“Patients want to be seen and treated as a whole person, not as diseases. A whole person is someone whose being has physical, emotional, and spiritual dimensions. Ignoring any of these aspects of humanity leaves the person incomplete and may even interfere with healing.”

—(Koenig, 2000, p. 1708)
"Patients want to be seen and treated as a whole person, not as diseases. A whole person is someone whose being has physical, emotional, and spiritual dimensions. Ignoring any of these aspects of humanity leaves the person incomplete and may even interfere with healing." (Koenig, 2000, p. 1708)

This fall issue of *Biofeedback* is dedicated to the place of biofeedback in the emerging movement of Complementary and Alternative Medicine (CAM). Many biofeedback practitioners react defensively to discussions of CAM, pointing out that biofeedback has a three decades long history, is supported by countless research studies documenting efficacy, and therefore should be recognized as mainstream and not complementary. Nevertheless there are shared values linking biofeedback and CAM. A review of the CAM literature (Moss, 2002, p. 283) shows that CAM consumers are interested in pursuing therapies with the following characteristics, among others:

1) A holistic view of mind, body and spirit
2) Viewing and treating the patient as a unique human being
3) A personal supportive relationship between healer and patient
4) An active role for the patient in the healing process
5) The inherent healing power of the living organism
6) Lifestyle and habit changes as tools to optimize health
7) Interventions to elicit the body’s healing powers
8) An aversion to invasive treatments that crush disease but harm the patient
9) A belief in eclecticism and empiricism
10) An acceptance for unconventional interventions and models that appear to work

Most biofeedback practitioners would probably accept at least the majority of these characteristics as desirable features of biofeedback and self-regulation oriented therapies as well. This common ground in values suggests that biofeedback may discover in CAM a window of opportunity for wider acceptance. We are probably appealing to many of the same patient groups, and presenting similar treatment approaches to our patients.

*What Do We Mean by CAM?* Complementary and alternative therapies, most broadly, have been defined as therapies which are not taught in medical schools. Because CAM therapies are making inroads in mainstream medicine, James Gordon recently revised this definition to say that CAM therapies are therapies which physicians over 30 did not learn in medical school (Gordon & Moss, 2003). Lake (2003) further clarified that complementary therapies include therapies which are compatible with the natural scientific paradigms of mainstream medicine, but which have not gained widespread acceptance. Herbal medicines are an example, since herbs have clear physiological mechanisms, just as do pharmaceutical medications. Biofeedback is another example, since biofeedback therapies rest on a paradigm of physiological and cognitive mechanisms that is compatible with mainstream medical thinking. On the other hand, alternative therapies are based on paradigms and mechanisms beyond the realm of mainstream medicine. An example would be the reference to life energies (or Qì) as mechanisms of action in Traditional Chinese Medicine.

*Who Uses CAM?* First, research by Eisenberg and others shows that increasing numbers of individuals are using CAM. Adam Burke (2003) shows that these numbers include a number of special groups: First, individuals with cultural backgrounds that include traditional medicine are high users of CAM therapies. For members of traditional Chinese communities in the United States, Traditional Chinese Medicine is not even perceived as alternative. Rather, this is their mainstream medicine. Second, individuals with chronic, complex and serious health problems use CAM in high numbers. They often feel threatened by their illness, are disappointed in the results of mainstream medicine, and sample eagerly the offerings of CAM. Finally, the “cultural creatives” use CAM in large numbers. Cultural creatives are persons who share alternative values and lifestyles, and who often are dissatisfied with the mainstream conventional culture. Burke argues that the latter two groups are especially ripe for biofeedback, since there is substantial evidence that biofeedback can help persons with complex and chronic conditions, and biofeedback itself continues to carry some flavor of the counter-culture.

*What Do We Mean by Integrative Medicine?* The full title of this special issue refers to both CAM and Integrative Medicine. Integrative Medicine refers to a vision for the new health care, integrating mainstream therapies and CAM therapies under one roof. Ideally, future patients will encounter one seamless health care, inte-

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FROM THE EDITOR

Fall 2003 Issue of *Biofeedback Magazine*

Special Issue on Complementary and Alternative Medicine and Integrative Medicine

*Donald Moss, PhD*

*Continued on page 12*
Ethical Behavior and Other Issues in Complementary and Alternative Medicine Interventions

Sebastian “Seb” Striefel, PhD, Logan, Utah

Abstract: Practitioners need to be aware of complementary and alternative treatment approaches, the support for such approaches, and the risks and benefits associated with such approaches so that they can help clients obtain the most appropriate help for their problem, can know when to accept or not accept a referral, and when to refer a client elsewhere. Sometimes the risks are as yet largely unknown. Different issues exist for the informed consent process when helping a client with a diagnosable illness versus when helping someone with a normal level of functioning to enhance their level of functioning and sometimes the rights of the individual conflict with those of society. Practitioners need to protect the rights of clients and this includes not exposing vulnerable individuals, e.g., children, to unnecessary risks purely because the parent wants their child to have an advantage. The best interests of the child also need to be considered. Specific and common factors both play a role in positive outcomes in treatment and client belief systems are one factor that needs to be considered by the practitioner in deciding what treatment to offer.

Introduction

More and more clients are approaching practitioners asking for or about CAM approaches. To ethically meet the requirements of informed consent, i.e., to be able to discuss the pros and cons of the alternative treatments available for dealing with the client’s condition, including those that would be considered CAM approaches, the practitioner must be aware of the current status of CAM approaches (Bassman & Uellendahl, 2003). I personally do not think that all biofeedback applications are still CAM approaches, especially relaxation and muscle re-education applications, rather I consider them to be mainstream treatment approaches. Bassman and Uellendahl (2003) stated, and I quote, “Hypnosis, meditation, and biofeedback are approaches that have largely made the transition from alternative to mainstream practice in recent history” (p. 264). Perhaps some biofeedback approaches are still in the CAM camp. Lake and Moss (in this issue) state that they consider EEG biofeedback and QEEGs to be CAM approaches. Clearly the way most practitioners practice biofeedback it does not fit the medical model but rather a self-empowerment model whose assumptions about health care differ considerably from mainstream medical practice. Is that a CAM feature? Originally the AAPB journal included the words self-regulation and that set of words still describes a core aspect of biofeedback applications.

CAM approaches have varying degrees of support on effectiveness and safety, so practitioners need to educate themselves about the various CAM approaches available, even those outside of their own areas of competence so that they can make referrals, if, and as appropriate (Bassman & Uellendahl, 2003).

Referral Issues

Every referral received by a practitioner involves a host of decision-making issues. Practitioners need to consider the source of the referral, financial and scheduling issues, and the practitioner’s impression of the client and his or her problem (Shapiro & Ginzberg, 2003). CAM approaches are often considered to be more risky than more empirically supported treatments (ESTs); that is one of the reasons that they are still considered to be CAM approaches. As such, when dealing with CAM approaches, more care needs to be taken to ensure that the informed consent process is accurate and complete in terms of presenting the alternative treatment options available and the risks and benefits associated with each. It is also important to remember that some CAM approaches are very well supported by research data.

In deciding whether or not to accept a referral, the practitioner also needs to consider his or her own areas of competence, what is known about effective treatments for the client’s problem, and which treatment is most likely to fit within the client’s belief system. In both rural and urban areas, the practitioner also needs to consider whether the referral might result in a problematic dual relationship that could interfere with effective treatment.

Illness Versus Enhancement

Have you ever thought about what is acceptable ethical behavior when helping a client overcome an illness versus when helping a client to enhance his or her performance? From a traditional ethical viewpoint, some degree of risk to a client is acceptable in treatment to help a client overcome pain and suffering, with of course, client informed consent. The acceptable level of risk may well be higher the more serious the illness and the greater the pain and suffering. Exposing a client to the same level of risk may well not always be acceptable when the goal of intervention is purely to enhance performance for a person who is not ill or who is functioning at what we call a normal level.
Dilemmas

Practitioners are regularly faced with the ethical and practical dilemmas associated with choosing among alternative treatments to determine which one is the best for a particular client (Deegear & Lawson, 2003). Increasingly the emphasis is on choosing specific approaches for specific problems based on what is empirically supported or what have been called ESTs (Deegear & Lawson, 2003). So when, if ever, is it acceptable to use a complementary and alternative medicine (CAM) approach for treatment when the approach has little research support on efficacy, effectiveness, or safety?

One might argue that using CAM approaches to treat illnesses is ethically acceptable, provided that one or more of the following guidelines is met: (1) when the use of the CAM approach has good research support, e.g., as being safe and effective; (2) there is no other known effective treatment available; (3) available treatments have associated high risks (e.g., the side effects of some medications); (4) the existing treatments are not acceptable for some good reason to the client, even after having the relevant facts; and (5) the CAM approach being proposed has no known serious side effects that would preclude its use.

Unknown Risks

It is increasingly clear that the general public is regularly taking unknown risks by using alternative treatments, often without the guidance of a professional practitioner, e.g., by using nutritional supplements for which efficacy, effectiveness, and safety are unknown or difficult to discern because of all the advertising hype. Individuals are seeking treatment for a wide variety of physical and mental conditions that traditional interventions have been ineffective in treating or where clients are dissatisfied with the outcomes, side effects, etc. Albert (2002) stated that people are so desperate for changes in their current level of functioning and desirous of enhancements in functioning that they are accessing all sorts of alternative treatments and substances, regardless of risk. She argues that they will not wait for clinical trials to determine effectiveness or safety. This seems to go along with some of the pressure that the Food and Drug Administration (FDA) has experienced for shortening the amount of time it takes to get a new drug or treatment approved, even though there are several FDA approved drugs on the market that have very dangerous side effects, e.g., Viagra has resulted in the death of many individuals. Some of these individuals were on the drug, not because they couldn't function sexually, but rather because they wanted enhanced sexual functioning.

Moral and Ethical

So when you are considering using a CAM approach to helping a client with a problem or to enhance his or her level of functioning, what is morally (right or wrong) and ethically (good or bad) acceptable, and how do you decide (Safire, 2002)? Moral refers to conforming with long established codes of conduct that often are set by religious authorities and which seldom, if ever, change over time (Safire, 2002). Ethical refers to whether something is fair (good or bad) at the present time in a particular society or group (e.g., AAPB) (Safire, 2002). Ethical views may well differ from society to society or time, e.g., not long ago in the United States it was ethically very acceptable for physicians to be paternalistic and to decide what was best for their patients, often without the patients involvement or consent, because it was believed that the physician knew better than the patient what was good for him or her. Today paternalism is no longer ethically acceptable and self-determination and informed consent have become critically essential factors in assessment and treatment (Moreno, 2002). It is no longer ethically acceptable to provide treatment without informed consent unless a life threatening emergency exists where informed consent is not possible. In a life threatening situation we generally consider intervention acceptable regardless of an individual's client rights because it is assumed that saving the client's life (society's desired outcome) supersedes the need to get informed consent. For example, Caplan (2002) reported that the Amish believe “that every child is a gift from God and they don't bring their children in for treatment, even when they have genetic anomalies and diseases” (p.111). Sometimes the courts have to intervene to ensure that a child in such communities gets appropriate treatment when a life threatening condition exists.

Societal Versus Individual Rights

Where does society's right to supercede an individual's rights began or end? There is an ongoing case right now where a prisoner accused of a serious crime and awaiting trial has refused treatment that would make him competent to stand trial. Without treatment for his psychosis/schizophrenia he may well never be competent to stand trial and without a trial he may well spend the rest of his life incarcerated without any probability of being released. Should he be treated in spite of his refusal to give consent? The US Supreme Court is in the process of deciding this issue.

Or take an example more directly relevant to biofeedback practitioners, especially those who use EEG biofeedback in the treatment of certain behavior in criminals. There seems to be increasing support that the Peniston Protocol can be very effective in dealing with substance abuse (drugs and alcohol) and that it reduces the likelihood of paroled prisoners having future contact with the legal system (Fahrion, 1998). There seem to be many implications for treating those who drink and drive, including possible reductions in the loss of life and injuries caused by drunk drivers. Does a societal goal of saving life and limb provide sufficient justification for society to decide that all individuals who have been convicted of a drinking or drug offense should be treated with EEG biofeedback even if they object or refuse to consent to such treatment? Would mandatory treatment of this sort work? Could a good working relationship be established with such a client? Can a client who is faced with giving consent and undergoing treatment, or going to, or staying in jail, really give informed consent or does such coercion violate the individual's rights? Court ordered treatments or going to jail have been part of our legal system for quite some time. Does such forced treatment diminish the individual freedom of all of us and does it move us closer to government imposed paternalism of doing what society thinks is right for classes of people regardless of constitutional guarantees? As a practitioner would/do you treat court ordered individuals? Is it morally and ethically acceptable.
for you to do so? John Crosby stated that just “because something is legal does not mean it’s ethical and because something isn’t illegal doesn’t mean it’s ethical” (Smith, 2003, p. 18). When one treats court ordered clients, it is very important to discuss the implications of their consenting or not consenting to treatment and to discuss what the practitioner’s responsibilities to the court are, e.g., what information will be shared with the court.

Informed Consent

Caplan (2002, p. 110) reports that sometimes parents push their children by exposing them to potentially dangerous interventions unnecessarily, e.g., children, especially boys who are a little short, but not dysfunctionally short, are exposed to growth hormone which has dangerous side effects because being short is not acceptable socially. How does one protect those who cannot protect themselves? One function that informed consent is supposed to serve is that of protection. Can a person experiencing pain and suffering ever really give informed consent or is their capacity for doing so clouded by the pain and suffering that they are experiencing?

Moreno (2002) argues that a patient can handle the truth if they are told the truth. In essence, patients can exercise self-determination or free will in the informed consent process by making appropriate judgments for themselves. He argues that serious issues in giving competent informed consent arise when a parent is asked to consent to treatment for one of their children because of the conflict of interest raised by their emotions and their goals for the child. Yet he argues that humans can exercise self-determination to a sufficient degree even in such situations just because they “will it to be so” (Moreno, 2002, p. 39). As such, the issue for practitioners goes beyond what is right for this client in this situation to include, how have I gone about making the decision about what is right for this client (Moreno, 2002)? So the process of making the decision becomes as important or maybe sometimes even more important, than the decision itself. A faulty decision making process can lead to a faulty decision. Respect for the client and his or her rights is ethically important in the decision-making process.

Churchland (2002) says that emotions and reason are on a continuum in decision making. As such, a practitioner needs to be careful not to let excess emotions interfere with reason in making ethical and practical decisions about what is right and good for a particular client.

Personal Identity

As a practitioner you often muck with someone’s brain via, e.g., changing their belief system or via a direct intervention such as EEG biofeedback. When we muck around in someone’s head we may well threaten the person’s sense of who they are (Caplan, 2002). The intervention may well modify them in ways that change their personal identity. Have you ever considered this as a risk factor when obtaining informed consent?

I remember receiving a referral from a parent of a young man. The young man had been diagnosed with Attention Deficit Hyperactivity Disorder (ADHD) with some associated conduct disorder problems. He was regularly having conflicts with the legal system and had been in prison because of a lack of control over impulsive behaviors. For example, one day he and some friends were throwing snowballs at cars. When the police came all his friends ran away, but he stayed and threw snowballs at the police car. The mother wanted him to get EEG biofeedback so that he would be less impulsive and less likely to end up back in prison. Medications had not been successful in helping him control his behavior. It quickly became clear that he liked the emotional high that he experienced when he was out of control and he was concerned that the EEG biofeedback would take that high away. He was not willing to participate in treatment nor was he willing to change his identity in that way. In fact, he was not willing to listen to an explanation about how EEG biofeedback would not take away his option to experience a high, but rather how it would create options for him on when, or if, to be in or out of control. After nine months in the state penitentiary he was more than willing to pursue treatment that would give him the option of being in control, regardless of whether it would or wouldn’t change his personal identity or state of feeling high.
l esterol of someone at risk for coronary heart disease (Hyman, 2002b). Probably so, but again good informed consent seems to be the key and that informed consent has to be an ongoing educational process throughout treatment to enhance performance. In some cases it may be necessary to have tighter controls on risk, especially for those who cannot protect themselves, e.g., children (Caplan, 2002). Perhaps professional associations like the American Medical Association have to establish more definitive guidelines for the use of risky interventions, especially if it is purely for performance enhancement. If professional groups do not establish the controls the legal system eventually will. Are there areas where the Association for Applied Psychophysiology and Biofeedback should have more definitive guidelines? As practitioners we must take responsibility for ensuring that we do not provide interventions that have high risk when less risky interventions are available for treating the same problem or for enhancing the same area of functioning. We probably should not ask a client to consent to the use of a highly risky intervention when other less risky options exist. Are there any biofeedback interventions with severe or high levels of risk? I cannot think of any, can you?

Specific Versus Common Factors

One caveat in all of this is related to the outcome data concerning psychotherapy. Research has shown that when treatments are compared, the outcomes on efficacy of treatment tend to be uniform, i.e., one treatment works as well as another (Deegear & Lawson, 2003; Smith & Glass, 1977; & Wampold et al., 1997). It is argued that it is not specific factors, techniques, and treatments that account for the positive outcomes achieved, but rather the outcomes are due to the factors common to all of the treatments (e.g., therapeutic alliance) (Deegear & Lawson, 2003). Specific ingredients seem to account for only 8% of the variance in positive outcomes from psychotherapy and common factors account for about 70% of the variance (Deegear & Lawson, 2003; Garfield, 1992). The findings seem similar to those reported by Wickramasekera (1999). He reported that biofeedback is often no more effective than placebos. Placebos are really those things that could be called common factors in all treatments. So does this mean that specific techniques like biofeedback do not work? Not really, because it could well be that we are not measuring the right variables in the outcome studies. Practically, clinicians and clients alike are both interested in getting positive outcomes regardless of whether it is the specific factors, the common factors, or some combination of both that account for the outcomes. Shadish et al. (2000), and Shaw et al. (1999) report that the specific ingredients in ESTs have questionable utility and that strict adherence to EST protocols may well not be related to outcomes and may in fact have detrimental effects (Deegear and Lawson, 2003; Castonquay et al., 1996). In fact, EST protocols have serious flaws and are very questionable as “best practices” (Wampold, 2001; Garfield, 1998). Part of the problem is that much of the research on treatment are related to studies of efficacy (which are often not carried out in clinical settings with clinical subjects) rather than on effectiveness (studies that show it works in clinical settings with those clients seeking help). Are you familiar with the status of the research findings on various CAM approaches?

Flexibility

The medical community seems to be increasingly define both physical and mental disorders as having a biological basis (see the DSM-IV for examples) and as such seems to be emphasizing pharmacological treatments for everything in spite of evidence that behavioral approaches often work just as well (Deegear & Lawson, 2003). Most practitioners know that to be effective in treating clients one must be flexible and select and adjust the treatments used to the characteristics and problems of the client (Deegear & Lawson, 2003), the practitioner’s competencies, and what he or she believes will work because this will influence the client’s belief system. In fact, Frank and Frank (1991) argue that the most critical factor in treatment effectiveness is the ability of the practitioner to apply treatments flexibly to accommodate the client’s beliefs. They state that the four necessary components in treatment seem to be: (1) having a good trusting therapeutic alliance, (2) the client believing that the practitioner will work for his or her betterment, (3) a rationale and framework for explaining the client’s problem and for supporting the particular intervention being used, and (4) the participation of both the client and the practitioner within that framework (Frank & Frank, 1999). Informed consent and support of other client rights such as autonomy are helpful in establishing a good working relationship, in adhering to ethical principles, and in providing the educational information needed for modifying the client’s belief system so that she or he believes that the practitioner is working in her or his best interests and thus being motivated to participate in the proposed treatment. According to Deegear and Lawson (2003), Frank and Franks’ (1991) four components support an argument for selecting treatments that are consistent with the client’s world views rather than considering only those that seem relevant to the particular problem being addressed. Practitioners tend to use the treatments that have worked with similar clients in the past and a good education program is one way to increase the likelihood that the proposed treatments will fall within the client’s view of the world and what will work for them.

