Resolution 10 (A-89), calls for the American Medical Association to study various self-healing and psychological techniques such as meditation, relaxation, and visualization and report on their role in patient care.

In recent years, many self-healing and self-care methods have been described in the scientific literature and popularized by articles in lay magazines and newspapers. These methods emphasize self-care, vitamins, nutrition, exercise, and stress management, and reflect a belief that a person's life style and behavior have a direct effect on susceptibility to and progression of disease.1 Historically, health practitioners and patients have investigated alternative methods of treatment for diseases for which modern medicine has offered little benefit,2 from the common cold to cancer and AIDS.3 The recent surge in popularity of alternative methods parallels increases in health education and the incidence of chronic debilitating and life-threatening diseases.4

Current cultural and social trends also influence the popularity of alternative therapies. Promotion of patient and consumer rights, self-help and physical fitness programs and disillusionment with traditional medicine have encouraged patients to assume more responsibility for their health and medical care.5 A major value in today's society emphasizes the power of individuals taking control of their lives and health.

"Psychological therapies" refers to almost any type of therapy which depends on the ability of the mind to alter physical, mental and emotional factors. Traditional psychoanalysis, individual and group psychotherapy, and cognitive and behavioral therapy are well recognized psychological treatments. A subset of behavioral therapy, however, may be described as alternative treatments which have less clearly defined clinical applications or evidence of effectiveness. These modalities include such things as hypnotherapy, autosuggestion, Silva mind control, autogenic training, imagery, progressive muscle relaxation, breathing techniques, Yoga, T'ai Chi, transcendental meditation and biofeedback.6,7,9 Review of the literature identifies several methodological difficulties that impair the scientific integrity of evaluations. Studies in this area are replete with ill-defined terminology,10 and investigators often have either developed their own technique or combined two or more modalities. Comparative evaluation of techniques is often difficult and in many cases impossible. Therefore, similar techniques will be grouped under common headings for discussion purposes only.

General Observations

The observation that psychosocial factors may affect disease outcome dates back to at least 200 AD when the ancient physician Galen reported that "melancholy women are more susceptible to breast cancer than sanguine women." Another well recognized phenomenon is the death of a widowed person soon after the death of the spouse.12 Alterations in the immune system have also been linked to psychological factors.13 It has been shown that women with multiple symptoms of depression have significantly lower natural killer cell activity than women with fewer depressive symptoms.14,15 In addition, recovery from major depressive illness has been found to be associated with reversal of depression-associated immunosuppression.16 These are just a few examples that suggest that emotional factors may contribute to physical conditions.

Efforts to document and explain the effects of behavioral therapies on physical health have come from many areas of science. The existing scientific literature does not allow for definitive understanding of all potential pathways mediating the links between psychological intervention and physiological change. Researchers hypothesize that such factors as emotions, sense of personal control and increased sense of well-being can lead to improved disease outcome and health.1

Psychological Techniques and the Immune System

Psychological interventions have been postulated to have some immune enhancing quality.16 The scientific
evidence that psychological or behavioral interventions influence the immune system, either directly or through the endocrine system, has come from three areas of investigation: 1) behavioral studies (primarily classical conditioning of alterations in immunologic reactivity) including human clinical situations and animal models; 2) studies of the anatomic and humoral circuitry underlying communication between the nervous, immune, and endocrine systems; and 3) physiological research into the mechanisms involved in this communication, including biochemical characterization of chemical messages and receptors shared by the three systems.

The effectiveness of psychological methods is hypothesized to be due, at least in part, to psychoneuroendocrine effects on immune function. Some investigators have attempted to study the neural and endocrine pathways that transduce information between the brain and immune system in order to explain the mechanism of intra-systemic communication. This area of study is called psychoneuroimmunology (PNI). It is also known as neuroimmunomodulation or behavioral immunology.

