR) and its variability (HRV), thoracic and abdominal breathing, and perhaps EEG. Psychophysiological assessment of the subject can show whether biofeedback training is advisable, and if so, on which measures.

B. 1) learn to control and orient the signal in the desired direction by modulating its intensity while keeping it within the chosen range; e.g. for EMG, more high-frequency components suggest more muscle tension and the subject's task is then to lower the signal's intensity and then relax; 2) this response in turn, shows that what was previously not even recognized can now be managed.

C. 1) gradually reduce biofeedback to check that the subject recognises the new response required.

In a typical session the therapist: 1) prepares a room with a comfortable chair or couch and no disturbing stimuli (e.g. excess light or noise), 2) asks the patient to complete there a state-anxiety test in paper form (STAI X1 & X2); 3) cleans the localization choices, e.g. selected areas on the finger, or trapezius or corrugator supercilii, on which to apply sensors; 4) applies the sensors coated with conductive paste; 5) activates and adjusts the equipment, i.e. synchronizes and verifies that the physiological signals display correctly; 6) starts a baseline phase of 5 mins. during which the patient is asked to relax and stay calm while data such as EMG, SC, HRV, etc. are gathered every 30-60 seconds; 7) gives 4 5-min. periods of acoustic and/or visual feedback, separated by 1-min. breaks; manually records data

every 30-60 secs.; 8) at the end of this session asks the patient to again complete the STAI; 9) decides after sessions 5 or 6 to continue if the subject has improved ability to self-regulate the psychophysiological measure/s chosen (EMG, SC, HRV, etc.); 10) from session 10 onward, biofeedback is no longer given during the 4th of the 4 5-min. periods. The total no. of sessions needed varies greatly, but is usually about 20 at a frequency of 1-2 sessions a week.

**Related procedures:** *self-regulation, coping skills training, mastery, relaxation.*

**Application:** Done individually. BFT has been used widely for chronic anxiety, stress-related psychophysiological problems, tension- and vascular-type headaches, tics, bruxism, motor rehabilitation (meniscectomy, stroke, pyramidal and extrapyramidal system damage, spinal cord injury, cerebral palsy, peripheral nerve injury, chronic pain), essential hypertension, sexual disorders, preparation for and assistance in childbirth, irritable bowel syndrome, fecal and urinary incontinence, and ADHD.

**References:**

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3. Schwartz MS, Andrasik F (2003). *Biofeedback. A practitioner's guide*. New York: The Guilford Press
4. Yucha C, Montgomery D (2008). *Evidence-Based Practice in Biofeedback and Neurofeedback, Applied Psychophysiology and Biofeedback*, Wheat Ridge, CO .

**Case illustration** (Unpublished).

Michela aged 38 had been married for 14 years and separated 2 years ago. She has a son of 14 and daughter aged 5, and works at times as a translator. Her ex-husband partly pays for raising their children and spends most weekends with them. Michela came to therapy complaining of 18-months duration of anxiety, fatigue, irritability, headache, difficulty falling asleep, worry, and low mood. She first felt she was not a good mother, unable to go on, a failure, and felt ill. Then came insomnia, headaches, fatigue, and, in the last few weeks, low mood, and loss of interests, motivation, appetite and weight. She sought from therapy relief from tension and headaches, and ability to sleep well and “to make all those bad thoughts disappear”. She had Generalized Anxiety Disorder with Major Depressive Episode.

Biofeedback therapy (BFT) began by examining Michela’s physiological measures: she had raised tension in her frontal muscles with poor recovery to her natural baseline of muscle tension, labored breathing and shortness of breath, and low heart-rate variability (HRV). Treatment therefore began with EMG-BFT, placing sensors on frontal muscles (corrugator supercilii), alternating sessions with HRV-BFT using her respiratory pattern of resonance frequency at which a system (e.g. cardiovascular) can be activated. Resonance frequency assessment tries to find which breathing rate maximizes heart rate variability

(HRV), before initiating HRV biofeedback. In training sessions 1 and 2, each about 30 mins. long, Michela did biofeedback exercises and was asked to practise the same exercises at home for at least 15 mins. daily. Her sessions were weekly - in each she repeated the exercises.

After 12 training sessions, general muscle tension diminished and headache frequency fell from 3 a week to 1 every 15 days, and, after 3 months, a mean of 1 a month. Her sleep-wake rhythm became normal.