References


Continued on page 12
Abstract: The general public has shown an increasing desire for complementary and alternative forms of healing. Medicine has pursued a variety of alternative paradigms in recent decades, including the biopsychosocial model, behavioral medicine, holistic health, mind-body medicine, complementary and alternative medicine, and integrative medicine. The present article summarizes the "new medicine" paradigm of James Gordon, Director of the Center for Mind-Body Medicine. This approach emphasizes seven pillars in health care, including: uniqueness, holism, healing partnerships, self-care, other health care systems, group support, and spirituality and transformation. This approach sees mind-body techniques, including biofeedback, hypnosis, and visualization as central.

Complementary and Alternative Medicine

For at least a decade public interest in the United States has grown dramatically in Complementary and Alternative Medicine (or CAM). The National Center for Complementary and Alternative Medicine (2002) has defined CAM as medical care systems, practices and products that are not presently considered to be a part of either conventional medical practice or the medical school curriculum. Because CAM is making inroads within both health care and medical school education, James Gordon now refers to CAM as therapies and interventions that physicians over 30 did not learn in medical school (2003).

Over 40% of Americans today are using complementary and alternative therapies as part of their ongoing health care, even though CAM therapies are largely paid out of pocket. CAM is not just a trendy pursuit of the affluent and relatively well population. Rather, current research shows that 69% of cancer patients are using some form of complementary and alternative therapy for their illness, and over 80% of cancer patients are interested in learning more about CAM (Richardson, Sanders, Palmer, Greisinger, & Singletary, 2000; Gordon & Curtin, 2000). Similar trends are evident in the use of alternative therapies by individuals with disabilities (Krauss, Godfrey, Kirk, & Eisenberg, 1998), AIDS (Standish, et al., 2001), and with chronic illnesses and conditions (Burke, 2003).

Manifesto for a New Medicine

If patients are restless and hungry for an alternative in health care, then professionals are challenged to define a paradigm for that new medicine. Over the past three decades, a variety of models have been proposed, calling for a biopsychosocial model (Engel, 1977), behavioral medicine (Ader, Weiner, & Baum, 1988), holistic medicine/nursing (Trossman, 1998), mind-body medicine (Moss, McGrady, Davies, & Wickramaskera, 2003), and complementary and alternative medicine (Lake, 2003). Each of these labels captures some essential aspect(s) of what is missing in mainstream medicine, yet each has failed to convey the larger picture of what medicine should become. More recently, Gaudet (1998) has called for an integrative medicine, which would encompass conventional mainstream medicine, CAM, mind-body therapies, and other alternative approaches. Gordon (1996) simply calls for a new medicine, which includes the best of many approaches under one roof. This article overviews Gordon's approach to the new medicine, as expressed in his works Manifesto for a New Medicine (Gordon, 1996), and Comprehensive Cancer Care (Gordon & Curtin, 2000).

The "old medicine" focused diagnosis primarily on the use of laboratory tests and imaging procedures to identify specific pathophysiological conditions that could in turn be alleviated by medication and surgical procedures. The old medicine has been highly successful in treating acute conditions, eliminating infections, and correcting structural injuries. However, the patient population presenting in primary care today has shifted dramatically, and medical care must accommodate. Patients are more likely today to present with symptoms that fall into several overlapping categories: somatization disorder, psychophysiological disorders related to psychosocial stress, symptoms of chronic disease, and somatic symptoms of psychiatric disorders (Moss, 2003a).

Seven Pillars

James Gordon identifies seven pillars which serve to define the new medicine.
The Center for Mind-Body Medicine  
James Gordon, MD, directs the Center for Mind-Body Medicine, located at 5225 Connecticut Ave., NW, Suite 414, Washington, DC 20015 (Phone 202-966-7338). Information about the Center is available online at www.cmbm.org.

The Center is a non-profit educational organization dedicated to reviving the spirit and transforming the practice of medicine. The Center is working to create a more effective, comprehensive and compassionate model of healthcare and education, especially through its professional training program.

The Professional Training Program in MindBodySpirit Medicine, now in its ninth year, is the most comprehensive training program in mind-body medicine in the United States. The program provides an intensive retreat where health professionals can begin the process of transforming their practices. Our program is unique because we work with small groups – to enhance practical learning – as well as a lecture format. There will be 15 full-time faculty and a limited enrollment of 150 participants. This allows the program to provide an intimate level of interaction and experience to enhance learning.

The lectures provide the scientific basis for the MindBodySpirit model, powerful experiences of these techniques and the most important research in the field. The program includes an added emphasis on the role of nutrition in mind-body health. This comprehensive material and hands-on experience will prepare you to integrate the model into your work in a wide variety of settings, including private practice with individuals and groups, hospital work, educational programs and work with populations affected by war, terrorism and other forms of trauma.

Each of these pillars addresses a need felt by individuals seeking alternative therapies, a strength within the new medical approaches, and a kind of empowerment for self-directed health and wellness.

1. Uniqueness. The new medicine respects the radical uniqueness of each human being. It is not only personality and identity which are unique in human beings. Rather, as Gordon (1996, p. 58) notes, “Though the diagnostic label may be the same, each person’s illness is different from everyone else’s.” Irritable bowel syndrome is an entirely different condition when it occurs in a 60 year old man with heart disease, than it is in a 24 year old woman who is anxious but otherwise healthy.

The research of Roger Williams emphasizes the “biochemical individuality” of human beings (Williams, 1980). The divergent nutritional requirements from one person to the next provides an example of this individuality. Williams’ research indicates that the needs for vitamins, minerals and amino acids varies enormously from person to person. Similarly, medication responses vary greatly, with one patient showing rapid recovery using a specific medication, and the next patient suffering nausea, fatigue, and disorientation on the same medication. Biochemical individuality dictates that treatments must be individualized for each patient, that patients reports of feeling worse on a new therapy be carefully heeded.

2. Holism. The new medicine is holistic, from holos, the Greek word for whole. Holism regards health as a state of harmony and wellness in body, mind, and spirit. Jan Christian Smuts, the South African biologist, developed the concept of holism, emphasizing that each biological organism is greater than the sum of its parts. The new medicine agrees with the words of the Swiss psychiatrist, Medard Boss (1975), who wrote that health consists of the “total haleness and wholeness” of the human being. Holistic medicine is inclusive; it includes within its focus the familial, social, economic, environmental and ethnic dimensions of each patient’s life. Above all, holistic medicine recognizes the central role of spirituality. Spirit is integral to health, not something separate from bodies and emotions.

3. Healing Partnerships. The new medicine rests on the healing partnership between healer and patient. This partnership is a collaborative one, in which the patient participates fully and actively in his/her own movement toward wellness. The healer’s role is powerful, but catalytic: The healer’s strength lies in awakening healing resources within the patient. Inviting the patient to be a full partner is particularly powerful in transcending the old problem of “patient non-compliance” – the failure of patient’s to carry out the medical orders of the physician. Research consistently shows that about 50 % of medical patients do not take medications as prescribed. One study found that only one week after a clinic visit, only 22 % of patients were taking the medication as prescribed (Boyd, Covington, Stanaszek, & Coussons, 1974). In contrast, an extensive review of research studies on patient involvement in treatment conclusively found that patients want to participate in decisions about treatment (Guadagnoli & Ward, 1998). When the patient actively develops strategies for behavioral changes relevant to diabetes or asthma, that patient experiences more ownership and commitment to the action plan.

4. Self Care. Individuals learning to care for their own health and wellness lie at the core of the new medicine. The old medicine has drugs and surgery at the core, and treats psychosocial therapies and CAM therapies as peripheral. In the new medicine, self care is the true primary care, and deserves equal attention from the health provider. Many of the factors leading to ill health and physical symptoms lie within the person and his or her behavior; the healing process must begin with the patient learning to change these behavioral pathways to disease.

Self care means that each patient must become more aware of the powerful role of mind and emotion on the human body and its functions. Biomedical research has established the physiological and neuroendocrine pathways of the human stress response, and its powerful role in producing disease. Similarly, research shows the power of relaxation and related techniques to reverse the stress response. Approaches for self care and self healing include: relaxation, meditation, biofeedback, imagery, hypnosis/self-hypnosis, exercise, nutrition, and prayer.

5. Other Healing Systems. Western biomedicine is not alone on this earth, and must develop the humility of learning from its elders. In the initial hubris of modern
medicine's victories over infectious diseases, and the power of its surgical procedures, the entire approach and tool chest of traditional medicine were dismissed as ignorance and superstition. Yet, the majority of the world’s population continues to turn for everyday guidance on maintaining health to a variety of traditional medical systems, ranging from the ancient Vedantic medicine of India, to the shamans of the Navaho, to the “bush doctors” of the Caribbean.

The new medicine respects, and borrows both specific tools and broader attitudes from these older healing systems, whenever they show themselves to be effective. Methodologically guided research is now proceeding to identify therapeutic effects within a variety of traditional herbal preparations. Acupuncture, for example, is steadily gaining acceptance as a mainstream tool for chronic pain and a variety of other disorders (Stein, 2003).

The new medicine also respects and draws on the efficacious elements within alternative healing systems in Western society, such as chiropractic and osteopathy, with their manual therapies, as well as the humanistic body therapies such as the Alexander technique, bio-energetics, and the Feldenkrais technique (Moss and Shane, 1998).

6. Group Support. The new medicine draws on the power of small groups to provide the milieu for healing and personal change. Many of the most successful studies showing the power of CAM therapies and mind-body methods in restoring health have imparted these healing strategies within a small cohesive therapeutic group. The group provides emotional support, encouragement, and connectedness for the sufferer, and may be a hidden source of the therapeutic outcomes in these research studies. Irvin Yalom (1985), the American existential therapist, noted the power of group process to install hope in the individual defeated by life’s problems, and to restore “universal” to persons who feel isolated in their illness. When I observe others with similar complaints, and then triumph over them, I feel less alone with my own problems, and it becomes easier to visualize myself triumphing over my problems.

Traditional medicine typically views the family and community as playing an active and integral role in the healing of an individual. Indigenous healers often gather the entire clan network around the sick individual to assist in restoring balance within this ill person’s psyche and world. In today’s world of geographically mobile individuals, in which many persons live far from extended family and community, the therapeutic group can serve an important role as a substitute network for healing.

In addition to these powerful group dynamic influences on the patient, the group provides an encouraging culture within which the individual can learn a variety of active coping strategies. The physician/therapist can teach specific skills in the group setting, such as relaxation, visualization, assertiveness, and cognitive reframing. The group then encourages the individual to practice and master these skills, first in the group, and then in daily life.

7. Spirituality and Transformation. The new medicine respects the integral role of spirituality in healing and transforming human beings. Traditional healing systems are closely integrated with the spirituality of their cultures, and may have much to teach Western medicine in this regard. Krippner (2003, p. 191) noted that: “spirituality is an integral part of the healing models of the indigenous healers who handle the health care needs of some 70 per cent of the current world population.”

A growing number of empirical studies show the powerful effect of spiritual practices, church attendance, and religious beliefs on health (Dossey, 1993, 1999; Moss, 2002, 2003; Koenig, McCullough, & Larson, 2001). Individuals who feel a sense of purpose and direction in life, and who experience a connection to a larger spiritual universe, exhibit greater physical well-being, reduced incidence of illness, more positive mood and mental state, and a greater ability to face adversity and discover hope for the future. Medicine must learn to mobilize the beliefs and spiritual resources of the individual patient, as powerful factors for enhancing health. Medicine is also challenged to find ways to offer a spiritual window for individuals who lack such resources, while respecting the autonomy of each person.

Mind-Body Therapies in the New Medicine

The new medicine is biopsychosocial and holistic in approach, and recognizes the power of mind-body approaches to enhance health and combat disease. Lifestyle, stress, and human behavior play a critical role in many of the illnesses and conditions that bring patients into the medical clinic today. One example is the so-called “metabolic syndrome” (McGrady, Bourey, & Bailey, 2003), the convergent problem of obesity, diabetes, hypertension, and hyperlipidemia. Sedentary lifestyle, nutrition, and behavior play a role in the onset of each of the component conditions within the metabolic syndrome, and modifications in lifestyle, nutrition and behavior must play a role in reversing or even managing these conditions. Similarly, inactivity, stress, and negative emotion (the “hostility factor”) play a major role in the onset of cardiovascular disease, and exercise, stress management and emotional healing are critical to long term survival with heart disease (Blumenthal, Jiang, Babyak, et al., 1997).

The so-called mind-body therapies offer powerful tools to assist the new medicine in enabling behavioral change.

Biofeedback. The paradigm of biofeedback is simple yet powerful. Feedback about a biological process enables awareness and control. Biofeedback involves the use of electronic instruments to provide an individual with feedback about his or her own bodily processes. This feedback increases the individual’s awareness of processes such as muscle tension or breathing, and enables the individual to gain control over the same bodily processes.

Biofeedback is a natural technology for the new medicine. The modality of biofeedback supports a philosophy of self-regulation and the acquisition of voluntary controls over one’s own body and life (Moss, 2001, 2003a). With biofeedback the individual gains control initially over a muscle, hand temperature, or brain wave activity, and frequently goes on to experience greater control over personal health, behavior at work, and other aspects of everyday life. In the past three decades, research and clinical practice have shown the capacity of individuals to self-regulate their physiology
in ways that reduce the symptoms and effects of countless disease conditions, ranging from anxiety to hypertension to depression and seizure disorders (Schwartz & Andrasik, 2003).

**Hypnosis.** Hypnosis includes the use of a variety of direct and indirect inductions to create a hypnotic state, which then provides an opportunity for psychotherapeutic exploration, recovery and processing of painful repressed memories, and the delivery of therapeutic post-hypnotic suggestions. The patient goes through a process of induction, and then enters a condition we call hypnosis or trance.

Current outcomes research shows that hypnosis produces effective results with a variety of disorders and conditions (Burrow, Stanley, & Bloom, 2001; Rhue, Lynn, & Kirsch, 1993). Most familiar is the powerful role of hypnosis in relieving pain, including the management of chronic pain, analgesia during surgery and childbirth, relief of acute pain in burn victims, and relief of pain in terminal cancer patients. In addition, research supports applications of hypnosis to habit change, including weight management and smoking cessation, and to asthma, eating disorders, wound healing following surgery, and a host of other conditions (Breuer, 2000; Kirsch, Capafons, Cardena-Buelna, 1999; Sugarman, 1996; Spiegel, 2000).

**Visualization.** Visualization is also a powerful tool at the interface between body and mind. Spiritual visions have played a role in the healing practices of shamans and spiritual healers in many traditional cultures (Achterberg, 1985, 1994). Modern schools of relaxation have drawn heavily on the power of visual imagery (Brigham, 1994). Research has shown many effects of deliberately cultivating positive mental imagery. Positive imagery exercises can reduce anxiety and tension, reduce blood pressure, decrease headaches, shrink gastric ulcers, and reduce back pain.

**Conclusion**
The illnesses and conditions which bring patients into the medical clinic today are most often related to lifestyle, nutrition, and stress. Today’s patients typically present with somatization disorders, functional illnesses, stress related disorders, chronic conditions, and psychiatric conditions with physical symptoms. This shift in the diseases to be treated calls for a new medicine, which is more holistic in approach and more integrative in its methods.

James Gordon’s work has identified a number of pillars of this new medicine: He calls for the new medicine to: 1) respect the patient’s uniqueness, 2) adopt a holistic approach, 3) utilize a healing partnership between healer and patient, 4) empower and educate the patient to engage in self-care, 5) draw on the power of group support, 6) borrow techniques and approaches from healing systems, other than Western biomedicine 7) draw on the patient’s spiritual resources for healing and transformation.

**References**

Continued on page 19
From the Editor

continued from Page 2

grat ing behavioral interventions, CAM, mind-body medicine, and traditional medical therapeutics, in one system. Today, patients shuttle back and forth among primary care physicians, CAM practitioners, behavioral practitioners, and health food stores, attempting to craft their own personal response to illness. Further, they often don’t trust their primary care physician enough to disclose the alternative therapies they are using, which risks adverse interactions among herbal supplements and mainstream medications (Eisenberg, et al, 1998).

Or worse yet, effective behavioral and CAM interventions often come into play only after the patient’s condition has become chronic and resistant to intervention. As health professionals, we owe it to patients to design integrative health care systems which offer the best documented therapies from day one of treatment (Moss, 2003).

CAM Articles in this Special Issue. This special issue is packed with an interesting selection of articles illustrating the potential contributions of biofeedback and neurofeedback to CAM and integrative medicine. Sebastian Striefel highlights some of the special ethical challenges facing CAM practitioners. By definition, therapies outside the mainstream can be more vulnerable for patient complaints.

James Gordon has allowed Biofeedback Magazine editor Don Moss to adapt and expand Dr. Gordon’s March 2003 keynote on the future of health care into an article highlighting a new paradigm for health care. Adam Burke presents a demographic overview of current CAM users, and identifies strategies for promoting biofeedback and advancing its integration both into mainstream primary care and into the practice of integrative medicine.

Jessica Depo zo and Richard Gevirtz introduce current applications of heart rate variability (HRV) biofeedback to heart disease, and in a second article Dr. Gevirtz reviews a wider variety of promising new applications of HRV biofeedback to medical disorders.

Erik Peper and Katherine Gibney present a fascinating approach to women’s health problems, using biofeedback and respiration training to assist women to self-regulate both menopausal hot flashes and premenstrual mood swings. They build on the earlier research of Robert Freedman and Suzanne Woodward. James Lake and Don Moss review emerging applications of neurofeedback and QEEG to psychiatric and neurological issues; they argue that neurofeedback is a genuine complementary therapy.

Feature Articles. David Sierer continues his special series on audio-visual entrainment (AVE); his second article features dental applications of AVE. Gabe Sella contributes an article on SEMG testing and treatments for disorders of the shoulder.

AABP News and Events Section. Finally, AABP President Lynda Kirk, President-Elect Steve Baskin, and Executive Director Francine Butler offer their current perspectives on events shaping professional research and practice today. In addition, readers will find information about the March AAPB meeting in Colorado Springs, Colorado.


Ethical Behavior and Other Issues

continued from Page 7


The editor also welcomes proposals for future special issues of the Biofeedback Magazine.

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Biofeedback and the CAM Consumer

Adam Burke, PhD, MPH, LAc, San Francisco, California

Abstract: A dramatic growth of complementary and alternative medicine (CAM) is occurring in the US, including significant increases in utilization and in expenditures for professional services. Three demographic categories are associated with use of CAM: being from a culture where traditional medicine is common; having a chronic, complex or serious health problem; or possessing alternative lifestyle values. Biofeedback is in an excellent position to contribute to this national movement as one of the better researched mind-body therapies. Strategies for successful integration are proposed.

The CAM Revolution

The US is witnessing dramatic growth in the use of complimentary and alternative medicine (CAM). For several decades interest in alternative health practices and products has been increasing. Alternative medical systems, such as oriental medicine, have also become more widely accepted. Between 1991 and 1997 total visits to alternative providers grew from 427 million to 629 million. Expenditures for these professional services also increased 45%, with $21 billion spent in 1997, $12 billion of that being out-of-pocket (Eisenberg et al., 1993). This development of CAM is the result of converging social and economic forces including patient dissatisfaction with drug side-effects, invasive treatments and impersonal institutional care. It is also driven by the needs of individuals facing complex, chronic health problems that are not always responsive to conventional western medical care (Burke, 2001; Eisenberg et al., 1998; Flaherty et al. 2001). This paper examines the role of biofeedback in this healthcare, self-care revolution.

