06 - 28.6 Biofeedback

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Harned MS, Korslund KE, Linehan MM. A pilot randomized controlled trial of Dialectical Behavior Therapy with and without the Dialectical Behavior Therapy Prolonged Exposure protocol for suicidal and self-injuring women with borderline personality disorder and PTSD. Behav Res Ther. 2014;55:7–17. Krause ED, Mendelson T, Lynch TR. Childhood emotion invalidation and adult psychological distress: The mediating role of inhibition. Child Abuse Negl. 2003;27:199–213. Lynch TL, Morse JQ, Mendelson T, Robins CJ. Dialectical behavior therapy for depressed older adults: A randomized pilot study. Am J Geriatr Psychiatry. 2003; 11:33–45. Rizvi SL, Steffel LM, Carson-Wong A. An overview of dialectical behavior therapy for professional psychologists. Prof Psychol. 2013;44(2):73–80. Rosenthal MZ, Lynch TR. Dialectical behavior therapy. In: Sadock BJ, Sadock VA, Ruiz P, eds. Kaplan & Sadock’s Comprehensive Textbook of Psychiatry. 9th ed. Vol. 2. Philadelphia: Lippincott Williams & Wilkins; 2009:2884. 28.6 Biofeedback Biofeedback involves the recording and display of small changes in the physiological levels of the feedback parameter. The display can be visual, such as a big meter or a bar of lights, or auditory. Patients are instructed to change the levels of the parameter, using the feedback from the display as a guide. Biofeedback is based on the idea that the autonomic nervous system can come under voluntary control through operant conditioning. Biofeedback can be used by itself or in combination with relaxation. For example, patients with urinary incontinence use biofeedback alone to regain control over the pelvic musculature. Biofeedback is also used in the rehabilitation of neurological disorders. The benefits of biofeedback may be augmented by the relaxation that patients are trained to facilitate. THEORY Neal Miller demonstrated the medical potential of biofeedback by showing that the normally involuntary autonomic nervous system can be operantly conditioned by use of appropriate feedback. By means of instruments, patients acquire information about the status of involuntary biological functions, such as skin temperature and electrical conductivity, muscle tension, blood pressure, heart rate, and brain wave activity. Patients then learn to regulate one or more of these biological states that affect symptoms. For example, a person can learn to raise the temperature of his or her hands to reduce the frequency of migraines, palpitations, or angina pectoris. Presumably, patients lower the sympathetic activation and voluntarily self-regulate arterial smooth muscle vasoconstrictive tendencies. METHODS Instrumentation The feedback instrument used depends on the patient and the specific problem. The most effective instruments are the electromyogram (EMG), which measures the electrical

potentials of muscle fibers; the electroencephalogram (EEG), which measures alpha waves that occur in relaxed states; the galvanic skin response (GSR) gauge, which shows decreased skin conductivity during a relaxed state; and the thermistor, which measures skin temperature (which drops during tension because of peripheral vasoconstriction). Patients are attached to one of the

instruments that measures a physiological function and translates the measurement into an audible or visual signal that patients use to gauge their responses. For example, in the treatment of bruxism, an EMG is attached to the masseter muscle. The EMG emits a high tone when the muscle is contracted and a low tone when at rest. Patients can learn to alter the tone to indicate relaxation. Patients receive feedback about the masseter muscle, the tone reinforces the learning, and the condition ameliorates—all of these events interacting synergistically. Many less-specific clinical applications (e.g., treating insomnia, dysmenorrhea, and speech problems; improving athletic performance; treating volitional disorders; achieving altered states of consciousness; managing stress; and supplementing psychotherapy for treating anxiety associated with somatic symptom and related disorders) use a model in which frontalis muscle EMG biofeedback is combined with thermal biofeedback and verbal instructions in progressive relaxation. Table 28.6-1 outlines some important clinical applications of biofeedback and shows that a wide variety of biofeedback modalities have been used to treat numerous conditions. Table 28.6-1 Biofeedback Applications

Relaxation Therapy Muscle relaxation is used as a component of treatment programs (e.g., systematic desensitization) or as treatment in its own right (relaxation therapy). Relaxation is characterized by (1) immobility of the body, (2) control over the focus of attention, (3) low muscle tone, and (4) cultivation of a specific frame of mind, described as contemplative, nonjudgmental, detached, or mindful. Progressive relaxation was developed by Edmund Jacobson in 1929. Jacobson observed that when an individual lies “relaxed,” in the ordinary sense, the following clinical signs reveal the presence of residual tension: respiration is slightly irregular in time or force; the pulse rate, although often normal, is in some instances moderately increased as compared with later tests; voluntary or local reflex activities are revealed in such slight marks as wrinkling of the forehead, frowning, movements of the eyeballs frequent or rapid winking, restless shifting of the head, a limb, or even a finger; and finally, the mind continues to be active, and once started, worry or oppressive emotion will persist. It is amazing that a faint degree of tension can be responsible for all of this. Learning relaxation, therefore, involves cultivating a muscle sense. To develop the

