6 Integrating Complementary and Alternative Medicine into Multidisciplinary Chronic Pain Treatment

Gabriel Tan
Michael E. DeBakey VA Medical Center, and Departments of Anesthesiology, and Physical Medicine and Rehabilitation, Baylor College of Medicine, Houston, Texas, U.S.A.

Mark P. Jensen
Department of Rehabilitation Medicine, University of Washington, Seattle, Washington, U.S.A.

In the practice of Western medicine, individuals suffering from chronic pain usually seek medical care with the hope of obtaining a specific diagnosis and curative treatment. When a curative treatment is not available, patients then often expect and are given prescriptions for analgesic medications ("pain killers") for pain relief. Unfortunately, however, specific diagnoses for most chronic pain problems are difficult to make, and treatments are rarely curative. Moreover, although analgesic medications can be effective in relieving acute pain in the short-term, their utility for treating chronic pain is controversial and efficacy is, at best, marginal (1). For example, in a recent review of the efficacy of various treatments for patients with chronic pain, it was noted that the average pain reduction for patients placed on long-term opioids is only 32% (2). In addition, anticonvulsants, tricyclic antidepressants, and topical preparations (considered the treatment of choice for neuropathic pain) seldom result in pain reductions to below a rating of 4 on 0 to 10 numerical scales. Turk (3) concluded that "... none of the currently available treatments eliminates pain for the majority of patients." Thus, despite the availability of multiple biomedical treatments for chronic pain, there remains ample room for additional, and perhaps for some patients, even more efficacious treatments.

PSYCHOLOGICAL INTERVENTIONS FOR PAIN MANAGEMENT

Cognitive-behavioral therapy (CBT) and other psychological interventions provide a viable alternative to traditional Western biomedical pain treatments. A growing body of research supports their efficacy for helping patients better manage chronic pain (4,5). However, like more traditional biomedical-focused pain treatments, psychological interventions are not universally effective (6).

Furthermore, psychological interventions are not without their limitations. First, in order to be successful, they require significant effort and motivation on the part of the patient (7). These treatments also tend to be time-intensive (10 or more 1-hour individual or group sessions is not unusual), and they usually require significant practice of the cognitive and behavioral management skills outside of treatment sessions. In addition, some patients with chronic pain are so wedded to

the traditional medical model, where treatments are done "to" them and not by them, that they may have little interest in treatments which require their own efforts. Many such patients who desire a biomedical-focused treatment approach will not participate or follow through with psychologically based therapies such as CBT.

Along these lines, there may be a subset of patients who are particularly skeptical, rational, analytic, and hyposensitive to the emotional/somatic component of psychosocial threats (8). Such patients tend to be reluctant to examine the etiology of negative emotional/somatic information and instead tend to search for physical explanations of and physical solutions for their distress. When these patients are referred for psychological treatment (for a pain problem), they may not show up for the sessions and may not follow through with homework assignments or practice recommendations that are often a part of these psychological approaches. One reason for this apparent resistance may be the belief that seeing a psychologist for pain problems amounts to an admission that their pain is "in the head" and not real.

COMPLEMENTARY AND ALTERNATIVE MEDICINE

Complementary and alternative medicine (CAM) has been defined as "diagnosis, treatment and/or prevention which complements mainstream medicine by contributing to a common whole, satisfying a demand not met by orthodoxy, or diversifying the conceptual frameworks of medicine" (9). According to the National Center for Complementary and Alternative Medicine, CAM includes "treatments and healthcare practices not taught widely in medical schools, not generally used in hospitals, and not usually reimbursed by medical insurance companies" (10). CAM encompasses both nontraditional treatments used in association with conventional Western medical practices as well as alternative medical interventions intended to replace traditional Western medical practices (11).

CAM interventions have been increasing in popularity over the past two decades due to dissatisfaction with traditional Western medicine, the availability of information on the Internet, the influence of marketing forces, and the desire of patients to be more actively involved in their own medical decision making (12). Eisenberg and colleagues (13) estimated that the U.S. public spent between $36 billion and $47 billion on CAM treatments in 1997. A recent U.S. national health survey of 31,044 adults found that 36% of the population surveyed used CAM therapies during the prior 12 months (14). This percentage increased to 62% if prayer for health reasons was included in the definition of CAM. Back pain, neck pain, and joint pain are among the problems for which CAM therapies are most commonly sought (14).

EFFICACY OF CAM THERAPIES

The National Institute of Health Office of Alternative Medicine (OAM) and the National Center for Complementary and Alternative Medicine (NCCAM) have grouped CAM therapies into four domains: biologically based medicine, energy medicine, manipulative and body-based medicine, and mind–body medicine. In addition, the NCCAM also defines a separate domain, "whole or professionalized CAM practices" (e.g., acupuncture and homeopathy).

Using the guidelines of the Clinical Psychology Division of the American Psychological Association for quantifying treatment efficacy (15). Tan and colleagues have examined the efficacy of various CAM therapies for chronic pain (16). Their findings indicate that the efficacy of CAM therapies varies considerably from modality to modality, with efficacy ranging from 2 (possibly efficacious) to 5 (highly efficacious). Hypnosis is rated at levels 4–5; biofeedback, acupuncture, and massage therapies at levels 2–4. Chiropractics, meditation, yoga, and glucosamine/chondroitin for arthritis have been assigned level 3 (probably efficacious).

USE OF CAM MODALITIES TO ENHANCE OUTCOMES AT THE MEDVAMC

This chapter will select three CAM modalities, used at the Michael E DeBakey VA Medical Center (MEDVAMC), to illustrate how their inclusion can enhance the outcomes of a pain management program. Two therapies, hypnosis and biofeedback, were selected because they have been shown to be among the most robust in terms of evidence for efficacy in the literature (16). A third modality to be discussed is cranial electrotherapy stimulation (CES), given the authors' experience that CES and hypnosis can be successfully incorporated into an existing pain practice (63,78).

Hypnosis

The use of hypnosis for pain relief in the West dates back to the 1770s when Anton Mesmer used hypnosis to treat a large number of problems, although he attributed treatment successes to his ability to direct the "magnetic fluid" that existed in all material (17). Before the availability of chemical anesthesia, hypnotic anesthesia had been used to successfully perform surgical procedures causing minimal pain (18,19). A meta-analysis of 18 studies by Montgomery et al. (20) found strong support for hypnotic analgesia as a valid and reliable phenomenon with 75% of clinical and experimental subjects reporting significant pain relief. Patterson and Jensen (21) supported this conclusion for both acute and chronic pain conditions. Hilgard and Hilgard (22) proposed three general classes of pain management approaches using hypnosis: direct suggestion for pain reduction (e.g., an area becoming numb, or "you will feel no pain"), alteration of the experience of pain (e.g., letting the pain fade away as the drop of water ripples and spreads outward in the lake, or the pain sensation going from hot to cool), and redirection of attention (e.g., hypnotic suggestion to become absorbed and intrigued by an internally generated event or scene). Overall, research indicates that hypnotic analgesic interventions have a significantly greater impact on pain reduction as compared to no treatment, medication management, physical therapy, and education/advice (23).

