Applied Psychophysiology And Family Medicine

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Just over a quarter of a century ago the 20th “specialized” field of medical practice was inaugurated via the establishment of the American Board of Family Practice. Described as a style of practice that specialized in breadth rather than depth, family medicine had a stated commitment to address the “whole patient” and to re-emphasize the mind-body perspective. George Engel’s application of system theory to clinical practice and his subsequent description of the biopsychosocial model (Engel, 1977) became a central point of reference for this new discipline. The importance of human behavior in the context of both health and illness became a major focus of attention and the practice and teaching of behavioral science was identified as an essential element within family medicine curricula.

Current reality contrasts poorly with the original ideals. Despite its founding commitment to behavioral science, family medicine has little to demonstrate in its modern day practice that illustrates the efficacy of the biopsychosocial approach. The use of family system theory and the relational genogram has expanded the diagnostic insight of many family practice residents, but in community practice the majority of family practitioners regard the biopsychosocial approach as too time-consuming to implement and of uncertain—if not unproved—benefit to patients. Most significant of all has been the lack of standardized treatment protocols for behavioral diagnoses, and the absence of a therapeutic method that could be relied upon to provide predictable, beneficial outcomes.

Our experience with the collaborative practice of family medicine and applied psychophysiology strongly suggests that this may represent a major solution to an overwhelming clinical need. Somatization as an expression of psychosocial problems has been estimated as occurring in as much as 75% of all patient visits to primary care physicians (Roberts, 1994). In one study of an academic family practice population, somatization disorder was identified as the fourth most common diagnosis encountered, placing it ahead of ischemic heart disease, diabetes mellitus, obesity, urinary tract infections, and otitis media (DeGray et al., 1987). The authors’ experiences over the past five years with patients attending a family medicine clinic at Eastern Virginia Medical School have corroborated this high volume of relevant clinical symptomatology. In addition, the effectiveness of the applied psychophysiological approach in primary care has been realized in many of these patient cases. Consequently, the Department of Family and Community Medicine at EVMS has recently established a Division of Behavioral Medicine to re-emphasize the practice and teaching of behavioral medicine for both medical students and residents. The division has initiated a new clinical service named “The Systemic Medicine Clinic,” which is located in the immediate proximity of the Family Practice Center. The intent is to normalize and expedite regular interaction between the two clinical settings, and reduce or remove the perceived stigma of a “psychological referral.” The notorious resistance of somatizers to psychological referral can thus be minimized.

The following case is illustrative of the kind of successful therapeutic outcomes that have occurred as a result of clinical collaboration between the two authors (one a family physician and the other a clinical psychologist). Anita was a 37-year-old white female with a long history of increasing atopy (a predisposition to allergic symptoms). She worked in a medical setting and had access to a number of physicians who all had a high regard for her administrative role. As a result she was able to organize multiple sources of prescribed therapy. In addition to antihistamines for allergic symptoms she was regularly using analgesics including Darvocet for “sinus headaches.” A course of allergic desensitization had been initiated some six months prior to the incident that led to effective intervention. A family physician was called to intervene after a classic anaphylactic reaction developed to her weekly allergen injection.

Case Presentation
Anita is a 37-year-old white female with presenting complaints of “severe respiratory allergies,” since age six, “sinus infections,” and “chronic headaches for over 15 years.” She had just com-
pleted 1-1/2 years of desensitization for multiple allergies. Her allergist told her that she had the “worst allergies she had ever encountered.” Dr. Davies referred the patient to Dr. Wickramasekera after witnessing a “classic anaphylactic reaction following her most recent allergen injection in which she developed hives in waves from head to toe.”

The patient was evaluated for psychophysiological psychotherapy, which is essentially psychotherapy guided by physiological monitoring for unconscious threat perception with adjunctive hypnotic and/or biofeedback (Wickramasekera, 1988, 1993). She was evaluated for psychophysiological psychotherapy by determining her status on nine specific high risk factors.

The High Risk Model of Threat Perception (HRMTP) provides nine quantitative psychophysiological risk factors that appear to amplify or reduce autonomic dysregulation and promote somatization and may eventually contribute to pathophysiology (Wickramasekera, 1976, 1979, 1988, 1994a,b, 1995). Three of these risk factors are hypothesized to block threat perception from consciousness: 1) high hypnotic ability or 2) low hypnotic ability (Wickramasekera, 1976, 1988), and 3) high covert neuroticism or “repression” (Weinberger, 1990). In other words, these three risk factors can block threat from reaching consciousness causing autonomic dysregulation (Wickramasekera, 1979, 1988).