What is CAM?

In 1998 the National Center for Complementary and Alternative Medicine (NCCAM) was established by the NIH in response to the increasing role of CAM in healthcare. This new institute, an outgrowth of the earlier Office of Alternative Medicine, was created to research alternative medicine and to evaluate its effectiveness and safety. The Center's operating budget for fiscal year 2002 was $105 million, up from $2 million in 1993.

NCCAM (2002b) defines CAM as "a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine." In an effort to organize the myriad methods that fall within this broad definition NCCAM established five categories of CAM resources: (1) alternative medical systems; (2) mind-body interventions; (3) biologically-based treatments; (4) manipulative and body-based methods; and (5) energy therapies. Biofeedback is considered to be one of the mind-body interventions.

What is Biofeedback’s Role in CAM?

National surveys indicate that CAM utilization is common, but varies across demographic segments. Three unique factors potentially affect utilization: (1) being from a culture where some form of traditional medicine was practiced; (2) having a chronic, complex or serious health problem; (3) and possessing alternative lifestyle values, or experiencing dissatisfaction or conflict with conventional western treatments.

1. Cultural Backgrounds that Include Traditional Medicine

The term CAM denotes that conventional western medicine is primary and that other traditional medical systems are secondary. Such language is actually inappropriate for many communities. These so called complementary or alternative approaches can be the most culturally relevant medicine for some people, and as such they play a significant role in service delivery (Becerra & Iglehart, 1995). At times these traditional medicines may even be the patient’s primary care for reasons of linguistic isolation, availability and affordability. Indeed, conventional western medicine may truly be the alternative form in such cases.

Traditional medicine is still a significant component of healthcare in many ethnic communities in the US. Biofeedback, however, is not historically a part of those medical traditions. Consequently this cohort of CAM consumers may either be a population that is difficult to access or one that provides a great undeveloped service opportunity.

2. Chronic, Complex and Serious Health Problems

Chronic pain is highly associated with CAM use. One study observed highest use among pain patients with severe pain, osteoarthritis and fibromyalgia. Ineffectiveness of prescription medications was also reported as a significant reason for use by almost half of those respondents.
Biofeedback has been shown to be useful in complex and serious health problems. (Palmer, Greisinger, & Singletary, 2000). Biofeedback may be an appropriate option for individuals motivated by alternative values, dissatisfaction with conventional care, or experiencing treatment conflicts. Biofeedback gained public notoriety in the 1970's as a vehicle for consciousness exploration and research (Schwartz & Olson, 1970's). It may also be a compelling therapy for patients dissatisfied with conventional care, those who seek to avoid drug side-effects or invasive treatments, or those who want to increase their sense of personal control in the healing process.

Opportunities and Challenges

CAM is growing, and with our aging population and continually challenging health problems, the demand for CAM will continue. Biofeedback is in a good position to contribute to this revolution, being one of the more well-recognized and well-researched mind-body therapies. To this end it may be prudent for biofeedback practitioners and biofeedback organizations to develop strategies to advance the profession through the following means:

1. Advocate for NIH grant sponsorship of more well-funded, randomized, clinical controlled studies in several appropriate areas. NCCAM has funded just one study on biofeedback and hypertension (NCCAM, 2002a);

2. Integrative medicine is growing, partly as a function of the CAM movement. It would be productive to increase biofeedback's role in primary care settings generally and in integrative medical practices specifically;

3. Develop a focused research agenda on CAM-relevant health issues including complex, chronic conditions like FMS, Irritable Bowel Syndrome and AIDS;

4. In an era of increasingly cost conscious healthcare future biofeedback research should include outcome measures on cost and cost containment, changes in utilization, patient satisfaction, and disease prevention and self-care when possible;

5. The majority of medical school programs in the US now offer CAM courses in their curriculum, as do several nursing and public health programs (Bhattacharya, 2000; Burke, Gordon & Bhattacharya, 2001). Palsson and Davies (2003) report an innovative program exposing medical students personally to biofeedback and mind-body learning. It would benefit the profession in the long-term if we informed future healthcare providers more effectively about biofeedback's important place in the healing process.

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**Note**

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Abstract: Complementary care for heart disease is an important area for research to prevent relapse and death, and increase quality of life. Biofeedback is one treatment tool that may be useful for cardiac patients in several ways, but especially as it targets cardiac variability. Cardiac variability, the moment-to-moment fluctuation in heart rate, measured in milliseconds, is an important predictor of morbidity and mortality for cardiac patients. Our study found that patients treated with cardiac variability biofeedback training were able to increase their overall cardiac variability compared to baseline and compared to controls.

Heart Rate Variability Biofeedback

One physiological measure that is gaining more widespread use in biofeedback is heart rate variability, or cardiac variability. Cardiac variability is the moment-to-moment change in heart rate measured in milliseconds (Task Force, 1996). This fluctuation reflects autonomic flexibility and adaptability. Biological factors influencing cardiac variability are baroreceptor sensors in the carotid arteries and aorta, the sinoatrial node, and chemoreceptors.

In the 1960's, moment-to-moment heart rate fluctuations were observed in fetal distress (Hon & Lee, 1965). More recently, cardiac variability has been found to correlate with a number of illnesses including depression, generalized anxiety disorder, post traumatic stress disorder, diabetes, asthma, & cardiac-related illness. It is actually a strong predictor of cardiac-related morbidity and mortality, as well as all-cause mortality (Krittayaphong, et al., 1997; Yeragani, Balon, Pohl, & Ramesh, 1995; Cohen, Kotler, Matar, & Kaplan, 1997; Lyon-fields, Borkovec, & Thayer, 1995; Kleiger, Miller, Bigger, Moss, 1987).

Cardiac variability is gaining more widespread use as a measure of cardiac response and overall health. Cardiac variability biofeedback has been used to train patients to increase their cardiac variability through respiratory sinus arrhythmia breathing retraining. As we inhale, heart rate naturally increases, and as we exhale, heart rate naturally decreases. This fluctuation is healthy. Patients may be able to learn to increase the variability in their heart rate, with the potential to improve their health status and outcomes. This is especially important for cardiac patients who often have extraordinarily low cardiac variability.

Several studies have attempted to change cardiac variability using biofeedback as a treatment intervention (Leher, Vaschillo, & Vaschillo, 2000; Reyes del Paso, Godoy, & Vila, 1992; and Cowan, Kogan, Burr, Hendershot, & Buchanan, 1990). Recently, we randomized 61 patients with coronary artery disease from Scripps Center for Integrative Medicine and Scripps Green Hospital in La Jolla, California. Half of them, the treatment group, received specific cardiac variability biofeedback training with diaphragmatic breathing retraining. The other half, the control group, received regular care and no biofeedback. All participants’ cardiac variability was measured at week 1, 6, and 18 on the Cardiopro™ (developed by Thought Technology; Montreal, Canada). Blood pressure was also measured at each of these sessions. A follow-up visit was scheduled 18 weeks after the first treatment session.
Eight participants reported a reduction in angina, 17 reported a reduction in blood pressure, 12 reported an increase in energy, 4 reported a decrease in chronic pain, and 1 reported irritable bowel symptoms improving. Other reports included feeling "more relaxed, more alert, less stressed, and able to do more."

A variety of heart patients may seek biofeedback for treatment to improve their current quality of life. Some may wish to decrease hypertension, improve anger management, decrease Type A personality characteristics, or decrease their general anxiety or health-related issues. It can be rewarding for them to learn to control various physiological functions available during biofeedback training. It may be possible for some to lessen angina symptoms or reduce arrhythmias. Other patients may feel palpitations that doctors have assured them are benign, yet the patients experience a lingering fear that something is wrong. Biofeedback can help these people reduce anxiety and feel more in control. Finally, some may have essential hypertension and have tried many traditional and alternative treatments to reduce it, with no success. Research shows mixed results for biofeedback training for hypertension, and it may not work for every case of hypertension (JNC, 1997). However, a portion of these hypertensive individuals will obtain clinically significant reductions in blood pressure. Again, biofeedback treatment may also reduce anxiety that compounds the problem of hypertension.

**Conclusion**

Biofeedback is a useful tool to integrate into traditional and supplementary cardiac rehabilitation. It may be useful for overall reduction sympathetic activity related to anxiety and tension, but also for specific training to increase cardiac variability. It is a non-invasive, takes relatively little effort, and provides instant feedback for patients to check their progress during training.

**References**


Abstract: Heart Rate Variability (HRV) is not only of interest as a powerful predictor of cardiac and other health outcomes, but can be used in a new and promising mode of biofeedback. This article describes some recent promising applications in HRV biofeedback.

Emerging Model of Heart Rate Variability Biofeedback

In recent years there has been increased interest in heart rate variability (HRV). In Cardiology, this interest has mostly involved methodological issues surrounding variability measures such as the standard deviation of normal to normal heart beats (SDNN). Some AAPB colleagues and I have also been interested in using HRV as a clinical biofeedback modality. In 1993, Diane Herbs and I reported data comparing "RSA" biofeedback to temperature training with Hypertension. RSA refers to Respiratory Sinus Arrhythmia, a phenomenon in which respiratory activity and heart rate changes enter a phasic relationship. Each inspiration is accompanied by an increase in heart rate, and each expiration is accompanied by a decrease in heart rate (with some phase differences depending on the actual rate of breathing).

Both the finger temperature training group and the RSA group showed clinically significant reductions in BP. At the time, we thought we were strengthening parasympathetic tone with the training, but subsequently Paul Lehrer introduced us to a Russian physiologist named Evgeny Vaschillo who had worked out an elaborate theory of what happens in “RSA” biofeedback, which we now call HRV Biofeedback. The theory is spelled out in other publications (Gevirtz, 2000; Giardino, 2000; Lehrer, Vaschillo, & Vaschillo, 2000; Vaschillo, Lehrer, Rishe, & Konstantinov, 2002), but the core concept is as follows: Regular practice in increasing HRV, guided initially by biofeedback, can produce strengthened homeostatic reflexes in the autonomic nervous system (ANS).

By increasing HRV we mean that the subject learns to increase the amplitude of variations in heart rate. The swings in heart rate during training are driven primarily by slow, effortless respiration. According to Dr. Vaschillo’s model, there is a natural resonant frequency for each individual, at which respiration and heart rate variations have an optimal effect on the autonomic self-regulation of the organism. For most individuals this resonant frequency involves breathing at a rate of about six times per minute, with about six cycles of heart rate variation within the same time period. If this model is correct, it identifies mediational pathways responsible for many “mind/body” and physical disorders. Furthermore, if this model is correct the HRV Biofeedback then emerges as a very powerful tool for treatment.

Some Applications

Thus far HRV biofeedback has been applied to the following disorders: asthma (Lehrer, Smetankin, & Potapova, 2000), cardiac rehabilitation (Del Pozo, 2002), IBS (Gevirtz, 2000), sports Performance (I'Strack, 2003), and hypertension (Herbs, 1994). In each case it is reasonable to assume that restoration of autonomic homeostatic reflexes would be salutary for the specific condition. For asthma, for example, we know that allergic and inflammatory processes play key roles in symptom production, but the role of autonomic regulation has often been overlooked. Paul Lehrer and his colleagues has shown that 6-8 sessions of training, in which subjects concentrate on producing breath patterns consistent with their own internal resonance (usually about 6 breaths per minute), can dramatically reduce asthma symptoms even with reduced medication use. The report of his full National Institutes of Health (NIH) sponsored trial was presented at the Spring 2003 American Thoracic Society meeting in Seattle and we may expect a published report fairly soon. This work should be recognized as one of the most convincing examples of biofeedback's efficacy in the literature since a credible control group (alpha EEG feedback) produced no changes in disease status, medication usage, or symptom severity.

My student, Jessica Del Pozo recently completed a study with coronary artery dis-
ease (CAD) patients using HRV biofeedback. Sixty-one patients were randomly assigned to a self-monitor condition or an active training condition (six 1-hour sessions). The HRV training produced HRV increases at 18 weeks that indicated meaningful clinical cardiac status improvements. As a side benefit, all of the CAD patients in the treatment group who were hypertensive pre-treatment, became normotensive at the 18 week follow-up. Patients also found the HRV training relaxing and beneficial as a general stress coping tool.

In a different arena, my student Ben Strack recently applied HRV training to baseball batting performance in skilled high school players. He randomly assigned 61 subjects to either a standard visualization practice sessions. While both groups improved on a batting performance contest pre to post, the HRV group had superior increases. The successful subjects reported an improved sense of enjoyment/flow during the post-contest period. Rollin McCraty of the HeartMath Institute has reported similar findings with corporate groups.

**Conclusion**

If HRV training does in fact affect homeostatic reflexes as the preliminary reports have indicated, it would appear to be a promising procedure for normalization or optimization of autonomic function. This would offer hope for improved performance in many contexts and correction of any disorder where autonomic regulation is thought to be important. We have conducted successful clinical trials with patients suffering from Irritable Bowel Syndrome, Recurrent Abdominal Pain, Rheumatoid Arthritis, Migraine, Muscle Pain Syndromes, Fibromyalgia, and Chronic Fatigue Syndrome, Syncope, among other disorders.

**References**


**Manifesto for a New Medicine continued from Page 11**


After the first week to my astonishment, I have fewer hot flashes and they bother me less. Each time I feel the warmth coming, I breathe out slowly and gently. To my surprise they are less intense and are much less frequent. I keep breathing slowly throughout the day. This is quite a surprise because I was referred for biofeedback training because of headaches that occurred after getting a large electrical shock. After 5 sessions my headaches have decreased and I can control them, and my hot flashes have decreased from 3-4 per day to 1-2 per week.

– 50 year old client

For the first time in years, I experienced control over my premenstrual mood swings. Each time I could feel myself reacting, I relaxed, did my autogenic training and breathing. I exhaled. It brought me back to center and calmness.

– 26 year old student

Abstract: Women have been troubled by hot flashes and premenstrual syndrome throughout the ages. Hot flashes often result in red faces, sweating bodies, and noticeable and embarrassing discomfort. They come in the middle of meetings, in the middle of the night, and in the middle of romantic interludes. Premenstrual syndrome also arrives without notice, bringing such symptoms as severe mood swings, anger, crying, and depression.

Hormone replacement therapy (HRT) was the most common treatment for hot flashes for decades. However, recent randomized controlled trials show that the benefits of HRT are less than previously thought and the risks—especially of invasive breast cancer, coronary artery disease, dementia, stroke and venous thromboembolism—are greater (Humphries & Gill, 2003; Shumaker, et al, 2003; Wassertheil-Smoller, et al, 2003). In addition, there is no evidence of increased quality of life improvements (general health, vitality, mental health, depressive symptoms, or sexual satisfaction) as claimed for HRT (Hays et al, 2003).

“As a result of recent studies, we know that hormone therapy should not be used to prevent heart disease. These studies also report an increased risk of heart attack, stroke, breast cancer, blood clots, and dementia…”


Because of the increased long-term risk and lack of benefit, many physicians are weaning women off HRT at a time when the largest population of maturing women in history (‘baby boomers’) is entering menopausal years. The desire to find a reliable remedy for hot flashes is on the front burner of many researchers’ minds, not to mention the minds of women suffering from these ‘uncontrollable’ power surges. Yet, many women are becoming increasingly leery of the view that menopause is an illness. There is a rising demand to find a natural remedy for this natural stage in women’s health and development.

For younger women a similar dilemma occurs when they seek treatment of discomfort associated with their menstrual cycle. Is premenstrual syndrome (PMS) just a natural variation in energy and mood levels? Or, are women expected to adapt to a masu-
line based environment that requires them to override the natural tendency to perform in rhythm with their own psychophysiological states? Instead of perceiving menstruation as a natural occurrence in which one has different moods and/or energy levels, women in our society are required to perform at the status quo, which may contribute to PMS. The feelings and mood changes are quickly labeled as pathology that can only be treated with medication.

Traditionally, premenstrual syndrome is treated with pharmaceuticals, such as birth control pills or Danazol. Although medications may alleviate some symptoms, many women experience unpleasant side effects, such as bloating or acne, and still experience a variety of PMS symptoms. Many cannot tolerate the medications. Thus, millions of women (and families) suffer monthly bouts of “uncontrollable” PMS symptoms.

For both hot flashes and PMS the biomedical model tends to frame the symptoms as a “structural biological problem.” Namely, the pathology occurs because the body is either lacking in, or has an excess of, some hormone. All that needs to be done is either augment or suppress hormones/symptoms with some form of drug. Recently, for example, medicine has turned to antidepressant medications to address menopausal hot flashes (Stearns, Beebe, Iyengar, & Dube, 2003).

The biomedical model, however, is only one perspective. The opposite perspective is that the dysfunction occurs because of how we use ourselves. Use in this sense means our thoughts, emotions and body patterns. As we use ourselves, we change our physiology and, thereby, may affect and slowly change the predisposing and maintaining factors that contribute to our dysfunction. By changing our use, we may reduce the constraints that limit the expression of the self-healing potential that is intrinsic in each person.

The intrinsic power of self-healing is easily observed when we cut our finger. Without the individual having to do anything, the small cut bleeds, clotting begins and tissue healing is activated. Obviously, we can interfere with the healing process, such as when we scrape the scab, rub dirt in the wound, reduce blood flow to the tissue or feel anxious or afraid. Conversely, cleaning the wound, increasing blood flow to the area, and feeling “safe” and relaxed can promote healing. Healing is a dynamic process in which both structure and use continuously affect each other. It is highly likely that menopausal hot flashes and PMS mood swings are equally an interaction of the biological structure (hormone levels) and the use factor (sympathetic/parasympathetic activation).

Uncontrollable or Overly Aroused?

Are the hot flashes and PMS mood swings really “uncontrollable”? From a physiological perspective, hot flashes are increased by sympathetic arousal. When the sympathetic system is activated, whether by medication or by emotions, hot flashes increase and similarly, when sympathetic activity decreases hot flashes decrease. Equally, PMS, with its strong mood swings, is aggravated by sympathetic arousal. There are many self-management approaches that can be mastered to change and reduce sympathetic arousal, such as breathing, meditation, behavioral cognitive therapy, and relaxation.

Breathing patterns are closely associated with hot flashes. During sleep, a sigh generally occurs one minute before a hot flash as reported by Freedman and Woodward (1992). Women who habitually breathe thoracically (in the chest) report much more discomfort and hot flashes than women who habitually breathe diaphragmatically. Freedman, Woodward, Brown, Javaid, and Pandey (1995) and Freedman and Woodward (1992) found that hot flash rates during menopause decreased in women who practiced slower breathing for two weeks. In their studies, the control groups received alpha electroencephalographic feedback and did not benefit from a reduction of hot flashes. Those who received training in paced breathing reduced the frequency of their hot flashes by 50% when they practiced slower breathing. This data suggest that the slower breathing has a significant effect on the sympathetic and parasympathetic balance.

Women with PMS appear similarly able to reduce their discomfort. An early study utilizing Autogenic Training (AT) combined with an emphasis on warming the lower abdomen resulted in women noting improvement in dysfunctional bleeding (Luthe & Schultz, 1969, pp. 144-148). Using a similar approach, Mathew, Claghorn, Largen, and Dobbins (1979) and Dewit (1981) found that biofeedback temperature training was helpful in reducing PMS symptoms. A later study by Goodale, Domar, and Benson (1990) found that women with severe PMS symptoms who practiced the relaxation response reported a 58% improvement in overall symptomatology as compared to a 27.2% improvement for the reading control group and a 17.0% improvement for the charting group.