The efficacy and mechanism of action of hypnosis on irritable bowel syndrome (IBS) has recently been reviewed (24). A special issue of the *International Journal of Clinical and Experimental Hypnosis* (volume 54:1, 2006) has been devoted exclusively to this topic. The findings are unequivocal in showing that the hypnosis is highly efficacious for the treatment of IBS.

Biofeedback

Biofeedback is the process of providing real-time information from psychophysiological recordings about the levels at which physiological systems are functioning.

Electronic biofeedback devices are designed to objectively record tiny changes in physiological functions noninvasively which could not be readily detected by other means. Most devices record physiological responses from the surface of the skin. The information recorded by surface sensors is sent to a computer for processing and then displayed on a monitor and/or through speakers. The patient and therapist can attend to the display of information and incorporate it into the processes they are attempting to modify. The physiological parameters most often recorded for biofeedback include muscle tension [the surface electromyogram (SEMG)], near surface blood flow (done by recording skin temperature), heart rate, sweating or galvanic skin response (GSR), brain waves (EEG), and respiration rate. Recently clinicians have been exploring the efficacy of neurofeedback for pain management (25–28).

A number of reviews of the efficacy literature on biofeedback for pain have been published (29–31); we present a very brief summary of this literature below. Perhaps the strongest evidence for the efficacy of biofeedback comes from research examining its efficacy for migraine and tension headache (32,33). Rains et al. (34) reviewed the relevant meta-analyses and concluded that biofeedback is highly efficacious for tension-type headaches. Comparative studies have shown that biofeedback is at least as, or more, effective than standard interventions such as medication and relaxation training for both tension and migraine types of headache (35). Regarding muscle-related orofacial pain, a comprehensive review concluded that biofeedback treatment of orofacial pain is effective when the pain is due to muscle rather than originating in the temporomandibular joint (36). Several studies have shown that biofeedback was as effective or better than splint therapy for orofacial pain and gains (in terms of pain reduction) were maintained for longer periods with biofeedback than with other treatments (37,38). A recent review (39) of 12 randomized controlled trials (RCTs) concluded that SEMG training with adjunctive CBT is an efficacious treatment for temporomandibular disorders and both SEMG training as the sole intervention and biofeedback-assisted relaxation training are probably efficacious treatments. For musculoskeletal back pain, reviews on efficacy of mixed behavioral interventions including biofeedback indicate that these can be very successful with chronic LBP (40–43). Reviews of studies of the efficacy of biofeedback on LBP have generally concluded that biofeedback is likely to help some patients with muscle-related back pain, and at an overall improvement rate of about 65% relative to 33% for placebo and no improvement for no-treatment controls (44).

Additional studies have investigated phantom limb pain, of which two types have been found to be amenable to biofeedback: burning and cramping pain. Studies have shown that nearly all amputees with cramping limb pain are helped by SEMG (45). The success rate for cramping limb pain (relative to burning pain) has been encouraging, as about half of the patients with burning limb pain have not been able to benefit from biofeedback (45). Many authors do not differentiate types of phantom pain when applying biofeedback but still report success (46,47). Regarding fibromyalgia, a series of studies has confirmed that psychophysiological intervention combining SEMG biofeedback and EEG-driven stimulation (a type of EEG biofeedback where a dominant frequency is selected and moved up and down as the situation demands) is effective in the treatment of fibromyalgia (48–50). These investigators identified diffuse muscular coactivation as a potential source of pain in fibromyalgia syndrome, and SEMG biofeedback has been successfully used to reduce the pain in these paired tender points (48,49).

Biofeedback as a Diagnostic and Self-monitoring Tool

Although biofeedback is often thought of as a treatment tool and its usual definition does not include psychophysiological assessment, it has been our experience (shared by other clinicians) that biofeedback equipment can be used for diagnostic and/or self-monitoring purposes. We are thinking, for example, of a patient recently referred to us with a chronic history of headaches that interfered with his employment as a manager of a store. He had been seen by neurology who placed him on Imitrex, which gave inconsistent relief. He was hooked up to a biofeedback machine with bilateral placement of SEMG electrodes on the upper trapezes. While obtaining baseline measures, he exhibited a slight increase in muscle tension that corresponded with each inhaling breadth and then subsided when he exhaled. This pattern was indicative of a braced breathing posture, which contributed to cumulative tension and muscle spasm, and was determined to be a likely contributor to his headache via the phenomenon of referred pain. He reported being totally unaware of this bracing posture. He was instructed to continue breathing but to do so without the muscle tension when inhaling. He learned this with the help of the visual feedback of his EMG muscle activity. After six training sessions, he reported significant decrease in the episodes and intensity of the headaches, and was able to eventually taper off his Imitrex.

Observing one's real-time psychophysiological recordings on a screen while one is performing a task or simply sitting still often creates an increased self-awareness and impetus for change. It is one thing to tell a patient that his or her standing posture is putting excessive stress and tension on the back. It is another to hook up the patient with SEMG electrodes in selected sites on the back so that he or she can directly observe real-time changes in SEMG recordings during different activities. The simple observation of how a corrected posture can reduce muscle tension may provide sufficient motivation and feedback information for some patients to self-correct the posture. In practice, however, several training sessions are usually needed to make the appropriate adjustments. Although the example given here refers to the use of SEMG electrodes to measure muscle tension, the same principles would apply to other biofeedback modalities as well.

Physiological Stress Profiling

Another common application of biofeedback training is to perform physiological stress profiling (PSP) while the patient is hooked up to several biofeedback modalities simultaneously and is subjected to a variety of stressful stimuli such as a sudden loud noise (with little or no warning) in order to produce a startle response, or is asked to perform increasingly difficult mental arithmetic tasks. Observing which physiological measures respond to the stressor, and in particular which ones remain reactive even after the stressor is removed, can provide useful feedback to both the patient and the therapist concerning how the patient responds to stress. For instance, some patients may display increased heart rate and shallow breathing in response to and following a stressor, others may show decreased finger temperature, and still others may display significant bracing of the neck muscles. More important for patients with chronic pain is the ability to rebound, that is, for the reactive physiological response systems to return to normal, prestress levels after the stressful stimuli are removed. Inability to rebound is often a contributing factor to many pain conditions such as back and neck pain, and headaches.

Biofeedback as an Adjunctive Therapy for Pain Relief

Biofeedback can be used as the sole treatment for pain or as an adjunctive treatment in combination with other interventions. One method is to combine it with pain medication with the goal of tapering off the medications as the patient acquires better pain management skills through biofeedback. Biofeedback is also often combined with psychotherapy as a part of behavioral intervention, or is used as one modality in a multidisciplinary treatment approach.

Some patients may be so distracted by pain that achieving some degree of relief with medication may be necessary before he or she can focus on the biofeedback training. As progress is made, the medication can be gradually reduced and even eventually tapered off. Also, there is some evidence that when combined with microcurrent electrical stimulation, the combined therapies are more effective than either one alone (51).

Biofeedback to Treat Pain-related Symptoms and Interference on Functioning

In addition to reducing pain, biofeedback therapies can be used to treat pain-related symptoms such as depression, excessive fatigue, chronic anger, sleep problems, and excessive anxiety. Biofeedback may be used to address other issues that can affect the outcome of pain management such as addiction to alcohol and pain medication (51,52).