On the other hand, the following risk factors (Wickramasekera, 1979, 1988) are hypothesized to amplify the perception of threat. They are 1) high hypnotic ability, 2) high neuroticism or high negative affectivity, 3) excessive major life changes, 4) multiple hassles, 5) low support systems, and 6) low coping skills. Incidentally, hypnotic ability is statistically unrelated (orthogonal) to all the above risk factors including high (17+) Marlowe Crowne scores which are used to index high covert neuroticism (Wickramasekera, 1988, 1994a,b, 1995). Paradoxically, high hypnotic ability, depending on how it is used, can both reduce (block as in hypnotic analgesia or post-hypnotic amnesia) or amplify (as in phobias or pain perception) the perception of threat.

These nine risk factors can be divided into predisposers:

1) high hypnotic ability.
2) low hypnotic ability.
3) high covert neuroticism.
4) high covert neuroticism.
5) high catastrophizing.

triggers:
6) major life changes.
7) multiple hassles.

buffers:
8) a high number of social supports and/or satisfaction with social support, and 9) high coping skills.

It is important that hypnotic ability is statistically unrelated to neuroticism.

It is hypothesized that the interaction of hypnotic ability with high overt or high covert neuroticism (negative affectivity) drives the bulk of psychological and somatic symptoms. The clinical use of this complex model is described elsewhere (Wickramasekera, 1988, 1993).

Anita was informed that her acceptance for therapy would be based on her demonstration “up front” of 1) her commitment to learning psychophysiological self-soothing skills (self-hypnosis and biofeedback), and 2) her willingness later to investigate the deeper antecedents and consequences of her somatic symptoms. She was also informed that “we will first put out the fire before looking for the matches.”

Testing on the psychological part of the HRMTP revealed a patient who had only two of nine risk factors for somatization. But these are two of the three most potent mechanisms for blocking the perception of threat (negative affect) from consciousness and appear to be relevant to the psychodynamics of this case. These high risk factors were 1) high hypnotic ability and 2) high covert neuroticism or “high repression.” Anita had two statistically unrelated or orthogonal (Palsson, 1993; Remler, 1990; Wickramasekera, 1979, 1988, 1995) cognitive mechanisms to block the perception of threat or trauma from consciousness. These potent cognitive blocking mechanisms may explain why all prior clinical interviews and all prior verbal report psychological tests like the (NEO) and the Symptom Check List-90 (SCL-90) were free of psychopathology producing an “illusion of mental health” (Shedler et al., 1993). But distress or negative affect blocked from consciousness is not necessarily abolished from the body. Linda’s suffering was “out of mind but not out of body” (Wickramasekera, 1979, 1988, 1994a,b, 1995).

On the Psychophysiological Stress Profile or P.S.P. (Wickramasekera, 1976, 1988, 1993) component of the HRMTP, there were several physiological indications of distress not present in the prior conscious verbal report tests. It is important to present pre/post testing on the P.S.P. because it provides both: 1) independent biological support for the two psychological risk factors, and 2) some support for the view that therapy did not simply reduce this patient’s symptoms but may have also altered “autonomic balance” (Winger and Cullen, 1973). Autonomic balance is hypothesized to be implicated in the etiology of somatization (Wickramasekera, 1988). Figure 1 shows pre-therapy and post-therapy means for: 1) left hand skin conductance, 2) left hand skin temperature, 3) blood volume pulse, 4) heart rate, 5) forehead muscle tension based on the Psychophysiological Stress Profiles. Clear changes in these five physiological measures from pre- to post-therapy are indicated by changes in the heights of the bars.

Because therapy was conducted in a consulting room outside the testing laboratory, adaptation to the laboratory is unlikely to explain these physiological changes. When asked during baseline testing to close her eyes and relax, her heart temperature actually dropped when normally it is expected to increase. This drop in heart temperature was correlated with intrusive aversive thoughts and feelings reported coming into her mind when she closed her eyes and tried to relax.

During the P.S.P., cognitive stress generated a paradoxical increase in hand temperature (PTT). This PTT was clearly documented also in a paradoxical increase in blood volume pulse (BVP) during the stress condition. It appears consistent with a learned “dissociative” type of “relaxation response” during stress. Many similar patients report cognitively escaping during the stress and reacting to stress only after the fact. Anita reported being “strong during the crisis” but states she becomes sick only after the crisis. Before therapy, her poststress baseline skin conductance (EDR)
was 17.22 umhos (S.D. 1.33 umhos).
EDR has been shown to be exclusively sympathetically innervated, unlike heart rate which is both sympathetically and parasympathetically innervated (Boucesin, 1992). During the baseline relaxation period, her EDR actually increases when she closes her eyes and tries to relax. This again suggests the intrusion of aversive cognitions or emotions when she closes her eyes and attempts to relax. Note that this response is abolished after therapy. Pre-post therapy EMG or muscle tension and her heart rate (HR) showed a normal baseline, and normal reactivity to cognitive stress and a rapid recovery.