muscle sense further, patients are taught to isolate and contract specific muscles or muscle groups, one at a time. For example, patients flex the forearm while the therapist holds it back to observe tenseness in the biceps muscle. (Jacobson used the word “tenseness” rather than “tension” to emphasize the patient’s role in tensing the muscles.) Once this sensation is reported, Jacobson would say, “This is your doing! What we wish is the reverse of this—simply not doing.” Patients are repeatedly reminded that relaxation involves no effort. In fact “making an effort is being tense and therefore is not to relax.” As the session progresses, patients are instructed to let go further and further, even past the point when the body part seems perfectly relaxed. Patients would work in this fashion with different muscle groups, often over more than 50 sessions. For example, an entire session might be devoted to relaxing the biceps muscle. Another feature of Jacobson’s method was that instructions were given tersely so they would not interfere with a patient’s focus on muscle sensations; suggestions commonly used today (e.g., “Your arm is becoming limp”) were avoided. Patients were also frequently left alone, while the therapist attended to other patients. In psychiatry, relaxation therapy is mainly used as a component of multifaceted broad-spectrum programs. Its use in desensitization was mentioned previously. Relaxing breathing exercises are often helpful for patients with panic disorder, especially when considered to be related to hyperventilation. In the treatment of patients with anxiety disorders,

relaxation can serve as an occasion-setting stimulus (i.e., as a context of safety in which other specific intervention can be confidently tried). Later Adaptation of Progressive Muscular Relaxation Joseph Wolpe chose progressive relaxation as a response incompatible with anxiety when designing his systematic desensitization treatment (discussed below). For this purpose, Jacobson's original method was too lengthy to be practical. Wolpe abbreviated the program to 20 minutes during the first six sessions (devoting the remainder of these sessions to other things, such as behavioral analysis). In a later modification of progressive relaxation, patients completed work with all the principal muscle groups in one session. The specific muscle groups and instructions for this type of progressive relaxation are listed in Table 28.6-2. Once patients have mastered this procedure (typically after three sessions), these groups are combined into larger groups. Finally, patients practice relaxation by recall (i.e., without tensing the muscles). Table 28.6-2 Outline of Initial Progressive Relaxation Session, All Muscle Groups

Autogenic Training Autogenic training is a method of self-suggestion that originated in Germany. It involves the patients directing their attention to specific bodily areas and hearing themselves think certain phrases reflecting a relaxed state. In the original German version, patients progressed through six themes over many sessions. The six areas are listed in Table 28.63 along with representative autogenic phrases. Autogenic relaxation is an American modification of autogenic training, in which all six areas are covered in one session. Table 28.6-3 Sample Autogenic Phrases Applied Tension Applied tension is a technique that is the opposite of relaxation; applied tension can be used to counteract the fainting response. The treatment extends over four sessions. In the first session, patients learn to tense the muscles of the arms, legs, and torso for 10 to 15 seconds (as if they were bodybuilders). The tension is maintained long enough for a sensation of warmth to develop in the face. The patients then release the tension, but do not progress to a state of relaxation. The maneuver is repeated five times at half-minute intervals. This method can be augmented with feedback of the patient's blood pressure during the muscle contraction; increased blood pressure suggests that appropriate muscle tension was achieved. The patients continue to practice the technique five times

a day. An adverse effect of treatment that sometimes develops is headache. In this case, the intensity of the muscle contraction and the frequency of treatment are reduced. Patients with blood and injury phobia show a unique, biphasic response when exposed to a phobic stimulus. The first phase is associated with increased heart rate and blood pressure. In the second phase, however, blood pressure suddenly falls and the patient faints. To treat the problem, patients are shown a series of slides that are provocative (e.g., mutilated bodies). They are coached in identifying early warning signs of fainting, such as queasiness, cold sweats, or dizziness, and in applying the learned muscle tension response quickly, contingent on these warning signs. Patients can also perform applied tension while donating blood or watching a surgical operation. The technique of isometric tension raises blood pressure, which prevents fainting. Applied Relaxation Applied relaxation involves eliciting a relaxation response in the stressful situation itself. The previous discussion showed that this is not advisable right away because of the possible ironic effects of relaxation. Therefore, patients should first practice relaxation in nonstressful circumstances. The method developed by Lars-Göran Öst and coworkers in Sweden has been proven efficacious for panic disorder and generalized anxiety disorder. Establishing the relaxation response in the patient's natural environment consists of seven phases of one to two sessions each: progressive relaxation, release-only relaxation, cue-controlled relaxation, differential relaxation, rapid relaxation,

application training, and maintenance. Details are provided in Table 28.6-4. Table 28.6-4 Steps in Applied Relaxation

RESULTS Biofeedback, progressive relaxation, and applied tension have been shown to be effective treatment methods for a broad range of disorders. They form one basis of behavioral medicine in which the patient changes (or learns how to change) behavior that contributes to illness. They form a basis on which many complementary and alternative medical procedures are effective (e.g., yoga and Reiki) in which relaxation is an important component. Relaxation also informs more mainstream treatments, such as hypnosis.

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