As indicated above, biofeedback for pain often works by first identifying the patient's individual physiological dysfunctions that may be contributing to the pain, helping the patient recognize when those dysfunctions are occurring, and then helping the patient correct them by watching the display and attempting to implement a variety of corrective strategies. For example, most people with chronic muscle-related pain are often not as able as people without pain to be aware of muscle tension (53). They then tend to keep the muscles very tense over long periods of time, which can cause or contribute to chronic pain. Biofeedback can be used to calibrate sensations coming from the muscles with actual levels of tension so that people do not remain more tense than necessary for longer than necessary.

Adverse events or negative side effects of biofeedback therapy for pain are rarely an issue. However, there are potentially serious side effects of other behavioral therapies commonly used conjointly with biofeedback, such as progressive muscle relaxation (PMR) training. Side effects may occur when biofeedback is used to treat conditions other than pain. For example, precipitation of panic attacks or hyperventilation may occur when respiratory alterations are induced among some individuals with significant anxiety or asthma, and there is a potential to trigger cardiac events when PMR is used with individuals with known (or unknown) cardiac problems (51).

The mechanism of action for biofeedback in pain management has not been fully established. However, there is increasing evidence that for chronic muscle or myofascial pain syndromes, pain modulation with biofeedback can occur in part because of increased perceptions of control and decreases in pain-related catastrophizing, as well as by learning lowered arousal techniques that keep sympathetic pathways to trigger points from being maintained (51,54). For pain conditions such as fibromyalgia, phantom limb pain, and other centrally mediated pain, biofeedback may counter the effects of central sensitization through decreasing sympathetic overload, parasympathetic withdrawal, and stress hormones (54,55). There is also some evidence that changing improper muscle

contraction and blood flow patterns has a direct effect on pain caused by these problems (56).

To conclude, biofeedback is a nonpharmacological intervention that can work directly or indirectly to help patients deal with pain. The direct approach, which teaches patients to correct the physiological problem causing the pain, is highly efficacious for several pain problems. The indirect approach involves helping patients modulate their pain experience as well as modulate how pain affects functioning. Biofeedback used for pain treatment has no known toxic effects and minimal side effects; it can be used as the sole treatment for pain or as an adjunctive treatment in combination with other interventions. Sufficient meta-analyses, detailed reviews, assessments by U.S. government–sponsored panels, and high-quality studies with long-term follow-ups of significant numbers of patients have concluded that biofeedback can be highly efficacious for assessing and treating a variety of disorders whose main symptom of interest is pain (e.g., 29–31).

Cranial Electrotherapy Stimulation (CES)

It involves "the application of a small amount of current, usually less than one milliampere, through the head via ear clip electrodes" (57). The CES device we use is called "Alpha-Stim," which has been approved by the U.S. Food and Drug Administration (FDA) as a treatment for depression, anxiety, and insomnia (58). Based on the finding that patients with chronic pain frequently have comorbid affective disorders, CES began to gain popularity as an adjunctive intervention for pain management in the 1990s.

A small, but growing, body of controlled studies has reported on the efficacy of CES in reducing pain in patients with fibromyalgia, tension headaches, spinal pain, dental pain, and unspecified chronic pain (56,58). For example, in a double-blind, placebo-controlled study, 60 patients with fibromyalgia were randomly assigned to 3 weeks of 1-hour daily CES treatments, sham CES treatments, or a wait-list control condition. In this study, treated patients showed significant improvements in pain, sleep, well-being, and quality of life and no placebo effect was found among the sham-treated controls (58). In another double-blind study in which 50 dental patients were randomly assigned to receive real ($N = 30$) versus sham ($N = 20$) CES, 24 of the 30 patients (80%) who received CES were able to undergo dental procedures without other anesthesia, while 15 of the 20 (75%) sham CES patients requested anesthesia (59). Our own double-blind, placebo-controlled pilot study on central neuropathic pain (below the level of injury) associated with spinal cord injury indicated significant reduction in pain intensity postsession that was greater for the active CES treatment than the sham CES treatment (60). A multisite study is currently in its second year of implementation which will hopefully further elucidate the efficacy, effectiveness, and long-term effects of this treatment.

Although the mechanism(s) of action of CES on pain is (are) still unclear, it is generally believed that the effects are mediated through a direct action on brain activity in the limbic system, hypothalamus, and/or reticular activating system (61). It also has been suggested that CES reduces anxiety and depression, thereby indirectly elevating the pain threshold (62). In addition, CES (and self-hypnosis training) can serve a useful "Trojan horse" function to persuade patients to become involved in psychologically based interventions. A practical feature of CES is that a clinician simultaneously can carry out psychotherapy while the patient is "hooked up" to the device. Once patients learn that they can modify pain with changes in

brain activity using CES, they may become more willing to consider other treatments that alter brain activity, such as CBT.

THE MICHAEL E DEBAKEY VETERANS AFFAIRS MEDICAL CENTER PAIN MANAGEMENT PROGRAM

The experience of the primary author will be described to illustrate how three CAM modalities (hypnosis, CES, and biofeedback) have been successfully integrated into an existing (anesthesiology-based) multidisciplinary pain management program. As with many pain management programs, this one includes a psychological component which offers CBTs in group and individual settings, along with other psychological services in the assessment and treatment of patients suffering from chronic pain.

Past experience had revealed a number of limitations to the services we traditionally offered, the most notable one being a consistently high rate of no-shows for initial appointments and/or limited follow through after the initial appointment. This pattern led us to consider providing CAM interventions for pain, which we thought would be of interest to at least a subset of our patients. A second limitation of the services we initially offered was related to the nature and characteristics of our pain population. Many of our patients travel long distances (60–150 miles) to reach the MEDVAMC and they have limited means to get to the center. To serve their needs, our interventions need to be brief and provide relatively quick results. A third factor that led us to consider CAM approaches was the severity of the pain conditions in our veteran population, which made pain relief a primary goal for many of our patients—a goal that is not entirely consistent with CBT, which tends to focus on improvement in function rather than pain relief, per se. Veterans who receive care from a VA medical center also differ from the population at large in several significant ways. They are more likely to be older, have poorer health status, be smokers, be heavy drinkers, have psychiatric problems, be socioeconomically disadvantaged, be homeless, and have more severe pain intensity, pain interference, depression, and disability when compared to nonveterans (63).

We have found that VA patients with chronic pain referred to our services are often not prepared for psychotherapy because they do not view their primary (pain) problem as affective or psychological in nature. Rather, like many patients with chronic pain, these patients consider pain as primarily a physical problem, and they want a "real" physically focused treatment. Our experience also has been that patients referred to our service are not likely to continue with an intervention that does not provide symptom relief in a short period of time. Therefore, we have developed a case-management approach where we aim at "connecting" quickly with the patient and focusing at first on providing quick symptomatic relief. Here is a typical sequence of service provision:

(a) All patients referred to the pain program complete and return a clinical questionnaire by mail, which is scored for risk factors and need for psychosocial interventions.
(b) Patients, thus identified, are scheduled to attend an education/orientation meeting followed by a brief 30-minute screening, before or concurrent to seeing a pain anesthesiologist. The meeting is structured to educate patients

about chronic pain by questioning and (hopefully) debunking a purely biomedical focus and introducing the notion that decreasing pain interference and mind and body reconditioning also might be important. By conceptualizing pain management as "brain" management, alternative interventions such as CES and self-hypnosis training, as well as CBT, are introduced. The expected impact is that patients will begin to adopt a different, more biopsychosocial conceptualization for the management of their pain.