Teaching Control and Achieving Results

Teaching women to breathe effortlessly can lead to positive results and an enhanced sense of control. By effortless breathing, the authors refer to their approach to breath training, which involves a slow, comfortable respiration, larger volume of air exchange, and a reliance upon action of the muscles of the diaphragm rather than the chest (Peper, 1990).

Slowing breathing helps to limit the sighs common to rapid thoracic breathing—sighs that often precede menopausal hot flashes. Effortless breathing is associated with stress reduction—stress and mood swings are common concerns of women suffering from PMS. In a pilot study Bier, Kazarian, Peper, and Gibney (2003) at San Francisco State University (SFSU) observed that when the subject practiced diaphragmatic breathing throughout the month, combined with Autogenic Training, her premenstrual psychological symptoms (anger, depressed mood, crying) and premenstrual responses to stressors were significantly reduced as shown in Figure 1.

In another pilot study at SFSU, Frobish, Peper, and Gibney (2003) trained a volunteer who suffered from frequent hot flashes to breathe diaphragmatically. The training goals included modifying breathing patterns, producing a Respiratory Sinus Arrhythmia (RSA), and peripheral hand warming. RSA refers to a pattern of slow, regular breathing during which variations in heart rate enter into a synchrony with the...
respiration. Each inspiration is accompanied by an increase in heart rate, and each expiration is accompanied by a decrease in heart rate (with some phase differences depending on the rate of breathing). The presence of the RSA pattern is an indication of optimal balance between sympathetic and parasympathetic nervous activity.

During the 11-day study period, the subject charted the occurrence of hot flashes and noted a significant decrease by day 5. However, on the evening of day 7 she sprained her ankle and experienced a dramatic increase in hot flashes on day 8. Once the subject recognized her stress response, she focused more on breathing and was able to reduce the flashes as shown in Figure 2.

Our clinical experience confirms the SFSU pilot studies and the previously referenced research by Freedman and Woodward (1992) and Freedman et al. (1995). When arousal is lowered and breathing is effortless, women are better able to cope with stress and report a reduction in symptoms. Habitual rapid thoracic breathing tends to increase arousal while slower breathing, especially slower exhalation, tends to relax and reduce arousal. Learning and then applying effortless breathing reduces excessive sympathetic arousal. It also interrupts the cycle of cognitive activation, anxiety, and somatic arousal. The anticipation and frustration at having hot flashes becomes the cue to shift attention and “breathe slower and lower.” This process stops the cognitively mediated self-activation.

Successful self-regulation and the return to health begin with cognitive reframing: We are not only a genetic biological fixed (deficient) structure but also a dynamic changing system in which all parts (thoughts, emotions, behavior, diet, stress, and physiology) affect and are effected by each other. Within this dynamic changing system, there is an opportunity to implement and practice behaviors and life patterns that promote health.

Learning Diaphragmatic Breathing with and without Biofeedback

Although there are many strategies to modify respiration, biofeedback monitoring combined with respiration training is very useful as it provides real-time feedback. Chest and abdominal movement are recorded with strain gauges and heart rate can be monitored either by an electrocardiogram (EKG) or by a photoplethysmograph sensor on a finger or thumb. Peripheral temperature and electrodermal activity (EDA) biofeedback are also helpful in training. The training focuses on teaching effortless diaphragmatic breathing and encouraging the participant to practice many times during the day, especially when becoming aware of the first sensations of discomfort.

Learning and integrating effortless diaphragmatic breathing into daily life is one of the biofeedback strategies that has been successfully used as a primary or adjunctive/complementary tool for the reversal of disorders such as hypertension, migraine headaches, repetitive strain injury, pain, asthma and anxiety (Schwartz & Andrasik, 2003), as well as hot flashes and PMS.

The biofeedback monitoring provides the trainer with a valuable tool to:

1. Observe & identify: Dysfunctional rapid thoracic breathing patterns, especially in response to stressors, are clearly displayed in real-time feedback.

2. Demonstrate & train: The physiological feedback display helps the person see that she is breathing rapidly and shallowly in her chest with episodic sighs. Coaching with feedback helps her to change her breathing pattern to one that promotes a more balanced homeostasis.

3. Motivate, persuade and change beliefs: The person observes her breathing patterns change concurrently with a felt shift in physiology, such as a decrease in irritability, or an increase in peripheral temperature, or a reduction in the incidence of hot flashes. Thus, she has a confirmation of the importance of breathing diaphragmatically.

In addition, we suggest exercises that integrate verbal and kinesthetic instructions, such as the following: “Exhale gently,” and “Breathe down your legs with a partner.”

Figure 1. Student’s Individual Subjective Rating in Response to PMS Symptoms.

Figure 2. Subjective Rating of Intensity, Frequency and Bothersomeness of Hot Flashes. The increase in hot flashes coincided with increased frustration about an ankle injury.
Learning Strategies in Biofeedback Assisted Breath Training

Common learning strategies that are associated with the more successful amelioration of hot flashes and PMS include:

1. Master effortless diaphragmatic breathing, and concurrently increase respiratory sinus arrhythmia (RSA). Instead of breathing rapidly, such as at 18 breaths per minute, the person learns to breathe effortlessly and slowly (about 6 to 8 breaths per minute). This slower breathing and increased RSA is an indication of sympathetic-parasympathetic balance as shown in Figure 3.

2. Practice slow effortless diaphragmatic breathing many times during the day and, especially in response to stressors.

3. Use the physical or emotional sensations of a hot flash or mood alteration as the cue to exhale, let go of anxiety, breathe diaphragmatically and relax.

4. Reframe thoughts by accepting the physiological processes of menstruation or menopause, and refocus the mind on positive thoughts, and breathing rhythmically.

5. Change one’s lifestyle and allow personal schedules to flow in better balance with individual, dynamic energy levels.

Exhale Gently:
Imagine that you are holding a baby. Now with your shoulders relaxed, inhale gently so that your abdomen widens. Then as you exhale, purse your lips and very gently and softly blow over the baby’s hair. Allow your abdomen to narrow when exhaling. Blow so softly that the baby’s hair barely moves. At the same time, imagine that you can allow your breath to flow down and through your legs. Continue imagining that you are gently blowing on the baby’s hair while feeling your breath flowing down your legs. Keep blowing very softly and continuously.

Practice exhaling like this the moment that you feel any sensation associated with hot flashes or PMS symptoms. Smile sweetly as you exhale.

Breathe Down Your Legs with a Partner:
Sit or lie comfortably with your feet a shoulder width apart. As you exhale softly whisper the sound “Haaaaa…” Or, very gently press your tongue to your pallet and exhale while making a very soft hissing sound.

Have your partner touch the side of your thighs. As you exhale have your partner stroke down your thighs to your feet and beyond, stroking in rhythm with your exhalation. Do not rush. Apply gentle pressure with the stroking. Do this for four or five breaths.

Now, continue breathing as you imagine your breath flowing through your legs and out your feet.

During the day remember the feeling of your breath flowing downward through your legs and out your feet as you exhale.

Generalizing Skills and Interrupting the Pattern

The limits of self-regulation are unknown, often held back only by the practitioner’s and participant’s beliefs. Biofeedback is a powerful self-regulation tool for individuals to observe and modify their covert physiological reactions. Other skills that augment diaphragmatic breathing are Quieting Reflex (Stroebel, 1982), Autogenic Training (Schultz & Luthe, 1969), and mindfulness training (Kabat-Zinn, 1990). In all skill learning, generalization is a fundamental factor underlying successful training. Integrating the learned psychophysiological skills into daily life can significantly improve health—especially in anticipation of and response to stress. The anticipated stress can be a physical, cognitive or social trigger, or merely the felt onset of a symptom.

As the person learns and applies effortless...
breathing to daily activities, she becomes more aware of factors that affect her breathing. She also experiences an increased sense of control: She can now take action (a slow effortless breath) in moments when she previously felt powerless. The biofeedback-mastered skill interrupts the evoked frustrations and irritations associated with an embarrassing history of hot flashes or mood swings. Instead of continuing with the automatic self-talk, such as “Damn, I am getting hot, why doesn’t it just stop?” (language fueling sympathetic arousal), she can take a relaxing breath in response to the internal sensations, stop the escalating negative self-talk and allows more acceptance—a process reducing sympathetic arousal.

In summary, effortless breathing appears to be a non-invasive behavioral strategy to reduce hot flashes and PMS symptoms. Practicing effortless diaphragmatic breathing contributes to a sense of control, supports a healthier homeostasis, reduces symptoms, and avoids the negative drug side effects. **We strongly recommend that effortless diaphragmatic breathing be taught as the first step to reduce hot flashes and PMS symptoms.**

I feel so much cooler. I can’t believe that my hand temperature went up. I actually feel calmer and can’t even feel the threat of a hot flash. Maybe this breathing does work!

——Menopausal patient after initial training in diaphragmatic breathing

References


Notes

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ii We thank Candy Frobish, Mary Bier and Dalainy Kazarian for their helpful contributions to this research.

iii Wyeth Pharmaceuticals produce Premarin, and other HRT products.

iv For an excellent text on learning relaxation and breathing, see van Dixhoorn (1998).
QEEG and EEG Biofeedback in the Diagnosis and Treatment of Psychiatric and Neurological Disorders: An Authentic Complementary Therapy

James Lake, MD, Pacific Grove, CA, and Donald Moss, PhD, Grand Haven, MI

Abstract: EEG biofeedback and Quantitative EEG (QEEG) are gradually emerging into mainstream psychiatry and medicine as promising diagnostic and treatment approaches in Western Europe and North America. In the U.S. two professional societies are devoted to training and research in both approaches. Current research shows that QEEG can be a useful adjunct in the assessment of a variety of neurological and psychiatric disorders, and EEG biofeedback provides a useful therapy for a number of common disorders. Both EEG and QEEG represent truly complementary therapies, based on a targeted re-regulation of cortical and subcortical electrical rhythms not addressed by mainstream medical therapies.

Historical Introduction
EEG biofeedback, also known as neurofeedback, emerged as a treatment modality from early research by Joe Kamiya (1969), which demonstrated the human capacity to gain awareness and voluntary control over cortical electrical rhythms. Initially EEG biofeedback was utilized to facilitate deeper states of relaxation and meditative awareness, but the past three decades have seen a proliferation of clinical and research reports showing that EEG biofeedback has efficacy for a variety of conditions, including seizures, attention deficit-hyperactivity disorder (ADHD), depression, anxiety, and substance abuse (Clinical EEG, 2000; Evans & Abarbanel, 1999; Moss, 2001). Subsequently, the use of quantitative electroencephalography (QEEG) emerged as a method for identifying abnormal cortical rhythms associated with specific neurological or psychiatric disorders (LaVaque, 2003; John et al., 1977; John & Prichep, 1993). Today the quantitative EEG provides a functional map of brain processes identifying areas of electrophysiological underactivity and over-activity, disturbances in inter-hemispheric coherence, and other evidence of cortical dysregulation. Normative data bases allow a detailed statistical comparison of the patient’s current QEEG to both normal brain function and typical patterns of dysregulation associated with specific disorders, such as seizure disorders, closed head injury, depression, and others. Drawing on EEG data bases showing pathological states, normative EEG databases and evidence-based markers, QEEG mapping is a method that provides adjunctive diagnostic evidence for the presence of specific disorders. QEEG results can also facilitate selection of the optimum EEG biofeedback protocol by identifying areas of abnormal cortical function, which can then become the focus for intervention.

Applications of Quantitative EEG
The Use of the QEEG in Diagnosis and Treatment Planning. The QEEG includes many sophisticated methods for analysis of brain electrical activity with the goal of clarifying the differential diagnosis. QEEG data help the clinician to determine the optimum treatment for a given patient, including EEG biofeedback or psychopharmacological therapies. In its early years, QEEG had limited success as a clinical tool because of the absence of standard EEG recording techniques and failed attempts to confirm correlations between specific EEG abnormalities and discrete psychiatric or neurological diagnoses. Because of these issues many physicians and psychologists were initially reluctant to adopt QEEG or EEG biofeedback. In recent years, however, several QEEG databases have been developed and validated. This has led to the elaboration of therapeutic EEG biofeedback protocols targeting discrete psychiatric or neurological disorders. Databases containing both normative EEG activity patterns and abnormal patterns associated with specific psychiatric or neurological disorders. QEEG mapping provides an objective method for identifying areas of brain dysfunction, which can then be targeted for intervention using EEG biofeedback.
neurological disorders have been created. For example, Prichep et al (1993) utilized QEEG to identify cortical signatures for subtypes of obsessive compulsive disorder. However, at present there are no widely accepted standards of practice regarding diagnostic uses of QEEG in clinical practice.

QEEG as Tool in Selecting Medication. Considerable renewed interest in QEEG has come from recently published studies in the mainstream medical literature showing that response rates to certain anti-depressants can be predicted on the basis of differences in brain electrical activity evoked by sounds of various intensities. The brain's response to an auditory signal is called an auditory evoked potential (AEP). In one study (Gallinat, et al., 2000), relatively greater auditory evoked potentials (AEP) corresponded to lower activity of brain serotonin, and predicted increased response rates of depressed patients to serotonin reuptake inhibitors (SSRIs).

This finding has been corroborated by other studies examining the relationship between cordance and response to anti-depressants that affect serotonin. Cordance is a measure of localized electrical brain activity relative to absolute EEG patterns. Several studies have established a correlation between cordance and measures of brain perfusion or regional metabolic activity as shown by functional MRI and PET. In a study at U.C.L.A. School of Medicine (Demott, 2002b; Cook, et al., 2002)], more than one half of patients with major depression who eventually showed the highest response rates to serotonin reuptake inhibitors, showed significant decreases in pre-frontal cordance during the first 48 hours of therapy. Interestingly, non-responders in both the active and placebo groups did not show negative pre-frontal cordance.

QEEG as an adjunct in the Diagnosis of Attention Deficit-Hyperactivity Disorder. In at least two well controlled studies, one of them a multi-site study of more than 480 cases at 8 clinics, researchers have established that QEEG criteria can successfully distinguish individuals with Attention Deficit Hyperactivity Disorder from control subjects (Monastera, Lubar, & Linden, VanDeusen, Green, Wing, Phillips, & Fenger, 1999; Monastera, Lubar, & Linden, 2001). Measuring the ratio of percent Theta power to percent Beta power, at the vertex of the scalp (location Cz in the International 10-20 EEG system), the ADHD subjects could be differentiated from controls with an accuracy of at least 90 percent (Lubar, 2003).

Studies by Clarke and colleagues independently support the ability of QEEG to discriminate individuals with ADHD (Clarke, Barry McCarthy, & Selikowitz, 2001a), and also identify a subgroup of children with ADHD who display a divergent EEG pattern, featuring an excess of beta range activity, primarily in frontal regions (Clarke, Barry, McCarthy, & Selikowitz, 2001b).

QEEG in the Detection of Mild Cognitive Impairment and Alzheimer’s Disease. QEEG and EEG evoked potentials are also promising diagnostic tools for the early detection of mild cognitive impairment and early Alzheimer’s Disease (AD) (or Alzheimer’s like dementia). In recent pilot studies researchers reliably differentiated patients with mild cognitive impairment (MCI) or Alzheimer’s Disease from intact subjects on the basis of QEEG findings alone. In the first study, Benvenuto, Jin, Casale, Lynch, and Granger (2002) used visual evoked potentials (VEPs), and identified reliable EEG signal features discriminating the Alzheimer’s patients. In a second study, the researchers found correlations between auditory evoked potentials (AEP’s) and mild cognitive impairment, possibly a precursor to AD. The same study identified a consistent EEG signature in patients with mild cognitive impairment, indicating degeneration in the pre-frontal cortex (Demott, 2002a). These results were interpreted as pre-frontal cortical dis-inhibition, a typical finding in AD and other kinds of dementia. As a significant percentage of mildly cognitively impaired adults eventually progress to frank dementia, early EEG evaluation of at-risk individuals may facilitate early aggressive treatment.

EEG Biofeedback

Both the International Society for Neuronal Regulation and the Neurofeedback Division within AAPB were established to further research, promote standardized recording techniques, refine databases and suggest protocols for clinical applications using EEG biofeedback for the entire spectrum of neuropsychiatric disorders. EEG biofeedback, also known as neurofeedback or neurotherapy, has the goal of modifying general or specific parameters of brain electrical activity in order to eliminate abnormal cortical patterns or normalize patterns that are believed to be associated with a particular neurological or psychiatric disorder. The patient is instructed to modify a visual or auditory feedback signal that provides information about real-time brain electrical activity, including frequency, amplitude, coherence and other parameters. EEG biofeedback takes place gradually over many sessions and when successful, results in shifts in EEG activity associated with diminished severity of the target symptom or disorder being treated.

EEG Biofeedback Applications. The use of electroencephalography (EEG) in biofeedback to treat psychiatric disorders dates to the mid-1960s (Budzynski, 1999; Evans & Abarbanel, 1999). Commonly used protocols initially entailed the modification of averaged EEG activity with the goal of increasing activity or coherence in the Alpha frequency bands (between 8 and 12 cycles/sec), or increasing activity in a portion of the Beta frequency band (between 15 and 20 Hz) while inhibiting activity in the Theta frequency band (between 4 and 8 Hz). Psychologists and psychiatrists use QEEG and EEG biofeedback singly or in combination with more conventional methods in the diagnosis and treatment of numerous psychiatric and neurological disorders including Attention Deficit/Hyperactivity Disorder (ADHD), PTSD, depression, substance abuse and alcoholism, traumatic brain injury, and post-stroke rehabilitation.

One of the best-documented applications of EEG biofeedback is the treatment of Attention Deficit/Hyperactivity Disorder (ADHD). Numerous uncontrolled studies have reported the evolution of this treatment paradigm, as reviewed by Lubar (2003). More recently, three controlled studies have shown that the efficacy of EEG biofeedback in reducing the symptoms of ADHD is equivalent or superior to psy-
chostimulants (Rossiter & LaVaque, 1995; Monastra, Monastra, & George, 2002; Fuchs, Bierbaum, Lutzenberger, Grutzelier, & Kaiser, 2003).

Recent Advances in EEG Biofeedback. Significant recent advances in EEG biofeedback include: 1) a report by Ibric (2002) showing a reduction in the symptoms of Parkinson’s disease, when neurofeedback is enhanced by light stimulation and low level electromagnetic stimulation, guided by real time EEG feedback; 2) case reports and research reports showing reduction in the severity of depressed mood using an alpha asymmetry EEG biofeedback protocol (Rosenfeld, 2000; Baehr, Rosenfeld, & Baehr, 2001; Baehr & Rosenfeld, 2003); 3) a case report by Hammond (in press) of positive outcomes with EEG biofeedback training for obsessive compulsive disorder (OCD); and 4) promising early reports on the treatment of eating disorders (Smith, 2002) and trigeminal neuralgia (Sime, 2002). Many of these reports are based on clinical case studies and small pilot studies, and require verification from large controlled studies.

QEEG and EEG Biofeedback in Current Practice. At present, most clinicians still rely primarily on clinical history when evaluating a new patient and determining when to use a specific EEG-biofeedback protocol. The QEEG offers the hope of more strategic selection of specific training protocols, which should reduce the total duration of biofeedback training and improve the overall magnitude of symptom reduction.