Psychoneuroimmunologic research has evolved from direct observations of the effects of behavior and of hormonal manipulations on immune responses. The existence of a complex, communicative, and interactive system between the brain and the immune system has been demonstrated by a number of studies. Several connections between the nervous system and the immune system have been isolated, such as sympathetic nerve endings in the thymus, lymph nodes, spleen, tonsils, appendix, Peyer’s patches of the small intestine, and bone marrow. Receptors on lymphocytes that are capable of receiving signals from the neural and endocrine systems have also been identified. In addition, the immune system receives input from the central nervous system via multiple neural and endocrine hormones, peptides, and transmitters such as norepinephrine, epinephrine, histamine, and dopamine. The question of whether psychological and social factors do in fact mediate their influence through the immune system has yet to be substantiated.

The Relaxation Response

The common physiological denominator in this field is the ability of relaxation, meditation, imagery, hypnosis and biofeedback to produce the relaxation response described by Benson. It is characterized by decreased oxygen consumption, respiratory rate and heart rate, and an increased production of alpha-waves and some theta-waves. Alteration in sympathetic nervous system and/or parasympathetic nervous system activity and reactivity is also seen in the relaxation response. In a controlled study by Benson, plasma norepinephrine levels unexpectedly increased following orthostatic and isometric stress in patients that regularly elicited the relaxation response for one month, twice daily. The control group showed no augmentation in norepinephrine levels following the same stress until regular elicitation of the relaxation response was achieved in a cross-over experiment. No concomitant increase in heart rate or blood pressure was observed in the experimental or cross-over groups. This reproducible cardiovascular response suggests a reduced end-organ sensitivity to sympathetic nervous system stimulation. Alterations in sympathetic activity may be one of the mechanisms by which psychological techniques exert their effect on disease.

Meditation and Relaxation

Meditation is a conscious attempt to focus on a constant or repetitive mental device to clear the mind and avoid ruminating thoughts. Multiple variations, among them yoga, zen, and transcendental meditation (TM), can be categorized into three groupings of attentional strategies: 1) a focus on the field (mindfulness meditation); 2) a focus on a specific object within the field (concentrative meditation); and 3) a shifting back and forth between the two. Meditation is considered a relaxation technique. Techniques similar to medication are frequently referred to in the literature as relaxation therapy. Other relaxation techniques described in the literature include autogenic training and progressive muscle relaxation. With autogenic training an individual repeats a series of phrases that suggest the occurrence of certain psychological sensations such as, "my left arm is heavy." Autogenic training can also elicit the relaxation response. Progressive muscle relaxation is a technique in which tensing and relaxing of successive muscle groups is done to achieve overall muscle relaxation. Progressive muscle relaxation seems to increase discriminative control over skeletal muscle until a subject can induce very low levels of tonus in major muscle groups.
fore will be covered under that heading. Assessment of psychological and social factors following relaxation and stress management showed concomitant reduction in anxiety, depression, and a variety of psychosomatic symptoms, while increasing a sense of well-being.\textsuperscript{41} Significantly more subjects practicing relaxation techniques reported improved relationships at work, improved general health, greater enjoyment of life, and improved personal and family relationships. Relaxation subjects also described a feeling of greater control over their health, which has been associated with greater compliance with antihypertensive drug treatment.\textsuperscript{42} Other clinical uses include the management of anxiety, pain (both acute and chronic), cancer and chemotherapy, post-operative surgical pain and wound healing, stress, drug abuse, and cerebral palsy.\textsuperscript{43-51}

Physiological studies of relaxation techniques have observed relative measurable alterations in heart rate, oxygen consumption, respiratory rate, alpha and theta-waves on EEG, skin resistance, blood pressure, renin, cortisol and aldosterone levels, red blood cell glycolysis, norepinephrine levels, salivary IgA, and natural killer cell activity.\textsuperscript{32,52-55}

A randomized controlled study of geriatric subjects compared the effects of progressive relaxation and guided imagery to social contact or no contact.\textsuperscript{56} Natural killer cell activity increased, antibody titers to herpes simplex virus decreased, and cell-rated distress decreased following intervention. Results were maintained at one-month follow-up. This study suggests that relaxation may alter immune function.