(c) CAM interventions, designed specifically to achieve initial pain relief (and indirectly to initiate the process of teaching patients self-management skills), are explained and made available to those who are interested. On average, 70–80% of patients attending this initial orientation/education class and screening have indicated a desire to pursue CAM interventions.

(d) When the patients are seen in subsequent individual sessions, the focus is to utilize CAM interventions such as CES to provide a "physical" treatment that typically results in immediate relief in pain or decrease in other symptoms. A preliminary analysis of 97 individual sessions where CES has been used since the beginning of this program indicates an average postsession pain reduction of 2.02 points on a 0 to 10 Likert scale or a 33.3% average reduction. Psychological interventions are not the main focus of treatment at first but are woven into the sessions for those who are interested. Patients are encouraged to participate concurrently in our education, support, and skills training groups.

This case management focus has been implemented with very positive and encouraging results. Preliminary data indicate that as many as 80% of veterans suffering from chronic pain chose to participate in the CAM therapies either as the sole treatments or in combination with more traditional therapies. Of the first 97 patients where CES was used alone or in combination with psychotherapy, an average pain reduction of 33.3% was achieved within 10 sessions, most of which occurred in the first 3 sessions (63). The veterans were found to be quite receptive to CAM interventions. We concluded that although no formal data were available for comparison, this model of service delivery appears to have substantially decreased the no-show rate since its introduction (63).

We would now like to describe two cases involving the use of CES and self-hypnosis. Since these cases are described in detail elsewhere in another publication (64), the presentation here is brief, and interested readers are referred to the previous publication for more detail.

Case Illustration 1: JS

JS is a 60-year-old married African-American male who was referred to the pain clinic by his primary-care physician (PCP), presenting with the complaint of worsening pain in his lower back and hip secondary to an injury in Vietnam. When asked to rate how much pain interfered with his daily life using the Brief Pain Inventory (BPI) Pain Interference scale, he rated the amount of interference as 9/10 for general activity, 9/10 for mood, 8/10 for walking ability, 8/10 for normal work, 8/10 for relations with people, 9/10 for sleep, and 9/10 for enjoyment of life. In addition, on a categorical scale of distress, he rated his current level of distress as "high." Previous treatments for his pain conditions included (a) chiropractor ("caused a lot more pain"), (b) massage ("made me feel really good but cost money"), (c) physical

therapy ("made me feel good but did not do anything with the pain"), and (d) medications (on various pain medications in the past—currently has good relief from Tramadol and Naproxen as prescribed by his PCP).

In addition to chronic pain, JS also suffered from combat-related posttraumatic stress disorder (PTSD). JS has been enrolled in the Mental Health Trauma Recovery Program for veterans suffering from PTSD since 2001. He was first seen by mental health due to sleep problems and nightmares. He endorsed symptoms of intrusive thoughts from his Vietnam experiences, hypervigilance, heightened startle reflex, and isolation. He denied having used alcohol or illicit drugs due to his religious beliefs.

JS has been married for 33 years to his second wife and describes their relationship as "very good" and his wife as being "very supportive." He stays at home most of the time doing household chores and helping out the neighbors with chores. Although generally isolated from others, he maintains frequent contact with his brother and neighbor.

JS developed a back injury and PTSD while serving in combat in Vietnam. As with many Vietnam veterans who suppressed their emotional trauma without full resolution, he "went on with life as usual." As he got older and retired from employment, he had more unoccupied time to himself and some of the unresolved conflicts began to surface. The reexperiencing of his trauma in the form of nightmares likely led to increased muscle tension and bracing postures which, in turn, triggered, escalated, and exacerbated his previous chronic back pain condition.

The initial treatment goals were to reduce pain, stabilize and improve sleep, and help him regain a sense of control over his daily activities. The treatment plan consisted of CES to reduce anxiety and improve sleep, develop and practice skills for monitoring stress levels and responses to stress, and hypnosis to help modulate his pain while making a long-distance trip and to begin the resolution of his trauma. Following an initial screening, JS was seen for a total of nine individual sessions. A typical session commenced with his completing a Likert scale where he was asked to rate his pain intensity from 0 to 10. The CES device and how it works was briefly explained together with the common sensation of "tingling" or "pins and needles" on his ear lobes as the current was increased. He was also made aware that some individuals might feel slightly light-headed initially as the body adjusted to the introduction of microcurrent delivered to the brain, but that this sensation typically disappeared after a few minutes. Next, JS was connected to the CES device with two ear clip electrodes, followed by a fine tuning of the level of current intensity from 0 to 6 on the device (the larger the number, the higher the ampere) by the therapist in order to determine the highest level the patient can tolerate without the feeling of discomfort. After the unit was turned on, JS was asked to report when he first noticed any sensation. The current was then increased to the point of causing discomfort and then the current was reduced until the discomfort disappeared. Finally, his progress and the previous session were discussed. The content of the discussion varied depending on JS's needs and desired treatment goals. Each session ended with a post–pain-intensity rating and a homework assignment if appropriate.

In addition to the patient's self-reported improvement in his pain and related symptoms, comparison of pre- and postpsychometric testing using the BPI and the abbreviated form of the Center for Epidemiological Scale-Depression (CESD) indicated a number of improvements including significant reductions in pain intensity,

pain interference, and depressive symptomatology. The findings indicated that JS benefited from the interventions, which included CES and self-hypnosis training. In addition to decreased pain intensity, he reported meaningful reductions on pain interference in all aspects of his daily functioning. Although he was only mildly depressed before treatment, some improvement in depression was also noted. Perhaps equally significant was the substantial reduction in pain medication use and the ability to function with minimal assistance from health-care providers.

Case Illustration 2: EC

Unlike the case of JS where hypnosis was employed as an "adjunct" to CES and psychotherapy, this case illustrates the use of hypnosis as the primary CAM modality. Although EC terminated his therapy prematurely due to transportation difficulties, his case was selected because it represents a classic example of how hypnosis can be used to treat pain in a person who appears to have moderately high hypnotic ability.

EC is a 63-year-old white male who also presented with chronic LBP. He sustained an injury in 1980 while working on an oil rig and spent 8 days in traction. He previously was examined by the anesthesiologist–pain specialist and given the diagnoses of lumbar spondylosis and facet disease. EC also reported severe intractable headaches that significantly interfered with his ability to focus and concentrate. Prior to treatment, EC reported on the BPI that his worst pain was 9/10, least pain was 6/10, average pain was 6/10, and current pain was 9/10. Pain interference was reported as 8/10 for general activity, 5/10 for mood, 5/10 for walking ability, 7/10 for normal work, 7/10 for relations with other people, 8/10 for sleep, and 8/10 for enjoyment of life. Satisfaction with life was rated as 6 to 7 out of 10.