EEG Biofeedback Is a Complementary Therapy. QEEG and, EEG Biofeedback are complementary to the Western Biomedical Paradigm. The scientific principles, technology and treatment protocols of EEG biofeedback derive from fundamental theories of cortical electrophysiology and neuroscience. As such, the theoretical bases of both QEEG and EEG biofeedback fall well within the paradigm of conventional Western biomedicine. Using accepted Western scientific methods, research in QEEG is gradually identifying cortical and sub-cortical patterns of dysregulation associated with many common disorders in psychiatry, neurology, and medicine in general.

While based on accepted Western biomedical theory, EEG biofeedback is outside of the domain of accepted biomedical practices, and therefore qualifies as a complementary therapy. By definition, complementary therapies are based on principles that are congruent with the core precepts of Western medicine, but are not yet accepted in mainstream medical practice because of ideological or institutional biases (Lake, 2003).

EEG biofeedback is an established complementary therapy in most Western countries, as it rests on accepted theories of brain function. EEG biofeedback seeks to strategically re-regulate cortical electrical activity in a manner not accomplished by existing conventional medical therapies. Perhaps the closest approximation to this approach to cortical re-regulation is the use of pharmacotherapy to modulate abnormal rhythms in epilepsy, or to enhance inhibition and attention in attention deficit-hyperactivity disorder. However, at its present level of evolution, pharmacotherapy is a crude method by comparison to EEG biofeedback, which is able to strategically target specific brain regions or frequency ranges for conditioning. When treated with anti-seizure medications, the epileptic brain shows progressively more abnormal electrical activity patterns over decades, whereas the brain treated by EEG biofeedback shows significant normalization in the course of treatment. Similarly, the ADHD child treated with stimulant medication will often show greater self-control and improved attention in school, yet often continues to display an abnormally elevated Theta to Beta ratio, one marker of an inattentive brain (Lubar, Swartwood, Swartwood, & Timmerman, 1995). Treating the same child using EEG biofeedback typically normalizes that ratio (Lubar, et al., 1995). In addition, the use of EEG biofeedback avoids the risks associated with adverse effects of many medications, resulting in frequent non-compliance during long-term medication treatment.

Evidence Based Evaluation of EEG Biofeedback Protocols. Many practitioners of neurofeedback argue that the “de facto” scientific validity of this method has been established by a series of studies demonstrating its efficacy in the treatment of attention deficit disorder, cognitive deficits following stroke, relapse prevention in alcoholism, improved functioning in chronic fatigue syndrome, and others. However, the uses and efficacy of neurofeedback continue to be disputed by many physicians. Because of this, the majority of EEG biofeedback practitioners are psychologists. In response to this concern, ISNR and AAPB created a joint task force in mid-2001 with the goals of developing standards of research methodology and establishing empirical evidence of treatment efficacy for EEG (and peripheral) biofeedback (Moss & Gunkelman, 2002). This work has led to the adoption of guidelines establishing five discrete levels of evidence (LaVaque et al., 2002). “Level 1” includes EEG biofeedback protocols that presently lack any empirical basis. “Level 5” protocols are those for which available evidence establishes both efficacy and specificity of a proposed treatment. Intermediate levels correspond to intermediate degrees of evidence.

Current Advances in Evidence-Based Biofeedback Practice. At the time of this writing, a new AAPB clinical efficacy book is in preparation. The new publication rates the efficacy and specificity of EEG biofeedback protocols for common neurological and psychiatric disorders, based on the efficacy guidelines discussed above (Yucha & Gilbert, in press for 2003). Adding to this effort, a joint AAPB/ISNR research task force is preparing a series of white papers based on exhaustive literature reviews. The White papers will include evidence-based recommendations for use of specific EEG biofeedback protocols in the management of specific disorders. The white papers, edited by Moss, LaVaque, and Hammond (in preparation), are scheduled for release starting in 2003. The AAPB guidelines and the forthcoming White Papers will significantly advance the field of EEG biofeedback by providing evidence-based tools to assist both health professionals and patients in identifying and selecting the most efficacious EEG biofeedback protocols for specific disorders..
Conclusion
Since the inception of EEG biofeedback, numerous specific EEG biofeedback treatment protocols have been developed. Prior to selecting an EEG biofeedback treatment protocol some neurotherapists perform an initial diagnostic QEEG map on every patient. Others select EEG biofeedback treatment methods strictly on the basis of the patient’s presenting complaints. The necessity for QEEG guided treatment in all cases remains controversial. However, the field seems to be slowly moving toward a standard of practice that will include QEEG brain mapping followed by the elaboration of a specific treatment protocol based on QEEG findings. The ideal approach to treatment planning in neurotherapy should entail use of QEEG mapping to correlate abnormal EEG findings with neurological or psychiatric symptoms and clinical history. This approach will lead to a rigorous evidence-based treatment plan that is customized for each patient and targets specific treatment goals of shifting dynamic pathological brain-wave activity toward normal functioning and amelioration of clinical symptoms.

Different “types” of abnormal electrophysiological brain activity have been treated using EEG biofeedback. These abnormal or pathological patterns include EEG inter-hemispheric asymmetries, relative “imbalance” between specific cortical brain regions in selected EEG frequency ranges, and “abnormal” (i.e., reduced or elevated) EEG frequency, amplitude or coherence measures corresponding to specific brain regions. Successful treatment requires a series of sessions, typically over a period of weeks or longer. It is common practice for therapists to combine other biofeedback modalities with neurobiofeedback in order to facilitate “re-conditioning” of the abnormal symptom pattern to a more adaptive level of functioning. Useful kinds of feedback correspond to different physiologic parameters that are associated with the “target” neurological or psychiatric symptom. Although few controlled studies support this view, many therapists believe that a combined feedback approach may facilitate more rapid “re-conditioning” of abnormal EEG states, and corresponding neurological or psychiatric symptom patterns, to more adaptive levels of functioning.

References

Continued on page 36
Abstract: A great deal of temporo-mandibular joint dysfunction and myofascial pain dysfunction is activated in relation to anxiety and fear responses to challenging tasks, self-criticism and daily hassles. AVE, like passive meditation, appears to effectively alleviate these symptoms.

Historical Background
The first few studies of visual entrainment (VE) involved a device called the Brain Wave Synchronizer. The seminal hypnosis study by Kroger and Schneider in 1959 prompted more research along hypnosis lines. Shortly thereafter VE was used as an analgesic for gastro-intestinal surgery, where it was found that over 90% of patients entered useable levels of trance induction prior to surgery (Sadove, 1961). The Sadove study caught the interest of the dental profession, which was awakening to the role of anxiety in temporo-mandibular joint (TMJ) and myofascial pain dysfunction during dental procedures.

Dental Studies
VE was shown to reliably “drive” dental patients into a hypnotic induction during dental work in a short period of time, if the VE frequency was set near the dominant natural alpha frequency of the patient (Margolis, 1966). Margolis placed the “synchronizer” near the patient during a dental procedure. He noted several positive effects.
1) VE reduced the amount of anesthetic used.
2) In some cases, hypno-anesthesia could be used exclusively.
3) Anesthesia could be terminated immediately following surgery.
4) VE produced no depressing physiologic side-effects.
5) VE made post-hypnotic anesthesia possible.
6) VE controlled gagging.
7) VE reduced fear and anxiety in the dental situation.

TMJ dysfunction is an affliction that affects many people. In order to understand the scope of the VE studies with TMJ, it is important to have a deeper understanding of TMJ dysfunction and myofascial pain dysfunction.

Theories of TMJ Dysfunction
Two theories exist to explain the origins of bruxism, TMJ dysfunction and myofascial pain dysfunction (MPD), a condition involving severe pain in facial regions. The tooth-muscle theory ascertains that disharmony in occlusion produces altered proprioceptive information that activates the occlusal pattern generator which activates the masticatory (jaw-closing) muscles, which in turn grind down the dentition until a satisfactory occlusion is reached (Manns, et.al., 1981, Moulton, 1966, Laskin, 1969). Certainly, many people can recall a time when a poorly made dental filling or orthotic has activated this response, quickly resulting in jaw tension and pain.

The psychophyslogic theory implies that emotional factors such as stress and anxiety manifest in increased muscle tension (Manns, et.al., 1981, Laskin, 1969, & Moulton 1966) and increased perception of pain (Christensen, 1981). It has also been shown that all people show high levels of masseter tension during initial exposures to a stimulus-response task (Yemm, 1971). Further, it has been shown that masseter muscle activity increases during challenging tasks, primarily when the subjects made errors (Yemm, 1969). The Yemm study implies a direct relationship between self-critical thoughts and tension. Controls show a trend towards relaxation with repeated exposures to the task, whereas those suffering with TMJ dysfunction show an initial relaxation phase during the first few exposures followed by a marked increase in masseter muscle tension with repeated exposures to stimulus-response tasks. This performance anxiety was termed TMJ personality by Yemm. Anxiety and stress, and the consequent impact on trait arousal are a major part of a variety of dental disorders (Spielberger, et.al.1970, Rugh & Solberg, 1975, Yemm, 1971, Weinstein, et. al., 1971). Some additional disorders relating to stress are gingivitis, osteoporosis of the alveolar bone in animals, alterations in the chemical composition of saliva, and ulcerative oral lesions in dogs (Giddon, 1966). A further investigation of subjects with gingivitis revealed reduced salivary output, increased gingival arterial dilation and increased sublingual temperature in response to stress.

Rugh and Solberg devised a study where the participants used a small data-logging EMG on the masseter to measure nighttime or nocturnal bruxism. Hard clenches activated the recorder. This device could log several days worth of data, which was displayed as the amount of time of bruxing, in brux seconds/hour. Figure 1 shows a typical example of the relationship between life stressors and jaw tension, in this case, in a young lady.

When experienced Transcendental Meditators were exposed to photic stimula-
tion near natural alpha frequencies, they reported subjective experiences similar to their usual experience during meditation (Williams & West, 1975). A comparison of various strategies aimed at reducing trait anxiety have shown that passive meditation techniques such as TM are considerably more effective than other strategies such as progressive relaxation or concentration meditation (Eppeley & Abrams, 1989). This connection between the ability to entrain a brain wave pattern similar to that of meditators, combined with the subjective meditative experience of AVE, and the fact that meditation produces a pronounced reduction in trait anxiety, may explain why AVE produces such striking reductions in anxiety as measured in AVE studies. The next study demonstrates this point.

Audio entrainment (AE) has shown promise as a singular therapeutic modality for treating tension and pain (Manns, Miralles, & Adrian, 1981). In this study, people suffering with myofascial pain and TMJ dysfunction were split into two groups — group A, those with symptoms for less than one year (n=14), and group B, those with symptoms for longer than one year (n=19). They received 15 minute sessions of auditory entrainment (AE) consisting of isochronic, pure (evenly pulsed sine wave) tones, followed by 15 minutes of EMG feedback and concluding with 15 minutes of AE and EMG feedback combined, for an average of 14 sessions. The study clearly shows greater reductions in EMG activity during AE. Table 1 shows the reduction in MPD/TMJ symptoms following treatment.

A study involving 10 people (Figure 2) with long histories of TMJ dysfunction was conducted to see whether they would relax to a guided imagery exercise. Just prior to the guided imagery, they were given the suggestion of entering deep relaxation by the end of the guided imagery (Thomas & Siever, 1988). With this expectation in mind, all of the subjects showed bracing or dysponesis as indicated by a drop in hand temperature and a short fall in masseter muscle (EMG) tension followed by a considerable increase in tension until the “relaxing” guided imagery ended (at which time they did begin to relax moderately).

Interestingly, all members subjectively reported feeling very relaxed, even though they all had tensed up somewhat. The group then underwent 10 minutes of 10 Hz AVE from a DAVID1 system. Within five minutes masseter muscle tension became very relaxed and hand temperature increased, signs of sympathetic deactivation and parasympathetic activation — the meditation response.

Dental patients often suffer anxiety before and during dental appointments (Lazarus, 1966, Dewitt, 1966, Corah & Pantera, 1968). Of all the dental procedures, root canal (endodontic) therapy is the most feared (Morse 1993). Audio-analgesia using white noise and/or music (as produced by a commercially marketed unit) has been shown to effectively increase pain threshold and pain tolerance during a dental procedure (Gardner & Licklider, 1959; Gardner, Licklider, & Weisz, 1960; Schermer, 1960; Monsey, 1960; Sidney, 1962; Morosko & Simmons, 1966). A study implementing AVE to reduce dental anxiety is described in the next section.

### Table 1 TMJ Symptoms Following Audio Entrainment and EMG Feedback

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Group A (n=14)</th>
<th>Group B (n=19)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre Tx Post Tx</td>
<td>Pre Tx Post Tx</td>
</tr>
<tr>
<td>Bruxism</td>
<td>100 7</td>
<td>100 32</td>
</tr>
<tr>
<td>Emotional tension</td>
<td>100 14</td>
<td>100 21</td>
</tr>
<tr>
<td>Muscle fatigue</td>
<td>93 0</td>
<td>74 21</td>
</tr>
<tr>
<td>Insomnia</td>
<td>57 0</td>
<td>53 0</td>
</tr>
<tr>
<td>Dizziness</td>
<td>21 0</td>
<td>53 0</td>
</tr>
<tr>
<td>Headache</td>
<td>93 0</td>
<td>74 0</td>
</tr>
<tr>
<td>TMJ Pain</td>
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<td>47 0</td>
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<tr>
<td>Masticatory muscle pain</td>
<td>71 0</td>
<td>58 9</td>
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<tr>
<td>Neck muscle pain</td>
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<td>79 26</td>
</tr>
<tr>
<td>Otalgia</td>
<td>79 9</td>
<td>32 17</td>
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<tr>
<td>Mastoid process pain</td>
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<td>16 0</td>
</tr>
<tr>
<td>Articular clicking</td>
<td>50 29</td>
<td>68 54</td>
</tr>
<tr>
<td>Mandibular deviation</td>
<td>79 36</td>
<td>84 56</td>
</tr>
<tr>
<td>Restricted opening</td>
<td>43 0</td>
<td>16 0</td>
</tr>
</tbody>
</table>

### Figure 1 Stressful Life Events and Nocturnal Bruxism

### Figure 2 Masseter Muscle Tension and Hand Temperature during a Guided Imagery and AVE
anxiety during a root-canal procedure has also shown promising results (Morse 1993). This study involved three groups of 10 subjects. The groups consisted of a group receiving 10 Hz AVE, a group receiving 10 Hz AVE plus an alpha relaxation tape (developed by Shealy) simultaneously, and a control group (Figure 3). The study confirmed that the part of a root-canal procedure that produces the greatest anxiety is the Novocaine™ injection, pushing average heart rate up to 107 bpm. The group using AVE had an average heart rate of 93 bpm, while the group that was further dissociated (AVE and music), had an average heart rate of 84 bpm.

AVE may settle down jaw tension through muscle spindle de-activation (Siever, 1992). Muscle spindles regulate body tone and posture as well as facilitate the myotatic reflex (McClintic, 1978). They are fibers that are directly attached to either the muscle fibers (extrafusal fibers) or to the filaments of tendons. As shown in Figure 4, the spindle consists of two parts, the nuclear chain fiber and the nuclear-bag fiber. Spiral sensory endings called afferent neurons wrap around the central portion of both fibers. The fibers receive gamma efferent neurons. These serve to set the “tone” or sensitivity of the spindle.

The spindle responds when it is stretched, by sending off a stream of pulses. As shown in Figure 5, the primary endings alert the nervous system that a stretch is occurring, whereas the secondary endings indicate a fair approximation of actual amount or objective measure of stretch of the muscle (Bradley, 1981).

This has important implications in dentistry. When the mouth is opened wide for dental work, the spindles within the masticatory or jaw-closing muscles stretch, sending output down the afferent fibers, which synapse with the alpha motor neuron of the muscle. Thus the muscle tightens up and attempts to return to its original length (Bradley, 1981). Therefore, the jaw muscles become very tight on wide openings. This in turns loads the temporo-mandibular joint and can damage the cartilage, or interarticular disc in the joint and cause TMJ dysfunction. To make matters worse from a dental perspective, the gamma efferent fibers receive input from the basal ganglia. The basal ganglia are a set of structures that surround the limbic system. They are involved with integrating feelings, thoughts and movement and help to smooth motor behavior. The basal ganglia regulate the body’s “idle speed”, affecting anxiety level (Amen, 1998, p. 43).

So how does this all tie together? When we are relaxed we have a small space of 1 – 3 mm between our teeth when we are sitting or standing. When we get anxious or scared, the basal ganglia sends output to the gamma efferent neurons, which in turn make the spindle “hyper-sensitive.” A hyper-sensitive spindle behaves as if the spindle is stretched, and before we realize it, we are clenching our teeth (watch the coaches and general managers during sporting events. Not only are they often clenching, but they have large, well developed masseter muscles seen as large lumps on the sides of their face). The basal ganglia / spindle mechanism causes severe jaw tension in patients who are scared when visiting a dentist, which in turn can damage the temporo-mandibular joint, leading to a lifetime of jaw and facial pain.

Now here’s the critical study. In this simple jaw-open study, six participants were...
asked to open their mouth near maximal openings to activate muscle spindles within the masseter muscle. The participants indicated that they had no reasons to be anxious during this study, so activation of the basal ganglia should not have been a confounding factor. The participants served as their own controls. EMG activity involving primarily fast-twitch muscle (100-300 Hz), and TMJ symptoms such as muscle soreness, stiffness of jaw and TMJ clicking sounds, was collected on the left masseter muscle during wide opening on both trials. The following day, the exercise was repeated during 10 Hz AVE from a DAVID Paradise. The results show a marked reduction in muscle tension and symptoms of TMJ dysfunction in the AVE trial. Figure 6 shows the EMG results of the study.

Conclusion

A great deal of TMJ and MPD symptoms are directly related to stress, fear and anxiety. Both meditation and AVE have been shown to effectively reduce these symptoms. Furthermore, AVE may also de-activate muscle spindle tone and the resulting muscle tension through two processes: 1) calming related basal ganglia activity, and 2) de-activating the reflex loop that controls muscle tone in relation to muscle stretch.

References


Shoulder SEMG Testing and Biofeedback / Re-education: A Segmental Motion and Regional Approach

Gabriel E. Sella, MD, MPH, MSc, Morgantown, WV.

Abstract: This article presents an overview of 17 shoulder muscles tested with dynamic SEMG protocols from the point of view of regional balances. The shoulder may be divided into four regional parts. Those components are compared in terms of overall SEMG activity potentials through six segments of motion. Inferences for SEMG investigation and a new outlook for muscular re-education/biofeedback are presented.

Introduction

Traditionally, surface EMG (SEMG) biofeedback has focused on individual muscles and not on myotatic units. Thus, the biofeedback practitioner is used to focusing on the re-education of one muscle at a time and is not used to viewing a muscle as a component of a larger, myotatic group or vector. In reality, muscles do not function singly but as components of myotatic groups and vectors. Practitioners should strive to recognize this reality and use it to the best of their ability during the processes of SEMG investigation and biofeedback and within the strengths and limitations of the SEMG dynamic methodology. The present article aims to illustrate the point of recognizing one joint and the muscles sub-tending it as a unit of concerted action, thus allowing the SEMG biofeedback practitioner to utilize this knowledge within the rehabilitation and ergonomic perspectives.

The shoulder is the joint described in this article. SEMG studies have been conducted on 551 shoulder muscles through the range of motion segments of abduction, flexion (anterior & lateral), extension (posterior), and external and internal rotation. The muscles tested were sub-divided by anatomical regions for the purpose of the illustration. The anterior shoulder group includes the anterior deltoid, pectoralis major & minor. The lateral shoulder group includes the middle deltoid. The superior shoulder group includes the upper trapezius, supraspinatus and levator scapulae. The posterior shoulder group includes the infraspinatus, latissimus dorsi, teres major & minor, serratus anterior, middle trapezius, lower trapezius, rhomboid major & minor.