It is worth noting that on clinical interview, conventional psychological testing (SCL-90, NEO) and on two conventional physiological measures, heart rate and muscle tension (EMG), Anita demonstrates normality! But testing on the HRMTP, specifically designed to study somatization, provides evidence of significant mind-body deregulation.

The patient was confronted with the pre-therapy test findings and told that the testing had revealed two unrelated cognitive mechanisms (Pallson, 1992; Remler, 1990; Wickramasekara, 1979, 1995) that enabled her to keep “secrets from herself” but not from her body. Her clinical symptoms were probably information about her unconscious distress. As she acquired an ability to physiologically “self-soothe” and to be less fearful, the currently unconscious “dragons” who were driving her body’s “red alert status” would step into consciousness.

Because of her high hypnotic ability, she was able to acquire mastery of the hand warming skill in four sessions. She reliably reached a hand temperature of 94°F from an initial baseline of approximately 80°F. In her low arousal state she also gained access and insight into her irritation, and later her rage at her husband. Several suppressed or “repressed” traumatic marital incidents that cannot be reported here emerged into consciousness. These incidents were independently documented by public records and her employer. In the course of therapy, the patient became more self-assertive at home and work. As her rage at her husband surfaced, she became very depressed about her marital situation. As this strong negative affect came to con-

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Figure 1—Mean changes in skin conductance, hand temperature, finger blood volume pulse, heart rate and forehead muscle tension, pre- and post-therapy. The height of each bar is equal to the mean of 15 data points collected over one minute. There are 8 means (8 minutes) prior to stress, 4 means (4 minutes) during stress and 8 means (8 minutes) during recovery from stress. Each pre-stress and post-stress period is composed of 4 minutes of eyes open and 4 minutes of eyes closed recording. A total of 300 data points are collected on each physiological measure during 20 minutes of recording time.
sciousness, her headache pain decreased. Anita had no headache through week 13-18 and has had few headaches in the last 24 months. Her allergic reactions to multiple foods, and environmental substances, plus her pain reports are reduced in spite of the withdrawal of all allergic and analgesic medications. She states at the 24 month follow-up: “I am eating foods (potatoes, hot dogs, crab meat, dairy products, green beans, peas, oatmeal) I could not eat before.” Her husband was unwilling to participate in marital therapy in spite of numerous efforts to directly or indirectly draw him into marital therapy even as a consultant.

Anita appears to have learned to use her hypnotic ability more adaptively to 1) identify rather that block subtle threats, and 2) to use self-hypnosis to “self-soothe” and recover more rapidly when she is agitated. At termination of her once per week three month therapy, the patient rated her allergies as 90% improved, and on long term follow-up (at 24 months) the patient reported 100% remission of all allergies and somatic symptoms, increased self-confidence, and sustained high self-assertion.

Discussion
This case illustrates that even well recognized clinical syndromes (i.e., seasonal rhinitis, allergic sinusitis) can be dramatically benefited by an applied psychophysiological approach. Patients with severe and florid physical symptoms can be convinced of their psycho neuroimmunologic basis when appropriate psychophysiological tests and therapies are used.

The program at EVMS is in the earliest stage of development, and it is evolving as a collaborative enterprise between the two Departments of Family and Community Medicine and Psychiatry. The need to mainstream mental health services within high-volume primary care practices can hardly be disputed, and the efficacy of the applied psychophysiological approach in dealing with a wide spectrum of illnesses is now well established. Clearly, in the current health care climate, the first pragmatic challenge is to demonstrate that such an arrangement results in improved, cost-effective outcomes. A considerable body of such documentation is already available, but actual data relating to the new practice will be needed to validate the program. This priority represents the first stage of research by the department’s Division of Behavioral Medicine.

A major goal of the project is to motivate and involve students and family physicians in the practice of biofeedback and related techniques. As described elsewhere in this issue of the Biofeedback newsmagazine, medical students have already shown an enthusiastic response to demonstrations of psychophysiological processes. Family practice residents react similarly when they recognize the changing physiologic tracings in response to stimuli or relaxation. Biofeedback is proving to be a “hard-data hook” on which to catch the biomedically-oriented physician’s attention to the behavioral domains of his/her patients!

The collaborative practice environment of the systemic medicine clinic will ultimately include medical students, family practice residents and family physician faculty—in addition to the core staff of a clinical psychologist, a psychology intern and a certified biofeedback technician. Co-therapy sessions involving psychologists and family physicians will be the training approach, and levels of expertise and competency will need to be defined as medical doctors become increasingly responsible for conducting biofeedback and counselling sessions on their own. The authors firmly believe that there is a need for this kind of applied psychophysiological clinical center in every family medicine residency in the country. The prototype currently under development at Eastern Virginia Medical School can be expected to provide some initial answers to the pragmatic issues associated with any new such venture.

References