EC had been responding partially to Percoset as prescribed by his PCP. He found a chiropractor helpful for a while, and he had been treated with traction and nonsteroidal anti-inflammatory drugs (NSAIDs). He denied having any history of mental-health problems or treatment, but he did acknowledge some symptoms of depression (fatigue, depressed mood, irritability). He consumed two to four beers a day and one pack of cigarettes per day pretreatment, but he denied using any illicit drugs. He reported a history of heavy alcohol use and previously smoked two to three packs of cigarettes per day. He previously had tried to quit smoking by using the nicotine patch and Zyban, which did not help. However, he reported that he subsequently was able to cut down on his smoking with the help of hypnosis (provided by other clinicians prior to being seen by us for pain).

EC had been separated for 7 years from his wife after many years of marriage. He was residing at his daughter's house because his house had been destroyed in a fire and was being rebuilt with help from his son. He reported that he was not active in the community; however, he maintained contact with his family and a few friends.

EC worked as a welder and pipe fitter for most of his life. He was unemployed and receiving social security disability due to "asbestosis" when he started treatment. He stated that he could not find a job due to back pain and his age.

It was clear from his presentation that EC was a "no nonsense" type of person whose primary expectation from treatment was to achieve pain reduction so that

he could "move on" with his life. Although he acknowledged some depression, he denied having any mental-health problem or treatment in the past. The fact that he was able to obtain some help from hypnosis to reduce his cigarette smoking was a clue that he might be able to follow through and benefit from this intervention for pain as well. Treatment goals were pain reduction in order to be able to enjoy activities, such as offshore fishing and golf, and improved physical condition. Treatment focused on training in self-hypnosis, but a stretching exercise program was also initiated as a means of increasing his ability to engage in daily activities.

After the initial screening, EC was seen for a total of five sessions with hypnosis as the primary intervention. Far-eye-fixation induction procedure was used, followed by several deepening procedures. Following the induction, the verbal suggestion was given that EC would be able to use his mind to decrease his pain intensity and that, as he gained mastery of hypnosis, his pain would interfere less with his life activities. He was given the further suggestion that he would be able to transfer his pain from one location to another if he desired so. He reported pre- to postsession pain reduction from 7/10 to 4/10 at the first session, suggesting a moderate degree of responsivity to hypnotic analgesia suggestions.

At the beginning of the second session, EC reported that he was able to transfer his pain from his head to his hand and to make his pain go away at times, which allowed him to focus on accomplishing more tasks involved in the rebuilding of his house. He also reported that his pain had been less "bothersome" and he had been practicing "relaxation" like he did in the last therapy session. During this session, hypnotic induction and deepening procedures were repeated along with the posthypnotic suggestion of being able to increase behavioral activities without being bothered by pain. EC reported a pre- to postsession pain reduction from 6/10 to 0/10. In addition to hypnotherapy, he was taught several slow-motion reconditioning stretches from Chinese Qigong and the need for reconditioning was emphasized.

During the third session, EC continued to report his ability to transfer pain from his head to his hand. He stated that his back pain had decreased and he had been feeling more comfortable in general. In addition, he reported being able to mow his lawn for the first time in over a year. Finally, he reported reducing the use of his pain medication from four to two pills a day. He said that he practiced the slow-motion stretching taught in the previous session. The hypnotic training was repeated as before along with the suggestion that he would be able to substitute the sensation of "drifting and floating" for "rocking and jerking." EC was seen again for hypnosis with further focus on transforming the sensation of "rocking and jerking" to "floating and drifting" to prepare him for a future deep-sea fishing trip. He reported a pain reduction from 8/10 to 5/10 during the fourth session. At the beginning of the fifth and final hypnotherapy session, EC reported continued progress. He also reported being "stressed" by having to baby sit several children belonging to friends and relatives who had unexpectedly dropped them off at his daughter's house where he was residing. Despite the higher level of stress, he reported pre- to postsession pain reduction from 8/10 to 0/10.

At the end of the fifth and final session, EC stated that he would have to take a break from the treatment due to lack of transportation. He noted that he was much

more comfortable now than he was prior to treatment, and he expressed confidence in his ability to apply his hypnotic skills on his own.

The cases presented here illustrate the potential for CES, self-hypnosis training, and their combination to help individuals with chronic pain experience less pain, gain control over pain symptoms, and minimize the effects of pain on their lives. The focus of both CES and the self-hypnosis training provided to these patients was on pain relief. In the second case, the hypnosis also included suggestions for increased activity and ability to function despite pain; hypnotic suggestions that may be underutilized in the treatment of chronic pain conditions (65). Many, but not all, patients are able to achieve meaningful reductions in the severity of pain with these interventions. For some of these patients, the pain relief can last for weeks, months, and even years (65).

Many patients with chronic pain begin treatment with a bias toward wanting treatments that are biomedical-focused and directly impact their experience of pain. For these patients who subsequently respond well to CES and/or self-hypnosis training, CAM interventions can be an effective means of engaging them and helping them achieve some reduction in their experience of pain. When effective for reducing pain and also improving other symptoms, such as global distress and sleep interference, these interventions can also be used as a way of helping patients learn that a direct "cause" of their pain need not necessarily be diagnosed and "fixed" in order for them to achieve relief (66).

Improvements that occur in some patients following CES and hypnosis may be enough for many patients. However, for patients seeking additional pain relief or reduced interference with functioning, the benefits obtained from CAM treatments such as CES or self-hypnosis training can be used as evidence for the potential efficacy of other psychological treatments that alter how the brain processes pain information, such as CBT. As more is learned about the specific effects of these and other CAM treatments for pain, they can be incorporated into and used in conjunction with other more traditional pain treatments, as a way to maximize the overall efficacy of pain treatment. In this way, we can seek to ensure that the greatest number of patients receive the most appropriate care.

Case Examples Using Biofeedback

The previous two cases demonstrated the use of CES and self-hypnosis involving veterans previously seen in the VA. Next, we will present two biofeedback cases provided by colleagues in the private practice settings in order to provide a balance between descriptions of patients seen in a government-based tertiary teaching hospital and those seen in the private sector.

Case Illustration 3: JJ[a]

Presenting Problem: JJ is a 42-year-old married, Caucasian female who has two children. She was referred by her general practitioner with the diagnosis of tension headache, which did not seem to respond to treatment. The tension-type headache

[a] Courtesy of Richard Gervitz, Private Practice, San Diego, California.

was of at least 10 years duration. Patient had "tried everything" including a variety of NSAIDs. She obtained temporary relief from chiropractic manipulation and acupuncture, but her symptoms typically returned within 24 hours. JS has good health habits (exercise, nutrition, etc.), and there were no notable stressors reported at intake. The patient was a medical receptionist at a large medical clinic. On assessment, her pain pattern matched the Travell and Simons Trigger Point (TP) manual for suboccipital and upper shoulder muscles (67). Her pain referred forward to forehead and temples. Trigger points were present and showed local tenderness, referral, and a twitch response.

Case Conceptualization: The case was conceptualized using the sympathetic (TP) model described by Gervitz et al. (54). It was hypothesized that ongoing subtle stressors created internalizing cognitions and thus prolonged sympathetic drive to the TPs. The goal of therapy was to break the vicious cycle setup by stress leading to muscle tension, tension leading to pain, and the pain leading to more stress.