This classification has minor limitations. However, the overall aim is to illustrate the point that SEMG investigation of the different regional shoulder groups can lead to an overall conclusion of equilibrium and stabilization of the shoulder, facts which can help in the biofeedback process and in the ergonomic endeavor. An understanding of the different vectors of forces is based on the general anatomic localization of the shoulder muscles described above. This presentation is paramount to the understanding of functional factors such as fatigue, related to repeated motion. Clinical problems such as repetitive motion injury on one hand and ergonomic factors of optimizing shoulder related activities may find better solutions by utilizing the presented data. Ideally, such motions should be performed at the level of least effort and fatigue. Workers or army personnel can also use the data presented in this article in terms of optimization of shoulder motion in athletic endeavors and other activities.

Materials and Methods

551 muscles were tested with SEMG dynamic protocols involving the following shoulder segmental motions: anterior flexion, abduction, external rotation, internal rotation, lateral flexion and posterior flexion. The degrees of motion were complete for the individuals tested and are documented in the peer-reviewed literature (Gerhardt & Sella, 2002; Cocchiarella & Anderson, 2001). The muscles were tested at the minimal level of effort of movement or contraction. Thus, the data below refer only to the activity potentials elicited from a minimal effort of contraction with or against gravity, while the individuals tested were in the standing position. The testing was performed with Myovision 3000 equipment according to established and published protocols (Sella, 1998a; Sella, 1998b; Sella, 2002). The complete statistics obtained from the study are published elsewhere (Sella, 2003). The data cited in the present article are modified from the original data. Testing was done through the shoulder ROM segmental activities and rest (Sella, 1998a, 1998b, 2000, 2002). The data refer only to activity potentials measured in µV RMS. The tables below refer to anatomical analysis of the muscular activity derived from the SEMG dynamic shoulder protocol. The shoulder region has been divided among the anterior, lateral, superior and posterior aspects.
**Results**

Seventeen discrete shoulder muscles were tested with SEMG through six shoulder ROM segments.

The results are documented in the six tables below. Table I represents the data of the average potentials of 118 anterior shoulder muscles.

Table II represents the data of the average potentials of 138 superior shoulder muscles.

Table III represents the data of the average potentials of 55 lateral shoulder muscles.

Tables IV A & B represent the data of the average potentials of 240 posterior shoulder muscles.

Table V represents a ranking (from high to low) of the SEMG activity potentials averaged from the different segmental shoulder motions tested for the 551 muscles described in the tables above.

Table VI represents a ranking (from high to low) of the SEMG average activity potentials of the four anatomic shoulder regions tested.

**Discussion**

Tables I to IV show that each individual muscle tested with SEMG through the shoulder segmental motions above has its own activity amplitude level. In terms of overall ranking, the middle deltoid muscle (lateral shoulder region) shows the highest activity potentials, while the teres minor (posterior shoulder region) shows the least level of activity. Ergonomic considerations would point to the fact that the middle deltoid would be expected to fatigue earlier than other muscles since it is the “lone ranger” in terms of being the only muscle of its shoulder region. In rehabilitation terms,
Table IV B: Shoulder Posterior Muscle Groups SEMG Segmental Motions Group Sum & Average Activity Potentials (µV RMS)

<table>
<thead>
<tr>
<th>Muscle Number</th>
<th>N=17</th>
<th>N=15</th>
<th>N=15</th>
<th>N=15</th>
<th>N=15</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROM Serratus Anterior</td>
<td>1.37 ± 5.8</td>
<td>13.7 ± 6.6</td>
<td>18.4 ± 9</td>
<td>14.3 ± 6.6</td>
<td>17.2 ± 8.6</td>
</tr>
<tr>
<td>Abduction</td>
<td>12.1 ± 4.8</td>
<td>26.02 ± 15.1</td>
<td>28.8 ± 14</td>
<td>26 ± 11.3</td>
<td>28.5 ± 13.2</td>
</tr>
<tr>
<td>External Rotation</td>
<td>10.8 ± 4</td>
<td>40.42 ± 23</td>
<td>32.2 ± 15.6</td>
<td>29.3 ± 16.7</td>
<td>29.1 ± 12.8</td>
</tr>
<tr>
<td>Internal Rotation</td>
<td>5.2 ± 2.3</td>
<td>32.3 ± 18.7</td>
<td>9.2 ± 4.4</td>
<td>18.7 ± 11.9</td>
<td>13.1 ± 6.2</td>
</tr>
<tr>
<td>Lateral Flexion</td>
<td>10.5 ± 4</td>
<td>31.3 ± 11.4</td>
<td>17.5 ± 7.5</td>
<td>22.1 ± 11.5</td>
<td>19.8 ± 9.9</td>
</tr>
<tr>
<td>Posterior Flexion</td>
<td>15.2 ± 13.2</td>
<td>20.8 ± 8.3</td>
<td>11.6 ± 9.2</td>
<td>17.3 ± 8.5</td>
<td>16.2 ± 7.6</td>
</tr>
<tr>
<td>Sum</td>
<td>67.5 ± 34.1</td>
<td>164.4 ± 83.1</td>
<td>118.6 ± 59.7</td>
<td>127.6 ± 66.5</td>
<td>123.9 ± 58.2</td>
</tr>
<tr>
<td>Avg.</td>
<td>11.3 ± 5.7</td>
<td>27.4 ± 13.8</td>
<td>19.8 ± 10</td>
<td>21.3 ± 11.1</td>
<td>20.7 ± 9.7</td>
</tr>
</tbody>
</table>

Group Sum 534.63 ± 215.87 Group Avg. 133.66 ± 53.97

Table V: Shoulder Muscle Groups Ranking by SEMG Segmental Motions Sum Total Activity Potentials (µV RMS)

<table>
<thead>
<tr>
<th>Shoulder Group</th>
<th>Lateral (I)</th>
<th>Superior (II)</th>
<th>Posterior (III)</th>
<th>Anterior (IV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N muscles in group</td>
<td>1</td>
<td>3</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Sum ± SD</td>
<td>206.3 ± 155</td>
<td>438.6 ± 345.4</td>
<td>1069.6 ± 345.02</td>
<td>316.9 ± 197.6</td>
</tr>
<tr>
<td>Avg. ± SD</td>
<td>206.5 ± 155</td>
<td>146.2 ± 113.1</td>
<td>107.6 ± 34.5</td>
<td>103.6 ± 65.9</td>
</tr>
</tbody>
</table>

Table VI: Shoulder Muscle Groups Ranking by SEMG ROM Average of Activity Potentials (µV RMS)

the superior shoulder region is the one most frequently associated with pain and dysfunction such as in myofascial trigger point pain syndromes and in rotator cuff injuries (Travell, 1983; Sella & Finn, 2001; Sunderland, 1991).

The clinician involved in SEMG biofeedback of the shoulder muscles may utilize the above data (and the more comprehensive data found in Sella, 2000a, 2002, 2003) in order to design individual surface EMG treatment plans. Thus, logic and common sense direct the biofeedback practitioner to treat in a ranking pattern following the principle of “least resistance.” In quantitative terms, the practitioner may want to utilize the data described above by choosing the “easiest” muscle to work with first. In other words, the practitioner would choose first the muscle that expends the least energy and start the neuromuscular reeducation in the segmental motion that has shown the least electrical amplitude of contractions. When working with the anterior shoulder group muscles, one would choose pectoralis major to start with and would start the biofeedback process in the lateral flexion segment of motion. The anterior flexion motion shows the highest electric potentials of effort, thus, it would be chosen last, after the pectoralis major has been well trained in the art of biofeedback performance of activity and rest. Within the same group, the next muscle in sequence of least amplitude of contraction would be pectoralis minor. One would also start the reeducation process in the lateral flexion motion and end it in the anterior flexion segment of motion.

Within the framework of segments of motion for all the muscles tested, the data from Table V show that external rotation requires the greatest energy of activity and internal rotation requires the least. Thus, the biofeedback practitioner, be it in the rehabilitation field or in the ergonomic field, would be well advised to start the biofeedback program in internal rotation and move through the progression of anterior flexion, posterior flexion, lateral flexion, abduction and external rotation. From an ergonomic standpoint, the data shown in Table V point clearly to the fact that since the greatest effort is required in external rotation, any machinery or equipment should be built such that it requires that particular motion for the least amount of time in the course of any vocation. The data in Table VI point to the fact that the average activity of the anterior shoulder region is the lowest. Most human shoulder motions are really performed most frequently within the anterior functional quadrant. If one adds up all the data of the anterior, superior and lateral regions sum total of amplitude potentials, one finds 962 µV RMS for the segments of motion described above. Those numbers are more than balanced by the sum total of amplitude potentials of the posterior shoulder region (1070 µV RMS). Thus, one can conclude that since most shoulder motions occur in the anterior, superior and lateral regions, the posterior shoulder muscles perform not only an active role but also a sustaining role in terms of equilibrium of overall activity.

The strength of this study lies in the fact that the data of 551 muscles now exist which makes it possible to draw a number of functional inferences not only in terms of SEMG dynamic protocol investigations, but also in terms of the muscular reeducation process with SEMG biofeedback. Furthermore, the data presented can help infer the preferential sequence of testing and reeducating muscles in terms of the
segmental motions of the shoulder. The biofeedback practitioner should choose the sequence leading from the motion requiring least effort and move slowly up in terms of the different motions requiring more muscular effort. Finally, the SEMG practitioner may decide which anatomic region of the shoulder one would work with in terms of either the SEMG investigation or the neuromuscular reeducation. It is highly likely that different levels of shoulder muscle effort are required for different vocations. Thus, the data presented in this article can serve as both a means of comparison as well as a goal in terms of the final levels of activity amplitudes at minimal effort of contraction.

The limitations of this study involve the following: Some shoulder region muscles are not amenable to SEMG testing. These include coracobrachialis and subscapularis. It would be useful to repeat the study at different levels of effort. These should include testing with different weights/resistances attached to the wrist. Thus, the equilibrium tendency between the posterior shoulder region muscles and the other regions may change with different levels of resistance. Finally, the testing would need to be done in different ergonomic or athletic conditions in order to assess the changes in the effort level required by different muscles, different shoulder regions or different shoulder motions.

Finally, the segmental motion of adduction was excluded from this study. Results of muscular effort involving this motion may change to a limited extent the overall pattern of effort and regional equilibrium.

**Conclusions**

An SEMG dynamic study of 551 muscles was performed for the purpose of assessing the different levels of effort and patterns of electrical activity through six shoulder segmental motions. The results allow for constraining data referring to different segmental motions and muscular anatomic regions of the shoulder joint. The SEMG activity potentials averages and summations of the shoulder muscles and motions allow clinical and ergonomic inferences both in the investigative realm and in the biofeedback/muscular reeducation field.

**References**


**QEEG and EEG Biofeedback**

continued from page 28


**Notes**

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David Siever graduated in 1978 as an engineering technologist. He later worked in the Faculty of Dentistry at the University of Alberta designing TMJ Dysfunction related diagnostic equipment and research facilities. He organized research projects, and taught basic physiology and a TMJ diagnostics course. Dave observed anxiety issues in many patients suffering with TMJ dysfunction, prompting him to learn and practice biofeedback and design biofeedback devices. In 1984, Dave designed his first audio-visual entrainment (AVE) device—the DAVID1. Since then he has researched and refined AVE technology, specifically for use in relaxation, and treating anxiety, depression, PMS, ADD, FMS, SAD, hypertension and insomnia. He presents AVE technology applications regularly at conferences and for special interest groups.

Sebastian “Seb” Striefel, PhD, became a Professor Emeritus in the Department of Psychology at Utah State University in September 2000. For twenty six years he taught graduate level courses in ethics and professional conduct, clinical applications of biofeedback, clinical applications of relaxation training and behavior therapy. He was also the Director of the Division of Services at the Center for Persons with Disabilities at Utah State University. In that role he managed a variety of programs, including an outpatient clinic, a biofeedback lab and an early intervention program. He is a past president of the Association for Applied Psychophysiology and Biofeedback (AAPB), past president of the Neurofeedback Division of AAPB and regularly writes an ongoing ethics column and conducts workshops on ethics, standards, and professional conduct.

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3. Failing to follow your own policies and procedures even when your actions fall within the standard of care.
4. Treating a client improperly. Never let the client feel like his or her opinion is unimportant or insignificant.
5. Speaking in a superior manner to a client using terminology he or she may not understand.
6. Refusing to treat a client because of his/her condition.
7. Telling a client that a co-worker made the error that caused the client’s problem.
8. Failing to obtain informed consent from the client.
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10. Speaking in reference to a client’s confidential information in an environment where unsuspecting family members or others may overhear the content of the information.

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"Let’s Start An Epidemic!"
Lynda Kirk, MA, LPC, BCIA-C, QEEGT

As I glanced at the cover of the August 4th issue of *Time* magazine, the word MEDITATION jumped out at me. “Wow”, I thought, “Meditation made the cover of *Time*.” On the cover was a blissful-looking photo of actress Heather Graham meditating. The cover’s big headline was *The Science of Meditation*. The byline read: New Age mumbo jumbo? Not for millions of Americans who meditate for health and well-being.

It’s time for Biofeedback to become a household word. It’s time (or should I say *Time*) for Biofeedback to change from being in the shadows and mostly misunderstood to becoming a familiar friend. After all, we’re coming up on our 35th Anniversary. It’s time for a change.

But how do we get from mostly misunderstood to the cover of *Time*? I suggest we borrow from the ideas of Malcolm Gladwell in his recent book, *The Tipping Point* (Little, Brown and Company, 2000). In Gladwell’s book, the word “Tipping Point” comes from the science of epidemiology. It’s the name given to that moment in an epidemic when a communicable agent reaches critical mass. It’s the boiling point, that moment on the graph when the line starts to shoot straight upwards. Gladwell applies what is known about epidemiology to non-medical contexts. He argues that ideas, behavior, messages and products sometimes behave just like outbreaks of communicable disease.

To understand how these “social epidemics” happen requires that we throw out our old beliefs about how change comes about. Gladwell says that we human beings expect everyday change to happen slowly and steadily. But, he emphasizes, we need to be open to a new understanding that social epidemics can happen quickly and that even the smallest change – like one child with something as communicable as chickenpox in a kindergarten class – can get them started. Things can happen almost all at once, and little changes can make a huge difference in reaching the tipping point.

So how does this new understanding help us get to the cover of *Time*? For one thing, it emphasizes the importance of little changes. Most of us think that the little things we do won’t really make much of a dent in the status quo. But if we want to get the word out about the often profound and sometimes miraculous differences that we and our biofeedback technology can make in the lives of the people we touch, we each need to be agents of change, no matter how small. We each need to be the contagious kid in the kindergarten class who starts the epidemic.

And what are we “infected” with that’s communicable? What is it that we want to spread? How about *ease* instead of *dis-ease*? How about *increased immunity* instead of *vulnerability*? How about *wellness* instead of *illness*? How about *self-regulation* instead of *dysregulation*? How about *eustress* instead of *distress*? How about *peak performance* instead of *routine performance*? How about *optimal function* instead of *dysfunction*? Like infectious optimism and infectious laughter, we can spread infectious information about the powerful effects of our technologies of transformation.

We Biofeedback practitioners have been too long in the shadows. All of us need to take every opportunity to bring Biofeedback out into the sun. Every time a local TV station runs a story, every time a newspaper prints something relevant, we need to respond. And if we ask, we can get many of our clients and patients to respond too, both locally and nationally.

I’ll share with you one example of a small personal change that I made last week. A member of AAPB’s Marketing Task Force emailed me and asked if I had seen the televised segment about ADHD on CNN’s “Housecall.” The show was primarily slanted toward medication as the answer for ADHD and made no mention of EEG...
We are about to have a Birthday. AAPB will celebrate its 35th birthday at our Meeting in Colorado Springs on April 1-4, 2004. Somehow it is fitting that we will be in Colorado Springs, home of many past and memorable AAPB meetings. Alas we won’t be at the Broadmoor but those of you who want a taste of that venerable hotel can take a short drive and walk around the stately grounds or have dinner there or hoist a yard long beer at the Golden Bee. There’s a bridge across the lake now but other than that, the memories abound.

Older usually comes with wiser and with more respect for the elderly. Without question I think we are wiser and we’ve learned a lot. We make fewer assumptions and we have a sense of our worth. Respect is another thing—we still are told that biofeedback is experimental and the reimbursement problems have not gone away.

Progress has been made and we should recognize the many achievements and accomplishments made by individual members and the organization. Too often we focus on the negatives and forget the positives. So thanks to all of you who have kept AAPB in the forefront and to those of who have supported AAPB through the years by continuing your membership and your volunteer efforts.

As to the future—we have a few challenges ahead of us and one, I believe, is to revisit and possibly redefine our identity. For years we were a bit of a renegade in the healthcare world, sort of forging upstream and laying a path for others to follow. I submit that biofeedback, while not a household word, is relatively mainstream now. It is still within the defined role of “alternative and complementary”. It is the oldest and most well established of that family of therapies. We should use this fact to our advantage.

Interestingly the other half of our name has not fared so well. Applied Psychophysiology is not a household word. A name denotes meaning and while none of us question the term biofeedback, the AP part lacks definition in the eyes of users. In other words, while it might have meaning to us, it does not have consumer identity. In this world, consumer identity is critical. If we want consumers to identify with AAPB we need a name they can identify with.

Some of you may not realize that we have changed names a few times evolving historically from the Biofeedback Research Society to the Biofeedback Society of America to AAPB. There is a lot of history in those transitions. In the first change we dropped the word Research and added a statement of geography. In the second we tried to encompass a wider range of application and indeed, applied psychophysiology is likely a more exact and appropriate name for what we do (it is just that nobody understands it). But note we did not drop the word biofeedback.

Try saying Association for Applied Psychophysiology and Biofeedback three times fast. Try saying it once.

The emerging term is mind-body, a name that seems to better encompass what we are about. Maybe it is time to revisit and incorporate that wording. Now there’s a vision for the next 35 years.

Call for Nominations for 2004 Board Positions

The AAPB Nominations Committee has the responsibility for presenting a slate of individuals to serve as officers and board members. The Nominating Committee seeks your suggestions for the following positions: President-Elect, Treasurer and two openings on the Board of Directors. Board positions are for a term of three years.

Criteria for board positions include: current membership in AAPB; committee, chapter or section service; contributions to biofeedback and the field; and past association governance experience. Board members are required to attend two meetings per year, and abide by AAPB ethical principles, including signing a conflict of interest statement.

In the event that an individual’s name is not on the official ballot, AAPB has a mechanism whereby a member, by using a petition process, may have his/her name placed on the ballot in addition to the Nominating Committee’s slate. Members who wish to use the petition process to place their name on the ballot must use the official petition form, available from the AAPB office. Only the official form will be accepted by the Nominating Committee. Deadline for submission of petitions to the Nominating Committee is November 1, 2003.
FROM THE PRESIDENT-ELECT

A Cautionary Note

Steve Baskin, Ph.D

I am pleased to see this edition of Biofeedback devoted to applications involving Complementary and Alternative or Integrative Medicine. I believe that biofeedback is the original CAM therapy, so original that many health care professionals consider it mainstream now. Biofeedback and self-regulation therapies help mobilize “natural” resources to better control our internal milieu. Our clients learn voluntary control by getting information “fed back” about biologic processes that are normally beyond their awareness and control to help return to homeostasis or increase performance. In my practice, over the years, I’ve worked to enhance individuals ability to self-regulate; giving them a better sense of control over their internal and external environments.