Relaxation has also been studied in association with pain management. Flaherty and Fitzpatrick\textsuperscript{48} studied the effects of relaxation in 21 postsurgical patients. There were fewer complaints of incisional pain and body distress following postoperative ambulation than in control patients. Reduction in postoperative discomfort and narcotic requirements following relaxation intervention have also been reported.\textsuperscript{8}

Transcendental meditation may be a useful tool in the successful intervention of drug abuse, as reported by Benson in a study of 1,862 subjects.\textsuperscript{57} There was a marked decrease in drug use, including hallucinogens, marijuana, LSD, tobacco, alcohol, narcotics, and amphetamines after an average of 20 months of regular practice of TM. Drug use decreased proportionately with the length of TM practiced, and by 21 months most of the subjects reportedly abstained from drug use. The most dramatic results were seen with LSD use, dropping from 48 percent to 11 percent after 3 months, with only 3 percent of the subjects still using LSD following 20 months of regular TM practice. Similar results were observed in all other drug categories including cigarette and alcohol abuse.

Biofeedback

The technique of biofeedback involves the use of electronic equipment to provide a patient with auditory or visual information to assist in manipulating involuntary physiological events such as heart rate, blood pressure, skin temperature, muscle contraction or other physiological variables.\textsuperscript{58} The majority of clinical data on the use of biofeedback comes from the study of essential hypertension and headaches (including migraines). Other clinical applications reported include: insomnia, neuromuscular disorders, chronic pain, attention deficit disorder, motion sickness, epilepsy, irritable bowel syndrome, fecal and urinary incontinence, anxiety and panic disorders, and temporomandibular joint disease.\textsuperscript{59,60}

The literature reports the effective use of biofeedback and relaxation techniques in the treatment of hypertension.\textsuperscript{61,62} Biofeedback and relaxation techniques have gained widespread acceptance for the treatment of hypertension following a report by The Joint National Commission on Detection, Evaluation and Treatment of High Blood Pressure (1984).\textsuperscript{63,64} This report recommended that non-drug therapies, including relaxation therapy and biofeedback, be used as an initial treatment for uncomplicated mild hypertension, and in combination with pharmacologic therapy in the treatment of more severe hypertension.

Significant reduction in blood pressure after relaxation therapy in a long-term follow-up (12 months) was reported by Patel.\textsuperscript{47} Behavioral management of hypertension, including relaxation techniques, in a randomized controlled trial reported a decrease in mean blood pressure from 168/100 mm Hg to 141/84 mm Hg compared with a decrease from 169/101 mm Hg to 160/96 mm Hg in the control group. Both groups were on antihypertensive medications.

The results of a worksite-based study showed a significantly greater reduction in blood pressure among patients using biofeedback techniques.\textsuperscript{41-65} The group with initial blood pressure of 166/101 mm Hg dropped to 143/89 mm Hg in the intervention group, compared with a decrease from 160/98 mm Hg to 150/98 mm Hg in the control group at 8-month follow-up. Several studies reported reasonably long follow-up of up to four years with positive results.\textsuperscript{56,67}
Some studies, however, failed to confirm long-term clinical effectiveness of relaxation and biofeedback therapy as the sole treatment of hypertension. Other studies report mixed results regarding the treatment of borderline and mild hypertension. Such variability of results in blood pressure studies following relaxation and/or biofeedback therapy is associated with many factors including the level of elevation of initial blood pressure. High pretreatment blood pressure levels resulted in the greatest overall improvement. Variability of success in blood pressure studies may also depend on the duration and quality of therapy taught, the effectiveness of the therapist, the characteristics of the subject and his/her disease, and subject and therapist expectations.

Some hypertension studies were unable to differentiate between the effectiveness of biofeedback and relaxation. Clinical application of relaxation and biofeedback as the primary treatment of hypertension requires further investigation.