Assessment and Treatment: Biofeedback assessment revealed moderate sympathetic arousal [skin conductance, temperature, heart rate variability (HRV) parameters, etc.] at baseline and at recovery from a stressor. This information was used in an extensive educational module which encompassed charts, videos of needle TP studies, and slides of muscle spindles to effect a change in attribution of pain etiology. Two sessions were used to educate the patient including conducting a PSP (as described earlier), a standard biofeedback procedure whereby the patient was hooked up to several biofeedback modalities and subjected to a number of stressful stimuli in order to determine how she responded physiologically to these stressful stimuli and how fast/slow she recovered from the stress reaction. Once the patient showed an understanding of the model, biofeedback was begun. The rationale for the treatment was presented as restoring balance to the autonomic nervous system thereby reducing excessive sympathetic flow to the TPs. Two biofeedback modalities were used in JJ's treatment protocol: SEMG and HRV biofeedback. The EMG was a frontalis threshold training program where the patient was instructed to decrease her frontalis muscle tension down to below one μV. In each session, the EMG biofeedback preceded the HRV biofeedback. JJ was able to reach less than one μV at the frontalis muscle after five training sessions (indicated markedly low levels of muscle activity). HRV biofeedback training began with breathing training using capnometer readings as benchmarks. Increasing abdominal breathing was observed over the course of the training sessions. Once resonant frequency was found (6.5 breaths per minute), she was given access to home-pacing devices (EZ-Air and an audio disk) and instructed to spend two 10-minute sessions a day practicing the breathing exercise. The patient quickly developed good self-regulatory skills and henceforth therapy began to focus on the underlying environmental conditions related to her pain and her reaction to them. Several workplace situations were identified as likely to interact negatively with her personality style so as to produce prolonged periods of increased stress and tension at work. Acceptance and commitment concepts (ACT) were introduced to promote better coping (68). At this point, her pain was 80% reduced and the remaining sessions concentrated on maintaining self-regulation skills and on generalization of the ACT concepts. At the 3-month mark, the patient was 90% pain free. The total number of treatment sessions was eight.

Case Illustration 4: BK ("Beth")[b]

This case involves a patient seen at the Productive Rehabilitation Institute of Dallas for Ergonomics (PRIDE) program. The PRIDE is a tertiary-level, chronic pain management facility in Dallas, TX. The clientele are almost exclusively injured workers who have been unsuccessful with previous treatments and have become significantly disabled. Most of the patients have been unable to work or function normally with daily activities for at least 6 months and some for up to several years. The general goals of the program are to increase each patient's physical conditioning, flexibility, and ability to function; to address psychosocial obstacles that might interfere with increased functioning; to provide extensive biopsychosocial education; and to facilitate a return to productive employment and normal daily activity.

The main phase of the program is 15 days of physically and educationally intensive treatment. This is preceded by 10 to 15 less-intensive preprogram visits. All program patients receive 5–10 "biofeedback classes" (psychophysiologically oriented classes) and 5–8 individual biofeedback sessions. The classes take place in the preprogram phase, and the majority of individual biofeedback sessions take place in the intensive phase.

There are three primary biofeedback treatment goals. First, education and rationale for mind–body interventions are provided to help patients "buy into" the treatment, follow through with homework, and utilize the skills on a daily basis. This education is provided primarily in the class. Second, training in specific relaxation techniques is provided, including a guided relaxation induction which is performed daily in the class, and periodically, as needed, in individual biofeedback sessions. Each patient is provided with two relaxation tapes, a tape player, and batteries. Patients are exposed to a variety of relaxation strategies (including breathing focus, body scanning, mental imagery, open focus, and self-coaching with autogenic-type phrases) so that they can choose the specific techniques that work best for them. Patients are encouraged to practice with their tapes daily until they can perform the techniques independently.

Third, in order to maximize success with relaxation and biofeedback training, patients are taught ways to generalize their self-regulation skills outside of treatment. Emphasis is placed on the use of slow, diaphragmatic breathing, along with "scanning" the body and releasing tension, periodically throughout the day. This goal also involves identifying specific muscle bracing and postural habits with SEMG, teaching patients increased awareness and control over these habits, and encouraging patients to monitor and correct these habits independently as part of their normal daily routine.

Biofeedback session protocol

Some traditional biofeedback protocols involve gradual shaping of a desired response toward a goal with minimal therapist instruction (31). Because of time

[b] This case example first appeared in Biofeedback 2004; (69). It is reprinted with the permission of the Biofeedback Magazine and the Association of Applied Psychophysiology and Biofeedback.

limitations in our program, individual biofeedback training tends to be very directive (similar to traditional golf lessons). When a training goal is identified, patients are actively shown how to reach the goal with verbal and tactile cuing, visual demonstration, and visual (and sometimes auditory) feedback. Patients are encouraged to develop both a somatosensory recognition of goal success and a specific behavioral strategy for achieving the goal. A heavy emphasis is placed on independent practice of skills outside of treatment sessions (64,70).

A typical biofeedback session is structured in the following way:

1. Discuss the follow through and success with homework.
2. Briefly review previous sessions and decide on a training focus for the current session.
3. Hook up an appropriate electrode placement and obtain a baseline measure of the particular physiological response being monitored. (If the baseline looks appropriate, then review what it revealed with the patient, hook up another electrode placement, and obtain another response baseline.)
4. Establish a specific training goal.
5. Show the patient how to reach the goal.
6. Reduce feedback as the patient becomes proficient at reaching the goal.
7. Assign homework to practice the newly learned skills.

CASE EXAMPLE

Beth was a 35-year-old female who was working as a recovery analyst for an insurance company at the time of her injury. She was injured in 2002, about 14 months prior to beginning treatment, when pulling out a 300-pound file drawer that had not been locked in properly. The drawer came out and fell on top of her. Beth reported a history of work injuries, including a neck injury in 1991, resulting in a two-level fusion; shoulder and back strain in 1993; and torn left and right rotator cuffs in 1999, resulted in surgeries to both shoulders. Her medical diagnosis at the time of her PRIDE treatment included chronic right lumbar radiculopathy, chronic old postoperative right cervical radicular syndrome; chronic old postoperative right shoulder impingement, chronic right hip dysfunction, chronic right elbow dysfunction, right wrist dysfunction, deconditioning syndrome, and chronic pain syndrome. She presented with major depressive disorder with anxious features, agitation, sleep disturbance, and family stressors, and she demonstrated some medication dependence on Lortab. At the time of her first doctor's visit, she reported a 10 out of 10 pain level.

Beth participated in five classes and six individual biofeedback sessions. Biofeedback therapy was begun several weeks into her rehabilitation program. By this time, Beth had tapered off of her Lortab and begun taking Paxil. Beth reported some improvement in her pain level and sleep success, which she attributed to her stretching exercises and to her Paxil. She had begun her "biofeedback classes," and received her first relaxation tape a few days before her initial individual biofeedback session. Though she reported pain in a number of body parts, her right shoulder and neck were her primary complaints. A synopsis of each session is provided below (71).

Session 1

Placements (reclining)	Two 5-min baselines	Best with training
Wrist-to-wrist SEMG (μV)	18.0–15.0	2.0
Ankle-to-ankle SEMG (μV)	6.5–5.0	3.5
Left hand temperature (°F)	93.7–95.0	N/A
Respiration	6 BPM, thoracic, forced	6 BPM, abdominal, smoother

Self-report: Patient had begun using her relaxation tape with moderate relaxation success, though she reported some difficulty in becoming comfortable and staying focused.