I was drawn to biofeedback and behavioral medicine because I thought that the interplay between biologic processes and behavioral, cognitive, and emotional factors was an exciting development. The concept of locus of control from social learning theory seemed beautifully tailored for this new field. Individuals with an internal locus of control have the perception that life-events and circumstances, including their health, are the results of ones own actions while externals believe that these same events are beyond ones own control relying on fate, chance, or other people. Many interventions that blossomed in the biofeedback/behavioral medicine/health psychology world gave clients and patients more control as they addressed their health issues.

Many of the chronic headache sufferers I’ve treated over the years have endured sinus and TMJ surgeries, invasive nerve blocks, IV antibiotics, lumbar punctures, and numerous MRI and CT scans to get that magical diagnosis or treatment that would make them “all better.” Many in their search for a “cure” became analgesic over-users, obese, out of shape, helpless and mostly frustrated. No doctor could “fix” them. There was rarely a single “magic pill.” They often improved when they began setting realistic goals, became an active participant in their care, began “undoing” mal-adaptive behaviors that maintained their headaches, and maximized their abilities to self-regulate. They improved when they changed from embracing a disease model to a coping skills model.

Recently I’ve noticed a subset of patients taking numerous vitamins, minerals, and herbs (“everything I take is organic”) as well as being massaged, manipulated, energized, and balanced. Many are looking for that new age “magic pill.” They seem to believe that this is the alternative medicine that they’ve been reading about. The hospital where I’m on the staff decided to develop an integrative medicine program. The pharmacist has put in the most time trying to make sense out of the myriad of drug-drug interactions that some of these “organic” substances have precipitated. Some aspects of this new program are gaining hospital acceptance. We have a relaxation program for kids having elective surgery. The children respond, feel less afraid and more in control, require less pain medication, and have better outcomes. Sounds like a self-regulation coping skills model to me. What is most interesting to me is that most initial successes in this new program are in approaches that have fostered self-regulation and actual behavior change outside the treatment session. The “quick fix”, either traditional or alternative, hasn’t worked well with people with chronic health concerns.

My point in all this is that biofeedback and applied psychophysiology are the heart and soul of mind-body medicine. There is nothing alternative about it. Of course, we need to investigate scientifically the plethora of “alternative” medicine treatments that are emerging. Many therapies outside the traditional standards of care are showing great promise. However, we need to move away from a culture that guides people to take a statin, magnesium, niacin, three Chinese herbs, Viagra ™, and spa treatments yet remain overweight and sedentary while eating a big steak daily (“I’m on the Atkins diet.”) So I advise a cautionary note. Let’s help shape CAM/Integrative Medicine by gathering data and measuring outcome, and using our knowledge of self-regulation and behavior change to develop this field. I believe that the papers in this special issue are doing just that, “integrating” CAM with a self-regulation model.

Award Nominations Invited

The AAPB membership is encouraged to submit nominations for the AAPB Distinguished Scientist Award and the Sheila Adler Distinguished Service Award. These awards recognize outstanding contributions to research in applied psychophysiology and biofeedback and service and by a biofeedback professional.

Nominating letters should include the name and address of the nominee(s), name and address of the nominator and a brief statement describing why the person is being nominated for the award. Letters should be addressed to the Awards Committee, and received at the offices of AAPB no later than November 15, 2003.

The awards will be presented at the 2004 Annual Meeting.
biofeedback (neurofeedback). So I shot off an email to CNN and included Dr. Vince Monastra's study on EEG Biofeedback and ADHD that appeared in the December 2002 AAPB Journal. (My email to CNN is at the end of this article for those interested in what I sent).

I wonder what might have happened if CNN had received letters, emails and calls from EEG biofeedback practitioners and their clients and patients from all over the country after their show. I think we would have moved closer to the tipping point. Together we can do it. The key words are “DO IT.” Let’s start an epidemic. Now.

Dear CNN Housecall Crew,

Thank you so much for featuring the important problem of Adult ADD today. I would like to bring to your attention a non-drug alternative to the treatment of ADD/ADHD. This treatment, EEG biofeedback, is equally successful with both adults and children.

An example study in the peer-reviewed journal Applied Psychophysiology and Biofeedback was recently featured in Reuters Health. I have copied it for you below. There are other studies but in the interest of time and space, I have included only the one below.

Perhaps your viewers would like to know that there is an effective, non-drug alternative for adults and children with ADHD. May I also suggest that this non-drug alternative would make an interesting and informative public interest story?

Please feel free to contact me or AAPB if we can be of help to you with more information, more studies, etc.

Best regards,

Lynda Kirk, MA, LPC, BCIA-C
President – Association of Applied Psychophysiology and Biofeedback

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We Encourage Submissions

Send chapter meeting announcements, section and division meeting reports, and any non-commercial information regarding meetings, presentations or publications which may be of interest to AAPB members. Articles should generally not exceed 750 words. Remember to send information on dated events well in advance (we may be able to publicize your event more than once if you get your calendar to us early enough).

Send Word (.doc) or text files by e-mail to the News and Events Editor: Ted LaVaque, PhD
tlavaque@gbonline.com.

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Association of Applied Physiology and Biofeedback Cooperates in New Membership Benefit Promoting Biofeedback Specialists

- AAPB has joined with American WholeHealth (AWH) in a program to promote BCIA Certified Biofeedback practitioners to members of associations and health plans.
- AARP, a nonprofit, nonpartisan membership organization for people 50 and better, has selected American WholeHealth to be the exclusive provider for the AARP Alternative Health and Wellness Network. For AARP members the program provides excellent access to quality practitioners and wellness facilities at a discounted rate.
- Based on industry and public surveys, people 50+, who control 50% of US discretionary income, are increasingly seeking alternatives to maintain and promote health and fitness.
- By joining the AWH Platinum Participating Practitioner program and paying an annual member fee, BCIA certified practitioners receive multiple direct to member program promotions and exposure on AARP’s web site to over 35 million AARP members.
- In addition the program offers a listing on the award-winning AHW consumer website, WholeHealthMD.com, plus exposure to an additional 20+ national and regional corporate clients of AWH, who direct their cash–paying members to the AHW network for services not covered by conventional health insurance.
- The initial annual fee of $125 for the Platinum Participating Practitioner program includes other membership benefits (website building software, discounts on publications, practice management tools).
- AWH has established a Biofeedback practitioner specialty listing for BCIA certificate holders. This program offers BCIA certified members of AAPB an opportunity to highlight their specialty training and accomplishments within the AHW network’s marketing exposure to the general public.
- AAPB members in good standing receive a 20% discount on the annual membership fee when joining this AWH Platinum Participating Practitioner program.
- Support this unique marketing initiative and send in your application today!

For more information contact:
Platinum Program customer service (888) 893-4639 or visit the AWH professional website:

www.WholeHealthPro.com
American WholeHealth Networks
45999 Center Oak Plaza, Suite 100
Sterling, VA 20166
The Association for Applied Psychophysiology and Biofeedback (AAPB) is pleased to announce a new program available through American WholeHealth, Inc., a provider of a nationwide network that integrates conventional and complementary health and wellness practitioners. American WholeHealth has been selected by AAPB as the exclusive provider for the AARP Alternative Health and Wellness Network. As a BCIA certified AAPB practitioner you can also be part of this network. Some of the services available through the AARP Alternative Health and Wellness Network include chiropractic care, pain management specialists, massage/bodywork, mind/body therapies, acupuncture, nutrition, exercise/movement, holistic physicians and nurse practitioners, yoga, tai chi, chi gong, homeopathy, naturopathy, Feldenkrais, Pilates, and personal training. Information is available on the AARP website at www.aarp.org/alternatives and www.aarphealthcare.com. As part of this program, AWH provides AAPB members with information on alternative health practices and practitioner specialties via the award winning consumer content of WholeHealthMD.com.

“American WholeHealth is proud to be the organization selected by America’s leading organization for people 50 and over, AARP,” said Bill Lubin, PA, MBA, DrPH, President and CEO of American WholeHealth, Inc. “We are delighted to enter into this relationship with AARP. This program is important for members, practitioners, and the industry. For AAPB members the program provides excellent access to quality practitioners and wellness facilities at a discounted rate. The program also provides members a wealth of information through American WholeHealth’s award winning site, WholeHealthMD.com. For practitioners and wellness facilities, the program provides a new path to inform and serve the public as the industry moves into the mainstream of health care delivery. “Many AARP members select alternative health and wellness therapies to complement traditional medicine for a range of benefits including pain management, stress reduction, enhanced fitness or just to boost energy. We’re pleased to offer this new member benefit to help make this type of health care alternative more affordable to those members who select it,” said Laura Weber Rosman, Director of New Products and Marketing, AARP Services Inc.

AWH is a nonprofit, nonpartisan membership organization for people 50 and better. It provides information and resources; advocates on legislative, consumer, and legal issues; assists members to serve their communities; and offers a wide range of benefits, special products, and services for those members. These benefits include the AARP Web place at www.aarp.org, AARP, the Magazine, and the monthly AARP Bulletin. Active in every state, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands, AARP celebrates the attitude that age is just a number and life is what you make it.

AARP Services Incorporated (ASI) is a wholly owned and independently operated subsidiary of AARP. ASI is responsible for the management of various services and programs, which provide value to the AARP membership.

Practitioners in the Alternative Health and Wellness Network pay an annual fee and undergo screening of their credentials to become Platinum Participants with AWH in this special marketing of their services to AARP members. Participating Practitioners agree to give a discount to AARP members for health and wellness services many of which are not covered by traditional insurance. AWH has included a number of practice management tools and services in the cost of the annual Platinum program. AAPB has agreed to place a representative on the AWH Business Advisory Council to support and advise AWH in its program development. The kickoff meeting of the AWH Business Advisory Council occurred in September 2002 in San Diego, where over 14,000 AARP members from across the US had gathered for their “Life @ 50+” member event.

American WholeHealth is the nation’s largest complementary health and wellness network company, dedicated to serving over 35 million lives through relationships with health plans, associations and employer groups, and to strengthening partnerships with over 25,000 practitioners across the county. American WholeHealth supports the education of health care consumers via its award-winning site, WholeHealthMD.com. American WholeHealth also supports its network participants through WholeHealthPro.com, a professional web site that helps practitioners better serve their patients and improve their professional practice.

“We are pleased that the AWH network recognizes our members in their specialty credentialing and their consumer directories. We are excited about the opportunity this represents for increasing public awareness of our biofeedback services and for our members to have a new option for marketing their services to the public” said Francine Butler.

Attention: APA Members
Remember to take your 25% discount on your APA renewal of dues. See line 3 on the renewal page. The explanation is on page 6 of the APA renewal package. This benefit comes to you because you are a member of AAPB and AAPB belongs to the Federation of Behavioral, Psychological and Cognitive Sciences.
Since the genesis of the field 40 years ago, clinicians, researchers and patients have been waiting for a comprehensive textbook that would give a voice to the vast, emerging knowledge and information available in neurofeedback and biofeedback.

**The wait is over!**

Debuting this fall. Advanced orders being taken now!

Drs. Michael and Lynda Thompson have made this book accessible for all levels of knowledge and experience ranging from the client just beginning to learn about his/her options to clinicians conducting advanced quantitative research. *The Neurofeedback Book* provides a wealth of clinical information and procedures. It is also a valuable resource toward which clinicians can direct patients who are seeking more information.

**Highlights include:**

- An easily understandable explanation of the science behind biofeedback and neurofeedback
- Clear, easy-to-understand and specifically helpful illustrations
- In-depth information about procedures and cutting-edge methodologies
- Insightful research and statistics to help you better evaluate results
- Basic and detailed terminology germane to all EEG literature
- Material specifically written to prepare you for certification, including a special section corresponding to the BCIA blueprint areas for EEG biofeedback

**Look what experts are already saying:**

“This comprehensive textbook will make the remarkable but largely unknown field of neurofeedback accessible to family physicians, pediatricians and psychiatrists.”

– André Coté, MD, SDPQ (Psych), DABFE; Former Medical Director, Royal Ottawa Hospital Regional Children’s Centre and Executive Director of Northern Ontario Francophone Psychiatric Programme

“If you are in the field of neurofeedback and/or biofeedback at any level, you simply MUST have this book. It will save you years of continuing education, speed up your learning curve, and give you techniques and information that you simply can’t get anywhere else.”

– Lynda Kirk, MA, LPC, BCIA-C, QEEGT; President, Association for Applied Psychophysiology and Biofeedback and Past President, International Society for Neuronal Regulation

“[The Thompsons] are master teachers. This book will be of great value to clinicians.”

– Tom Budzynski, PhD; Affiliate Professor of Psychology, University of Washington

Whether you are using neurofeedback to optimize performance or as a symptom management tool, this book will quickly become the first place to which you turn for answers.

Keep ahead of the knowledge curve by ordering your copy from the publisher today!

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Unlocking the Potential of Patients with Attention-Deficit/Hyperactivity Disorder: A Comprehensive, Neuro-Behavioral Treatment Approach
Friday, December 5, 2003
9 a.m. – 5 p.m.
Presenter: Vincent Monastra, PhD
Clinical Director of the FPI Attention Disorders Clinic in Endicott, NY

Attention-Deficit/Hyperactivity Disorder (ADHD) is the most commonly diagnosed, yet hotly debated, psychiatric disorder of childhood and adolescence. Although this condition is characterized by symptoms of inattention, hyperactivity, and impulsivity, the presence of other symptoms (e.g. depression, anxiety and aggression) in the majority of patients, makes the process of differential diagnosis a challenging one. In addition, the severity of functional problems that occur in these patients require treatment plans that combine medical, neurophysiological, educational, nutritional, and parenting interventions. This workshop will provide information about advances in the assessment and treatment of patients with ADHD. His most recently published research examined the effects of a “multi-modal” treatment approach that integrates medication and parent training, as well as, neurophysiological, educational and nutritional interventions. The lessons learned from his clinical research and practice will be published in the book, Parenting Children with ADHD: Lessons That Medicine Cannot Teach, due to be released in 2004.

General Clinical Biofeedback: A Review
Saturday, December 6, 2003
9 a.m. – 5 p.m.
Presented by Doil Montgomery, PhD
Past-President AAPM, former Chair of BCIA

This workshop will be a review of biofeedback and associated adjunctive techniques used in a mental health clinic. It will cover clinical applications of Surface EMG, Finger Temperature, Skin Conductance Activity, and Heart Rate. We will discuss how these modalities are used to assess physiological response style, facilitate physiological self-regulation to treat a variety of disorders, and as an adjunctive technique during psychotherapy. Ample time will be given to the discussion of cases taken from the presenter’s clinical experience. There also will be an opportunity to discuss your cases. In addition to providing clinical applications of biofeedback, the workshop will serve as a review for those who are preparing for the BCIA General Certification Examination.

Attendees will:

• Review the basic physiology underlying sEMG, Finger Temperature, Skin Conductance Activity and Heart Rate.
• Discuss the clinical applications of the physiological processes above in a typical mental health clinic.
• Demonstrate applicable clinical biofeedback techniques used with clients.

Dr. Montgomery has more than 30 years of clinical experience with biofeedback in a variety of settings. As a member of the graduate faculty of Nova and Nova Southeastern University, he has taught the graduate course in Clinical Biofeedback for over 20 years. In this role, he has supervised graduate students conducting clinical outcome research, many of whom have had work published as case studies or controlled group comparisons. He also maintains a part-time biofeedback practice. His background includes eight years of full-time private practice in a neurosurgical clinic, where he offered direct service and supervised other biofeedback providers. He has served on the boards of AAPB, BCIA and the Biofeedback Society of Florida.
**Who Should Attend**

Psychologists, primary care physicians, nurses, social workers, counselors, and others who wish to incorporate biofeedback into their clinical practice and/or wish to meet the didactic educational requirements for certification in general biofeedback by BCIA.

**Continuing Education Information for All Workshops**

**For Psychologists:**

The Association for Applied Psychophysiology and Biofeedback is approved by the American Psychological Association to offer continuing education for psychologists. The APA Approved Sponsor maintains responsibility for the program.

**For Nurses:**

The Association for Applied Psychophysiology and Biofeedback is approved as a provider of continuing education in nursing by the Colorado Nurses Association, which is accredited as an approver of continuing education in nursing by the American Nurses Credentialing Centers Commission on Accreditation.

**Workshop Schedule**

Each workshop is scheduled from 9:00 a.m. to 5:00 p.m. with a one-hour lunch break. Coffee will be available in the morning. Registration will be available 30 minutes prior to the opening of each workshop.

**Meeting Location and Accommodations:**

The workshops will be held at the DoubleTree Hotel in Philadelphia, PA. Accommodation details will be included with your confirmation packet.

**Air Travel and Car Rental**

If you need assistance with travel arrangements, you may call Preferred Travel at (800) 848-6864 or (303) 298-7050 or fax requests to (303) 298-7090 – 9:00 a.m. to 6:00 p.m. MST. Please identify yourself as an attendee of the AAPB Workshops.

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**REGISTRATION FORM**

### The AAPB Winter 2003 Professional Workshops

**Join AAPB and take advantage of member rates!**

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Discount: For each additional registration from the same company, deduct $20 for each workshop.

Cancellation Policy

Cancellations received in writing by November 25, 2003 will be issued a refund less a $50 processing fee. NO REFUNDS FOR CANCELLATIONS AFTER NOVEMBER 25, 2003. AAPB reserves the right to cancel. In the unlikely event of cancellation, AAPB is not responsible for any costs, damages, or other expenses of any kind, including, without limitation, transportation, and/or hotel costs incurred by registrant. Speakers subject to change without notice.
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"4th Annual LORETA and QEEG Conference
QEEG: From Acquisition to
Advanced Protocol Design"
Thursday - Sunday / January 15 – 18, 2004
Location to be announced in Scottsdale, Arizona

Thursday Jan 15: DEYMED Diagnostic: TruScan EEG
The TruScan 24/32 Hardware, TruScan Acquisition and TruScan
Explorer software will be presented.

Doug Youngberg
Friday Jan 16: LORETA-Key & NTE Pack 2003
The basic theory involved in the LORETA-Key software available
from the Key Institute for Brain-Mind Research will be explained
briefly. The latest softwares, EureKa3! AV & MHyT3! will both be
demonstrated with a practical approach to LORETA techniques.
The use of the software for individual and group data analysis
will be presented in a detailed step by step and hands on
sequence.

Marco Congedo & Leslie Sherlin
Saturday Jan 17: LORETA Neurofeedback
The principles and fundamentals of LORETA Neurofeedback will
be explained. The LORETA Neurofeedback system will be
demonstrated with a user friendly approach.

Marco Congedo, Joel Lubar, Doug Youngberg, & Leslie
Sherlin
Sunday Jan 18: Complex Neurofeedback Protocol Design
QEEG and LORETA based Neurofeedback protocol design
techniques will be taught integrating various analysis systems.

Joel Lubar & Bob Gurnee

"Bring your laptops, EEG recordings, and maps on overheads to
review
Attendees can register for any one or all of the days.

Certificates of Completion available for up to 32 hours.
Conference hours will be 8:30-12:30 and 2:00-6:00 daily

Sponsored by: Nova Tech EEG at NovaTechEEG@yahoo.com;
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ADD Clinic/SNI QEEG Mapping Service

For Information or to register contact the ADD Clinic/SNI QEEG
Mapping Service at: ph (480) 424-7200 fax: (480) 424-7800 or
Bob@Add-Clinic.com

$175 per day if registered before December 20, 2003, then $195.
$595 for all 4 days before December 20, 2003, then $695.
Refunds less $50 until January 2nd

6900 E. Camelback Road, Suite 260 Scottsdale AZ 85251
Robert L. Gurnee, Director
That’s APA today.

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In order to affirm the role of science and education in psychology and to make dues more affordable for individuals belonging to multiple scientific organizations, the American Psychological Association has reduced APA dues for members of your society.