**Imagery**

Various terminologies are described in the literature (mental imagery, emotional imagery, relaxation imagery, guided imagery and visualization) that denote the basic technique of thinking in pictures or forming a mental representation of an object or events that can involve some or all of the senses. Guided imagery is the process of consciously altering body function by the internal representation of events to produce a psychological or physiological response. Once the technique is learned, a person can use imagery to control patterns of thinking, arouse emotions, understand and experience emotions and thoughts more intensely, and assist in controlling autonomic nervous system functions.

Clinically, imagery has been utilized in the treatment of a variety of conditions: stress, anxiety and phobias, pain, psychosomatic illness, and hypertension. It has been used in the management of cancer, chemotherapy and radiation therapy, burn debridement, pre- and post-operative surgical pain and wound healing, and irritable bowel syndrome. Multiple childhood illnesses have also been managed with the aid of imagery, including asthma, phobias, affective disorders, psychosomatic illnesses, and weight loss. Physiological responsiveness to imagery has been demonstrated by alteration in salivation, heart rate, blood pressure, pupillary reactions, body temperature, galvanic-skin response, gastric acid secretion, serum glucose levels, salivary IgA, and breast milk production.

A study on breast feeding showed that mothers of infants in intensive care who listened to a 20-minute relaxation and guided imagery tape produced 63 percent more breast milk after one relaxation session than did a randomized group of controls. Also, a small group of mothers whose infants were receiving mechanical ventilation had a 121 percent increase in milk production over controls.

Guided imagery has been frequently used with cancer patients to help reduce the anxiety and pain associated with the disease and its treatment. For example, the Simonton method involves training the patient to visualize conflict between the immune system or anti-cancer drugs and the cancer cells in order to stimulate the body's defense mechanisms against the disease. Patients are asked to mentally picture this conflict, focusing on how the body operates against the cancer cells. In addition to guided imagery, Simonton also trained medically incurable cancer patients in progressive muscle relaxation and counseled them extensively in stress management. Reviews of Simonton's work report that 90 percent of the subjects trained lived an average of 24 months after diagnosis, exceeding twice the national life expectancy norms for medically incurable patients. Survival was associated with frequency of relaxation and imagery practice. Simonton has reportedly treated patients with advanced malignancies who failed conventional therapy but were able to achieve a tumor-free state following imagery therapy. The main criticism of Simonton's work, and other guided imagery methods as adjunct treatments for cancer, is the lack of well controlled trials on any anti-tumor effect. Extension of survival time does not, in and of itself, demonstrate a direct effect of visualization techniques on any disease process.

Others use guided imagery to probe the subconscious of "exceptional cancer patients" (i.e., those who have a very strong will to live) in an effort to explore their feelings about their disease. Using this technique, Siegel has claimed substantial improvement in cancer prognosis, although, in one study the impact of a psychosocial support program on survival of patients with breast cancer was inconclusive. The work of Siegel, Simonton and others has come under ethical scrutiny for overburdening patients with the responsibility for their own recovery. Critics observe that a patient may feel unnecessary guilt when self-induced psychological therapies do not produce the desired results.

Relaxation in combination with guided imagery (RGI) has been associated with various indexes of surgical recovery. A review of RGI in postsurgical man-
agement showed that patients had less postsurgical pain and anxiety, required less blood and medication, had shorter hospitalizations and experienced fewer feelings of loss of personal control than control patients. Using a very small sample, Holden-Lund demonstrated that patients who listened to one 20-minute preoperative RGI tape and three 20-minute post-operative tapes had less state anxiety, lower cortisol levels one day following surgery, and less surgical wound erythema than did a control group.\(^92\)

Relaxation in combination with guided imagery has also been used extensively with children in a variety of settings. Proponents have reported significant improvement in the management of pain and anxiety associated with medical procedures, migraine headaches, enuresis, anxiety reactions, obesity, acute and chronic pain, asthma, habit disorders (e.g., nail-biting and hair twisting), and cancer.\(^93\) Oleson, Cohen and colleagues\(^94\) reported dramatic results with RGI in the management of 505 pediatric visits for many of these problems. Fifty-one percent of the children were reported to have complete resolution of their medical problem. Significant improvement was reported in 32 percent of the cases. Recurrence of symptoms was reported in 10 percent, and 7 percent of the patients showed no change. A review of RGI as adjunctive treatment in the management of asthma in children revealed fewer emergency room visits, decreased severity of symptoms and reduced medication requirements. Twenty percent of the children studied reported no further need for medications, having no evidence of sustained difficulty with asthmatic symptoms such as missed school, exercise intolerance or other restrictions in activity.\(^95\)