Session notes: During this baseline, Beth tried to perform the breathing technique that had been described in her classes. Pace was good, but breathing style was primarily thoracic and overly effortful. She was surprised at her muscle tension levels at the baseline and thought that she was more relaxed than she was. During training, Beth had a tendency to be impatient and to force relaxation. It required moderate to maximal cuing to achieve SEMG relaxation. She made some improvement in allowing her breathing to flow more abdominally and effortlessly with visual and verbal cues.

Session 2

Placements (reclining)	5-Min baseline	Best with training	Average during induction
Wrist-to-wrist SEMG (μv)	33.0–23.0	2.0	<3
Ankle-to-ankle SEMG (μv)	23.0–15.0	3.5	<3
Left hand temperature (°F)	93.0–94.8	N/A	>94
Respiration	6–8 BPM, thoracic, strained	6–8 BPM, abdominal, smoother, less strained	6–8 BPM, abdominal, smooth, less strained

Self-report: Patient reported daily use of relaxation tape, generally good success with relaxation, and inconsistent success with decreased pain.

Session notes: The physical therapist requested biofeedback intervention today to address a pain "flare-up" in her neck and shoulder. Beth was initially very tense. She seemed fearful and pain-focused. She was trying to use her breathing and relaxation skills during the baseline, but she appeared to be forcing and struggling. Education about the "pain>>>>fear>>>>tension cycle" was provided. Beth was successful in reducing muscle tension, smoothing her breathing pattern, and reducing her fearful "struggling" approach to pain, with visual feedback and verbal cuing. An autogenic-type relaxation induction was performed. She maintained good relaxation during the exercise. She reported good success with focusing away from pain during the induction, and a reduced pain level at the end of the session.

Session 3

	20-Sec baselines			After training		
First SEMG placements	Sitting	Standing	Recovery	Sitting	Standing	Recovery
Left cervical to upper trapezius (μv)	2.7	3.9	5.0	1.5	3.0	3.0
Right cervical to upper trapezius (μv)	3.3	4.5	9.0	1.8	3.0	3.6

Second SEMG placements	20-Sec baselines		After training	
	Sitting	Neck flexion	Sitting	Neck flexion
Left cervical to mid trapezius (μv)	8.0–6.0	5.0	2.5	3.5
Right cervical to mid trapezius (μv)	8.8–6.0	5.5	2.5	3.5

Self-report: Patient reported daily practice with her relaxation tapes, good success with relaxation, good success with focusing away from pain, and success with decreased pain most of the time.

Session notes: Beth continued to report pain and stiffness in her neck and right shoulder. Recovery problems were noted in her right neck and shoulder following a contraction (with first EMG placements). We worked on contract/recovery trials with visual feedback, verbal cues, and an emphasis on somatosensory awareness of muscle activity. Beth demonstrated increased awareness of muscle bracing versus relaxation and good progress with recovery following contractions. Specific strategies such as "head floating" and "shoulders dropping heavy" seemed to help her relaxation success. Postural imbalance was noted while sitting in a chair, including head forward and rounded shoulders. With verbal cuing and visual feedback (with second SEMG placements), she was able to correct her posture and reduce excessive muscle bracing in her neck and upper back. Patient's physical therapist had previously requested that biofeedback be utilized to help her increase inhibited neck movement (72). We worked on relaxation while stretching her neck into forward flexion (with second SEMG placements). She demonstrated improved relaxation and improved range-of-motion during neck flexion with breathing cues and auditory feedback. Beth was encouraged to monitor posture and muscle bracing, and to practice relaxed neck stretches, at every opportunity during the day.

Session 4

Placements (reclining)	5-Min baseline	Practice
Wrist-to-wrist SEMG (μv)	<3	<3.0
Ankle-to-ankle SEMG (μv)	<3	<3.0
Respiration	5–6 BPM, abdominal, smooth	6–8 BPM, abdominal, smooth

Self-report: Patient reported daily practice with relaxation tape, good success with subjective relaxation, good success with decreased pain, and improved success with sleep at night. She reported frequent focus on scanning and self-regulating muscle tension in her neck and shoulders and good follow-through with relaxed stretches. She verbalized, "When my body is more tense, my pain is more irritating. When I'm relaxed, I don't notice it as much."

Session notes: Beth demonstrated good carry-over with general relaxation training from previous sessions. She spent some time practicing breathing maintenance with mental focus on a meditative phrase. We discussed her progress to this point.

Session 5

First SEMG placements	20-Sec baselines			After training		
	Sitting	Standing	Recovery	Sitting	Standing	Recovery
Left cervical to upper trapezius (μv)	1.5	2.8	2.8	N/A	N/A	N/A
Right cervical to upper trapezius (μv)	1.9	3.0	3.0	N/A	N/A	N/A

2nd SEMG placements	20-Sec baselines		After training	
	Sitting	Neck flexion	Sitting	Neck flexion
Left cervical to mid trapezius (μv)	4.0–3.0	2.0	1.5	N/A
Right cervical to mid trapezius (μv)	4.0–3.0	2.1	1.5	N/A

Self-report: Patient reported daily relaxation practice, both with the relaxation tapes and independently, without the tapes. She reported frequent focus on scanning and self-regulating muscle tension in her neck and shoulders and good follow-through with relaxed stretches. She reported consistent success with relaxation, pain control, and sleep at night. She verbalized "I feel so much better since you taught me how to relax my neck. It doesn't get as stiff and painful now."

Session notes: Good carry-over with neck and shoulder relaxation. Beth needed some additional practice to establish consistency with postural balance. Developing and using a specific postural strategy, rather that just relying on somatosensory cues, helped to improve her consistency. I had her verbalize her postural strategy several times as she practiced.

Session 6

SEMG placement (walking)	30-Sec baseline	Best with training
Left to right upper trapezius (μV)	9.0	<5.0

Self-report: Continued success in all areas. Also, feeling stronger and more confident in general.

Session notes: I placed a portable SEMG unit on patient's shoulders, and let her walk around the facility with auditory feedback in order to facilitate generalization of muscular relaxation skills. Her walking SEMG levels were only moderately elevated compared with many other patients with similar symptoms who often show SEMG levels above 20 μv. We worked on relaxed and balanced posture during standing and walking, and did some contract/recovery practice.

CONCLUSIONS

It can be challenging to provide effective biofeedback and psychophysiological interventions within the time restrictions of a brief, intensive, rehabilitation program. To optimize success, one should "sell" mind–body and self-regulation concepts, in order to encourage independent practice with the techniques. Individual biofeedback therapy sessions must be efficient and goal-directed in order to maximize treatment time. Treatment must be individualized to meet the specific needs of each patient. One must prioritize the treatment focus and recognize that there isn't time to "fix" everything. Support from other treatment team members in reinforcing self-regulation principles is extremely helpful.

Beth was an especially adept patient. It generally takes more treatment time for the average patient to develop and carry-over the skills that she learned. She made strong gains in all areas of her treatment program. I attribute Beth's success to her determination and willingness to follow-though independently with homework. At the completion of the treatment program, she reported confidence in her ability to return to employment and get on with life. She reported a decreased pain level and only minimal functional limitations due to pain. In Beth's words, "I'm tired of sitting around. This is my body, and I'm going to take control of it."