As a member of the Association for Applied Psychophysiology and Biofeedback, you are invited to take advantage of this special offer:

If you are not affiliated with APA:

Join APA now!

Members pay just $47 in 2004. Associate members pay just $67. You’ll receive the $45 journal credit and all other benefits of membership.

If you are currently an APA Member, Fellow, or Associate member:

You will find instructions on how to take advantage of the 25% dues reduction in your APA dues statement.

If you are a former APA member:

You can reinstate your membership using the 25% dues reduction. Reinstated Members pay just $185 and Associate members pay just $134 — offset by a $45 journal credit and all other benefits!

APA Member Benefits Include:

- First year APA Member dues: $62 - 25% = $47
- $45 member journal credit on already low member subscription rates
- Discounts on vital information resources: APA books, convention fees, and career and teaching aids
- Members-only access to online PsycINFO® and full-text journal article databases
- The American Psychologist — APA’s monthly journal
- Monitor on Psychology — APA’s monthly magazine
- Focused information from the APA Science and Education Directorates and the Public Policy Office, the Psychological Science Agenda newsletter, access to scientific divisions of the APA, and links to e-mail and listserv networks.

APA is working on behalf of scientists and academicians through endeavors such as:

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- Legislative and regulatory advocacy
- Promoting psychological education and psychology’s application in education
- Advancing the integrity and exchange of scientific information

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2. Neuroguide - R. Thatcher Normative Database
   A. Eyes Closed Linked Ears Z-scores $60.00
   B. Eyes Closed LaPlacian Z-scores $60.00
   C. Eyes Open Linked Ears Z-scores $60.00
   D. Eyes Open LaPlacian Z-scores $60.00
3. Neurorep - W. Hudspeth QEEG Analysis System
   A. Eyes Closed - Weighted Average, Z-scores, Magnitude,
      % Power, LaPlacian, Average Spectrum $60.00
   B. Eyes Open - Weighted Average, Z-scores, Magnitude,
      % Power, LaPlacian, Average Spectrum $60.00
4. Nova Tech EEG - Loretta/QEEG Analysis System and
   Adult Normative Database Eyes Closed $60.00
5. Thatcher TBI Discriminant Analysis and Severity Index $60.00
6. Clinical Correlations and Neurotherapy Recommendations
   by Bob Gurnee Value $480.00

7. Conventional Medical EEG - Read by Neurologist $125.00
8. Nova Tech EEG - Loretta/QEEG Analysis System: Eyes Open $60.00
9. SKIL Topographic Analysis - Sterman/Kaiser Imaging
   Eyes Closed or Open, or Task - Clinical and CoModulation Topographic
   Maps (data and stat) Topometric Display for Delta, Theta, Alpha, SMR,
   Beta 1 and Beta 2 $60.00
    Weighted Average, Z-scores, Magnitude,
    % Power, LaPlacian, Average Spectrum $60.00
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Robert L. Gurnee, MSW,
BCIA: EEG, QEEG Diplomate,
Director
Leslie Sherlin, BA

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AND PSYCHOPHYSIOLOGY™
Full Compatibility

Current users of Thought Technology products can rest assured that the new Infiniti Technology Platform will work perfectly with their existing hardware or software. For example, the new ProComp Infiniti encoder device is completely compatible with existing BioGraph® software, while ProComp+™ users will find that their ProComp+ performs seamlessly with the new BioGraph Infiniti Legacy software suite.

Of course, using the new ProComp Infiniti hardware together with BioGraph Infiniti software allows you to take full advantage of all our new features and enhancements.

Infiniti Hardware Platform

Our new ProComp Infiniti and FlexComp Infiniti encoder devices incorporate cutting-edge technology, while enhancing the signal quality, resolution and integrity that made earlier generations of Thought Technology hardware synonymous with quality and reliability.

FlexComp Infiniti, our top-of-the-line encoder, is the ideal data acquisition and psycho-physiological monitoring device for power users. It offers ten high-speed channels (2048 samples/sec.) that can acquire data from any Thought Technology sensor.

Researchers and clinicians will appreciate its flexibility to display raw, median frequency, RMS, peak-to-peak, 2D and 3D frequency and power spectrum, sEMG, EEG and EKG signals. Up to four encoders can be connected together to produce a forty-channel "window" into a subject's physiology.

From the lab to the field, FlexComp Infiniti has the power to record and save complex data instantaneously to the computer or Compact Flash (for remote data storage).
THE INFINITI

Thought Technology systems are recognized as the standard of excellence by clinicians, therapists and researchers throughout the world. We are committed to design and manufacture physiological monitoring and biofeedback instruments that are precise and reliable – for both computer-based and stand-alone applications. Our vision is to expand the exciting potential of behavioral, psychophysiological and non-invasive medicine in the 21st century, so that we may further enhance human health and self-efficacy. The Infiniti Technology Platform incorporates the latest advances in hardware and software architecture. Its modular design offers maximum flexibility and ease of use across a wide range of applications.
The ProComp Infiniti is an eight-channel, multi-modality encoder that has all the power and flexibility you need for real-time, computerized biofeedback and data acquisition in any clinical setting.

Housed in an ergonomically-designed case and requiring only a USB port, ProComp Infiniti can be used with any IBM-compatible laptop or desktop PC. The new high-speed TT-USB connection allows for higher sampling rates. The first two sensor channels provide ultimate signal fidelity (2048 samples per second) for viewing raw EEG, EMG and EKG signals. The remaining six channels (256 samples/sec) can be used with any combination of sensors, including EEG, EKG, RMS EMG, skin conductance, heart rate, blood volume pulse, respiration, goniometry, force, accelerometers, torsiometers and voltage isolators.

What’s more, not only can ProComp Infiniti capture data in real time by connecting directly to the PC via its fiber-optic cable, but it can also store data on a Compact Flash memory card for uploading later to the PC.

In short, ProComp Infiniti covers the full range of objective physiological signals used in clinical observation and biofeedback in any environment.
The ProComp2™ is a compact yet powerful two-channel device that allows clinicians to set up a second clinical system— or to empower their clients by offering them a take-home device that is convenient to wear on a headband or a shirt collar.

The ProComp2 contains a built-in EEG sensor (simply connect an extender cable for EEG monitoring and biofeedback), and it can use any two of the ProComp Infiniti sensors. The ProComp2 system contains all the peripherals to easily connect it to a desktop or laptop IBM-compatible PC.

Benefits for you and your clients
- Ability to expand your clinical practice quickly and economically by adding training rooms
- Power to train in home environment, thereby enhancing long-term compliance and improved outcomes
- Capacity to monitor peripheral measures as well as EEG for greater flexibility
Complete Range of Sensors

Skin Conductance
Measures the conductance across the skin, normally connected to the fingers or toes. Supplied with two finger bands.

Temperature Sensor
Small bead thermistor measures temperature from 50 - 125°F/10 - 45°C with >0.008°F resolution.

Respiration
Electronic sensor with Velcro belt for monitoring respiration rate, amplitude and rate.

Blood Volume Pulse (BVP)
Finger-worn photoplethysmograph displays the pulse waveform, and measures amplitude and heart rate.

Pre-amplified EMG, EEG and EKG sensors
amplifies the signals at the measurement site, and can detect signals as small as 0.10 microVolts. Low noise wire and gold-plated protected-pin connectors ensure unparalleled accuracy, even when moved.

Thought Technology's advanced design and active electronic sensors meet exacting standards for instrument accuracy, sensitivity, durability, and ease of use.

All sensors are completely non-invasive and require little or no preparation for use.

After-Sales Service
- A one-year warranty policy (optional three years) on all encoders and sensors provides peace of mind.
- Training courses at various skill levels help you maximize the use of your system.
- Our professional and friendly technical support staff makes getting assistance stress-free.
- Prompt and reliable service gives you what you are looking for when you buy the best.

Specifications

<table>
<thead>
<tr>
<th></th>
<th>FlexComp Infiniti (SA7550)</th>
<th>ProComp Infiniti (SA7550)</th>
<th>ProComp2 (SA7400)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>5.1&quot; x 3.7&quot; x 1.5&quot; (130 mm x 95 mm x 37 mm)</td>
<td>5.1&quot; x 3.7&quot; x 1.5&quot; (130 mm x 95 mm x 37 mm)</td>
<td>2.2&quot; x 2.8&quot; x 0.75&quot; (56 mm x 71 mm x 19 mm)</td>
</tr>
<tr>
<td>Connection to PC</td>
<td>Fiber Optic to USB through TT-USB interface unit</td>
<td>Fiber Optic to USB through TT-USB interface unit</td>
<td>Fiber Optic to USB (TT-USB) or COM port (Pro-SB)</td>
</tr>
<tr>
<td>Sensor type</td>
<td>External sensors</td>
<td>External sensors</td>
<td>Internal ECG or any 2 External sensors</td>
</tr>
<tr>
<td>Impedance checking</td>
<td>All channels</td>
<td>All channels</td>
<td>Channel B only</td>
</tr>
<tr>
<td>(with EEG, T, sensor)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-calibration</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Compact Flash memory storage</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Fast channels (rate, bandwidth)</td>
<td>10 channels, 2048 samples/sec DC - 512 Hz</td>
<td>2 channels, 1048 samples/sec DC - 512 Hz</td>
<td>2 channels, 256 samples/sec DC - 45 Hz (shared with slow channels)</td>
</tr>
<tr>
<td>Slow channels (rate, bandwidth)</td>
<td>5 channels, 512 samples/sec DC - 8 Hz</td>
<td>2 channels, 256 samples/sec DC - 8 Hz (shared with fast channels)</td>
<td></td>
</tr>
<tr>
<td>Emulated protocols</td>
<td>ProComp Infiniti, ProComp+</td>
<td>ProComp+</td>
<td>ProComp+ (2 channels active)</td>
</tr>
<tr>
<td>Power source</td>
<td>4AA batteries, single-use alkaline or NiMH rechargeable</td>
<td>4AA batteries, single-use alkaline or NiMH rechargeable</td>
<td>1 AA battery, single-use alkaline</td>
</tr>
<tr>
<td>Battery life (alkaline cells)</td>
<td>30 hours typical, 20 hours minimum</td>
<td>30 hours typical, 20 hours minimum</td>
<td>10 hours typical</td>
</tr>
<tr>
<td>ADC output</td>
<td>14 bits</td>
<td>14 bits</td>
<td>13 bits</td>
</tr>
</tbody>
</table>

* See our software brochure for more information. This brochure describes the encoders in their Infiniti modes not Legacy settings.
* Contact Thought Technology or your local representative for availability.
NEUROPATHWAYS EEG IMAGING®

The First All Digital Real Time EEG and EEG Feedback

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Neuropathways EEG Imaging® provides individualized EEG Neurofeedback education for professionals and graduate students. The individualized education focuses on neurophysiology, electrode placement for EEG Neurofeedback and the recognition of EEG patterns and their subtleties. Margaret Ayers, president of Neuropathways EEG Imaging® was first to publish in EEG Neurofeedback for head trauma, stroke, coma, and absence seizures. For more information please visit the website at www.neuropathways.com or write to 427 North Canon Drive, Suite 209, Beverly Hills, California 90210 or call 310-276-9181 or fax 310-275-7894.

The Neuropathways EEG Imaging® Neurofeedback system is protected under the following United States patents: 4919143,5024236,5571057 and patents in England, Germany and Japan.
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Professional Biofeedback 4-Day Certificate Program

<table>
<thead>
<tr>
<th>City</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ft. Lauderdale, FL</td>
<td>Nov. 15 - 18, 2003</td>
</tr>
<tr>
<td>San Francisco, CA</td>
<td>Dec. 6 - 9, 2003</td>
</tr>
<tr>
<td>Atlanta, GA</td>
<td>Jan. 24 - 27, 2004</td>
</tr>
<tr>
<td>Los Angeles, CA</td>
<td>Feb. 21 - 24, 2004</td>
</tr>
</tbody>
</table>

Professional 4-Day EEG Certificate Program

<table>
<thead>
<tr>
<th>City</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlanta, GA</td>
<td>Jan. 29 - Feb. 1, 2004</td>
</tr>
<tr>
<td>Los Angeles, CA</td>
<td>Feb. 26 - 29, 2004</td>
</tr>
</tbody>
</table>

Free 1-Day Advanced Application

<table>
<thead>
<tr>
<th>Application</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biofeedback</td>
<td>Every month</td>
</tr>
<tr>
<td>EEG</td>
<td>(Feb., Mar., April, May, July, Sept., Oct., Dec.)</td>
</tr>
</tbody>
</table>

2-Day Workshops

<table>
<thead>
<tr>
<th>Topic</th>
<th>Dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEG Advanced Applications</td>
<td>April 1-2</td>
</tr>
<tr>
<td>Chronic Pain, Headache &amp; Anxiety Disorders</td>
<td>(June, Nov, Dec.)</td>
</tr>
<tr>
<td>Pediatrics &amp; Biofeedback</td>
<td>(October)</td>
</tr>
<tr>
<td>Incontinence</td>
<td>(October)</td>
</tr>
<tr>
<td>RSA</td>
<td>(October)</td>
</tr>
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</table>

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Exhibitors Include: Thought Technology, Brainmaster, and Comptronics

Register today and take advantage of these pre-conference workshops:

February 4th & 5th  Joel & Judith Lubar 2 Day Comprehensive Training & Demonstration Workshop on EEG Evaluation & treatment of ADD/HD, depression, anxiety, addiction, PTSD, closed head injury & other disorders. Approved by BCIA to meet 16 hours of blueprint toward certification ($39 extra charge at meeting if being used for certification).


February 4th & 5th  Sue and Sig Othmer Workshop 2 day course on Neurofeedback.

www.brainmeeting.com (continues next page)
2004
Winter Brain Meeting
Pre-conference workshops (Continued)

February 4th & 5th  Jay Gunkelman and Richard Soutar present a 2 day workshop on Introduction to QEEG.

February 4th & 5th  Anna Wise presents a 2 day workshop on Awakening the High Performance Mind.

February 5th  One day multi-speaker Neurofeedback Foundations Course presented by Joel Lubar, Sue and Sig Othmer, Lynda & Michael Thompson, Anna Wise, Paul Swingle, Valdeane Brown, Rob Kall.

The 2004 Winter Brain Meeting is packed with workshops, exhibits, and live panel discussions!

To register for the 12th Annual Winter Brain Meeting, visit our website at:

www.brainmeeting.com

Special discounts available for students! Details available on our website.

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>Winter Brain Meeting Feb. 6 - 10 (includes Optimal Functioning Mtg)</td>
<td>$599.00</td>
<td>$649.00</td>
<td>$699.00</td>
<td>$749.00</td>
</tr>
<tr>
<td>One Day Intro to EEG Biofeedback pre-conference, Feb. 5th: at least 10 teachers including Joel Lubar, Sue and Sig Othmer, Lynda and Michael Thompson, Anna Wise, Paul Swingle, Valdeane Brown and Rob Kall</td>
<td>$169.00</td>
<td>$179.00</td>
<td>$189.00</td>
<td>$199.00</td>
</tr>
<tr>
<td>Optional 10 hour Workshop package</td>
<td>$210.00</td>
<td>$215.00</td>
<td>$225.00</td>
<td>$245.00</td>
</tr>
<tr>
<td>Combination Winter Brain 2004 and EEG BF Foundations Course</td>
<td>$649.00</td>
<td>$699.00</td>
<td>$749.00</td>
<td>$799.00</td>
</tr>
<tr>
<td>Best Deal for First Timers: Package Winter Brain 2004 and one day EEG BF Foundations Course and 10 hour Workshop package</td>
<td>$899.00</td>
<td>$909.00</td>
<td>$969.00</td>
<td>$1,039.00</td>
</tr>
<tr>
<td>One day registration</td>
<td>$179.00</td>
<td>$189.00</td>
<td>$189.00</td>
<td>$199.00</td>
</tr>
<tr>
<td>Three day registration</td>
<td>$529.00</td>
<td>$559.00</td>
<td>$559.00</td>
<td>$589.00</td>
</tr>
<tr>
<td>Optional Functioning 1 Day Program (included in Winter Brain Meeting fee)</td>
<td>$229.00</td>
<td>$239.00</td>
<td>$239.00</td>
<td>$249.00</td>
</tr>
</tbody>
</table>

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Featuring 19 of the Leading Speakers, Educators, Visionaries.

Including: Joel Lubar, Judith Lubar, Barry Sterling, Lynda and Michael Thompson, Sig Othmer, Anna Wise, Valdeane Brown, Paul Swingle, Peter Van Deusen, Rob Kall, John Anderson, Richard Soutar, Len Ochs, Hershel Toomin, Helena Kerehzi, Tom Bydynyiski, Nancy White, Carol Schneider, Sue Othmer. (Buy our video version from last year ($209) get better prepared to digest information at a higher level of understanding, and attend this year's live course free.)

Valdeane Brown Simplifying the Complex: A Comprehensive Approach To Understanding What Fundamentally Changes During Neurofeedback And How We Can Optimaly Influence That Change. Many theories and rationales abound concerning the nature of neurofeedback and how to approach clinical practice. Almost all approaches are based on monitoring some form of intensity-based measure of the emergent EEG and then selectively decreasing and/or increasing certain segments of this derived signal. This session will give you a simple and comprehensive way to understand all of neurofeedback and will provide a working language for optimizing neurofeedback no matter how you do it.

Hershel Toomin: Hemispheric Electroencephalography (HEG): A New Form of Neurofeedback With Potential For Enhancing Brain Function in Multiple Conditions. Hemispheric electroencephalography (HEG) is an innovative method of biofeedback-guided brain exercise, which can enhance brain function through targeted activation of underfunctioning brain areas. This can recruit its localized blood supply based on moment-to-moment needs. When a specific area of brain is activated, blood flow to that area momentarily increases to meet the demand. As the local brain activation returns to baseline, the local brain blood flow returns to baseline as well. Patterns of local brain blood flow thus provide an ongoing map of patterns of local brain activation.

Len Ochs: The Low Energy Neurofeedback System (LENS): What It Is and How the EEG Changes with It. The single-channel LENS provides low energy feedback. It is also used to provide topographic brain maps to guide this treatment. This presentation shows sequences of maps made over the course of treatment, showing the physiological basis for the behavioral changes that take place.

Peter Van Deusen: Neurofeedback providers seem to operate at two extremes with regard to assessment and protocol selection issues. One group says that this process is essentially unnecessary and either "one size fits all" in terms of protocols, or they can be selected by trial and error. Another group goes all the way to Quantitative EEG's with normative database comparisons for all clients, training to "normalize the Q." There is a middle ground, which involves looking at the client's subjective performance and objective (EEG) patterns and then using these to derive a training quantity. One version of this approach has been developed by Peter Van Deusen, using two simple tools for identifying key training issues and selecting more likely protocols using inexpensive two-channel equipment and comparing the client's brain against itself.

Paul G. Swingle: Beginners Grand Rounds: Following the GRANDROUNDS format, actual patient records will be scrutinized to provide step-by-step procedures for the neuropsychiatric treatment of a wide variety of disorders. The problem of artificits that compromise treatment will be examined. Complementary treatments that potentiate neurotherapy will be discussed in detail so that participants can incorporate these procedures in their practices.

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