Hypnosis

Hypnosis is an altered state of awareness characterized by increased suggestibility to such things as muscle rigidity, amnesia, hallucination, and anesthesia.\(^96\) Whether induced by a therapist or self, hypnosis has been used to moderate pain associated with surgery, cancer, and chronic disease, and in the management of psychosomatic disorders, gastrointestinal illnesses, dermatologic problems and a variety of childhood conditions.\(^97,98\)

A variety of physiological responses have been studied including hypnotic control over finger temperature, skin test reactivity, gastric acid secretion, and salivary IgA.\(^99\) Psychological factors have been implicated in the pathogenesis of many gastrointestinal conditions. Examination of the clinical role of hypnosis in modifying gastrointestinal function includes the reports of modification of gastric acid secretion and gastrointestinal motility. In a study by Spiegel,\(^100\) induction of different psychological states by hypnosis resulted in subjects being able to raise their basal gastric acid secretion by 89 percent, or lower it by 39 percent. In a controlled study, Whorwell documented some therapeutic benefit of hypnosis in the prevention of duodenal ulcer relapse.\(^101\) In another controlled trial, 30 patients with severe irritable bowel syndrome (IBS) improved dramatically after three months of hypnotherapy, as compared with a control group receiving placebo medication plus supportive psychotherapy.\(^102\) The authors suggest that hypnotized subjects demonstrated the ability to influence gastrointestinal motility. In a follow-up study at 18 months, 84 percent of the patients remained symptom free, with best results occurring among classical IBS patients and those under age 50.\(^103\)

Hypnotherapy was least successful in preventing remission in patients that demonstrated significant psychopathology.

The hypnotherapy used by Whorwell included "gut directed" guided imagery, in which patients placed their hands over their abdomens and visualized warmth beneath their hands. Six subjects had received nonspecific hypnotherapy prior to the study without gastrointestinal benefit. Successful remission of gastrointestinal symptoms was reported by the same six subjects following hypnotherapy with the addition of the gut-directed guided imagery. It has been shown that the hypnotic suggestion of relaxation also decreases gastric acid secretion and motility;\(^104\) the state of relaxation induced by hypnosis, guided imagery and meditation may produce the same gastrointestinal effects. Specifically designed studies are needed that compare the effectiveness of each of these modalities individually in their ability to alter gastrointestinal function.

Conclusion

There is evidence to suggest that alternative psychological techniques such as meditation, relaxation, hypnosis, and visualization affect many systems. Cardiovascular influence has been demonstrated by the ability of these techniques to elicit the relaxation response. Immunological effects may occur through a complex communicative network between the brain, endocrine and immune systems. Involvement of multiple physiological and psychological pathways, as well as the report of a few well-controlled studies and abundant anecdotal data, suggest that these factors may alter susceptibility to and progression of disease. However, current research in this area is inadequate and inconclusive. Studies are replete with methodological inadequacies, poorly defined terms, and inconsistent results.
There is a clear need for standardization of definitions and methodology. Adequate evaluation of the effectiveness of these modalities requires further investigation.

Current data does provide encouraging signs that efforts to incorporate these alternative psychological techniques into daily life can potentially affect one's state of health and manifestation and progression of certain disease processes. Although unlined, some generalized positive effect appears to occur following regular practice of these modalities. Successful intervention with one or a combination of these techniques has been demonstrated in the management of hypertension, stress, anxiety, depression, and sense of loss of control associated with chronic illness. Other promising areas of application include psychosomatic illness, gastrointestinal disease, drug abuse, asthma, and post-surgical management. Further research may define other important clinical applications of psychological techniques.

References


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