INCORPORATING CAM THERAPIES INTO MULTIDISCIPLINARY PAIN PRACTICES

Interest in incorporating CAM therapies into multidisciplinary pain treatment is not new. For example, in 2001, the NCCAM and the Royal College of Physicians cosponsored a conference in London where experts in the field met to discuss the question, "Can alternative medicine be integrated into main stream care?" Subsequent to this conference, another was held in Edmonton entitled "North American Research Conference on Complementary and Integrative Medicine."

Developing an integrative health care program within the Veterans Administration Hospitals (VHA) is the focus of a recent article (73). The authors outlined a systematic way of incorporating CAM modalities into a conventional medical facility by following these steps: identifying scientifically supported therapies for inclusion, education of providers and patients on the modalities; development of a clinical research protocol, exploration, development, and evaluation of new models of integrative health care; and reintegration of physical, emotional, mental, and spiritual life values into health care and health education.

In incorporating CAM modalities into a multidisciplinary pain management program, several issues should be considered. First, not all CAM modalities are equally efficacious. For example, although not everyone responds to these treatments, and their immediate efficacy is not always maintained, hypnosis, biofeedback, and massage therapies for LBP and shoulder pain all have a degree of support for their efficacy over and above a number of control conditions and in some cases, other treatments (16). Pulsed electromagnetic fields (PEMFs) have demonstrated support for its efficacy for migraine and osteoarthritis only and no other pain condition (16). CES, massage therapies for neck and other pain conditions, spinal manipulation therapy, meditation, and yoga appear to be promising treatments, but more research is needed to replicate preliminary findings. The CAM treatments that show more mixed results include herbal and dietary interventions (perhaps due to the fact that this CAM treatment really represents hundreds of different interventions, so mixed results would certainly be expected), therapeutic touch, craniosacral therapy, Reiki, qigong therapy, and homeopathy (16). However, even these interventions might be helpful for a subgroup of patients.

Acupuncture appears to belong to a category of its own. While there are multiple meta-analyses and clinical trials attesting to the efficacy of this modality as analgesia and for the treatment of a wide variety of medical conditions, relatively few have focused on the treatment of chronic pain conditions (16). As was noted by Tan et al. (16), this may be partially due to the fact that acupuncture was originally developed as an integral part of Traditional Chinese Medicine (TCM) which has a very different paradigm for conceptualizing health and illness (16). Using Western scientific methods such as RCTs to assess the efficacy of a treatment modality based on a completely different paradigm to treat non-TCM chronic pain conditions as defined by Western diagnosis may be like comparing apples and oranges. In short, the efficacy of acupuncture for analgesia is not in dispute, but research on its efficacy in treating chronic pain has mixed results.

In addition to efficacy, there are other issues relevant to practitioners when making decisions to use or incorporate CAM modalities into their pain practice. These include additional requirements for training and equipment, known side effects or potential toxic effects, safety in combining CAM and other modalities,

likely acceptance by clients and the public (which raises the issue of long-term compliance), and ease of incorporation into traditional pain management practices (16).

Additional Requirements

The use of biofeedback requires specialized equipment and training, and the use of hypnosis requires special training. A number of treatments, including acupuncture, homeopathy, massage, and chiropractic care, require that a practitioner be licensed. Also, some modalities can be expected to produce concrete results in just a few sessions for some patients (e.g., CES, hypnosis, biofeedback), while others may require longer commitment of time and effort (e.g., yoga, meditation). In general, even when they are effective, CAM modalities as a group tend to require more time than traditional medical pain interventions to achieve results.

Side and Toxic Effects

Another important issue is that, as compared to traditional pain interventions, CAM modalities as a group have fewer known and documented side effects or toxic effects. For example, the "side effects" of training in self-hypnosis for chronic pain are overwhelmingly positive (66). This may explain, at least in part, their popularity relative to traditional medical interventions, which tend to be invasive and tend to undermine patient self-efficacy and control.

Combining CAM and Other Modalities

Another issue that should be considered by clinicians is the fact that some CAM modalities can be combined safely with each other and traditional pain interventions to produce additive or synergistic effects. For example, CES can easily be administered along with self-hypnosis or biofeedback training or with psychotherapy. In this way, any potential benefits of the individual treatments could potentially be combined to provide maximum pain relief for the patient.

There is an increasing interest in combining traditional medical treatments to maximize pain relief, but there is no reason that more established CAM modalities should not be at least considered when developing multimodal treatment plans (74,75). Additional research is needed to examine the use of individual CAM therapies with other CAM approaches and CAM with traditional interventions both in terms of safety and synergistic effects. Recently, there have been some concerns about the combined use of medication with herbal preparations (76,77). Some herbal preparations should be avoided completely due to their rapid, negative, and irreversible actions (76,77).

Acceptance, Compliance, and Ease of Incorporation

The popularity of CAM therapies for chronic pain has been partially fueled by the current lack of efficacious traditional medical treatments for certain conditions. However, after a patient's initial desperation for relief and the curiosity about and novelty of new treatments have worn off, the issue of long-term compliance may quickly emerge as a potential road block to successful positive outcomes. There are few data that would indicate which CAM therapies are more likely be accepted and adhered to, and which are not. In the absence of such data, one might assume that those CAM modalities that most resemble currently accepted medical treatments might have an advantage. Thus, the use of herbal and dietary supplements may result in greater compliance, since the public has been acculturated to the idea of

taking medication to get well and stay well. Treatments that utilize sophisticated equipment such as biofeedback, CES, PEMF, and perhaps, acupuncture may also be more easily accepted by the chronic pain patient population. The idea of "massaging" away tension and pain has been ingrained in the human psyche, as has chiropractic care to reduce pain. Hypnosis has been presented in the popular media and by entertainers as a powerful "mind control" intervention so that some members of the public are anxious about losing control with hypnosis treatments, and others have unrealistic beliefs about the effects of hypnosis. Yoga, meditation, healing touch, and qigong may have a foreign connotation, and may appeal only to a subset of the general public. The ease of incorporation of CAM modalities into pain practices and adherence to the techniques is likely to be influenced by the level of public acceptance.

Other Advantages of CAM Use

There may also be instances in which the use of CAM leads to a greater acceptance of traditional interventions. A case in point is the use of CES to increase acceptance of psychological interventions such as CBT. Tan et al. (78) have shown that the use of CES helps veterans become more willing to engage in psychologically based or mind–body therapies because CES was perceived by veterans to be a "real" physical treatment that could produce rapid pain reduction and was credible in treating "real" pain. Once engaged, the veterans became more amenable to participating in and benefited from other mind–body or psychological therapies.

In conclusion, some CAM modalities can provide chronic pain sufferers with significant relief and for some individuals; this relief is maintained over time. While more research is needed to specify the mechanisms of different CAM treatments, enough evidence exists to support offering at least a subset of these (in particular, biofeedback, self-hypnosis training, and CES) to those patients who express an interest in these interventions. As more is learned about the efficacy of these approaches, and as the modalities with established efficacy are more consistently provided to individuals with chronic pain, we can anticipate a corresponding reduction in the disability and suffering associated with chronic pain conditions.

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