Neurofeedback Therapy As a Treatment
For Psychogenic Non-Epileptic Seizures (PNES)
William Lambos Ph.D. and Charles Stark, M.D.

The history of neurofeedback treatment of patients with epileptic seizures, particularly focal seizures originating in the temporal lobes, is well established. In the 1970s Barry Sterman discovered, quite serendipitously, that cats selectively reinforced to generate the sensory motor rhythm (SMR) were protected against seizures after exposure to monomethyl hydrazine (rocket fuel). Exposure to hydrazine causes severe seizures in mammals, but animals conditioned to produce SMR were far less susceptible to them.

This finding led to the successful treatment of human patients with epilepsy via SMR reinforcement using neurofeedback. However, a third or more of patients who present to epileptologists with seizure activity do not, when examined in video EEG studies, show the brain activity typical of epilepsy. That is, these patients experience the bodily symptoms of seizures, but no epileptogenic or paroxysmal brain wave patterns are recorded in their EEG. Such patients are instead diagnosed with PNES, or Psychogenic Non-Epileptic Seizures. PNES patients are characterized by a history of trauma, usually sexual or physical abuse in childhood. Because of this, PNES is thought to be related to post traumatic stress disorder (PTSD) rather than to epilepsy. For the PNES patient, the psychogenic seizures seem to represent an avenue to escape situations which would otherwise cause unbearable levels of stress. The client is, in this sense, experiencing a dissociative condition in which the non-epileptic seizures allow for escape from an unbearable context. It is important to understand that PNES are not factitious, and the patients that present with such seizures are not malingering; their seizures trouble them greatly and they wish them to cease.

K.G., a 47 year-old woman, was referred to us by a neurologist and a mental health counselor who determined that her seizures were non-epileptic and likely related to a history of sexual abuse by her father and multi-

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FROM THE PRESIDENT

Evidence-based Biofeedback?
It’s about Time!

As part of an introductory graduate class on psychophysiology, I asked the students to react to the famous quote by Lord William Thomson Kelvin, “When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is a meager and unsatisfactory kind.” We may argue that this analysis is incomplete or misguided, but I believe it is at the heart of the discussion on evidence-based procedures. So where do we stand? It depends on whether you care about insurance reimbursement. A non-licensed counselor/therapist/coach, has no reimbursement issues. All they have to worry about is an occasional lawsuit. If you are licensed, the stakes are different. If you do have a coveted license to practice, all you have to worry about is an occasional lawsuit and being reimbursed. Now insurance reimbursement faces a new hurdle, evidenced-based procedures. Biofeedback is in an outstanding position here, a theme we will explore at our November Annual Convention in San Francisco. How does biofeedback compare to other medical procedures seeking acceptance as evidence-based? As your soon-to-be past president, I talked to several different licensed professionals about their struggle to get on board the new Worker’s

FROM THE EDITOR

As summer becomes fall, my hope is that this season we will reap all of the benefits in our clinics, schools, labs and private practices of the seeds we have sown to raise awareness of biofeedback.

In this issue, we feature a section entitled “Your Turn: BSC Members Speak”, where Jan Markle, MA poses the question “Do you think the field of biofeedback should be licensed by the state?” There’s an extensive history of debate on licensure and it remains controversial and highly relevant in California in light of the recent changes in worker’s compensation legislation.

In addition to working hard at directing the BSC organization, Cynthia Kerson, MA offers us this thoughtful examination of “Biofeedback as Placebo,” which explores redefining the term placebo in relation to biofeedback and points out the complications the placebo effect has on medication trials.

William Lambos, PhD and Richard Stark, MD have presented an interesting case study on a patient with psychogenic non-epileptic seizures (PNES). The authors found frontal hypercorrelation and a brainwave pattern becoming common in PNES patients by thorough analysis of the patient’s QEEG data. The patient significantly improved utilizing specific protocols for neurofeedback training derived from the QEEG findings.

Finally, Caroline Grierson, RN submits a case study of an RSD patient within a comprehensive pain clinic. Reflex Sympathetic Dystrophy (RSD) is a chronic neurological condition that challenges even the most talented clinicians.

I would like to thank Cynthia Kerson for helping revitalize California Biofeedback and co-editing. I have enjoyed working together. Cynthia will be taking a break from the newsletter but will maintain her position as Executive Director of the BSC.

I look forward to connecting with colleagues and friends at the annual conference in San Francisco. Hope to see you there.

Christina Malewicz (formerly Chesley), c.malewicz@yahoo.com
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An Introduction to Newly Published Books Regarding the Roshi System

Victoria L. Ibric, MD, PhD, BCIAC, DABPS

The Roshi neurofeedback instrument, based on the mind mirror presentation of brain waves was developed as a meditation enhancer in the early 1990s. Neurofeedback training is an active process for the client and generally is quite hard to accomplish when the brain has been affected by various traumatic injuries. Roshi adds a passive type of training through its light and electromagnetic (EM) stimulation. By delivering the brain waves, as light or EM, back to the trainee, neurofeedback training may be facilitated and enhanced without too much effort on the part of the client.

There are two books that have been published about Roshi in August and September of this year.

1. The first book is one written by Ms. Gracelyn Guyol, who researched all the nontraditional therapeutic modalities for treating depression and compiled them in her book. Among them, she writes in the chapter 9, the success story of a patient of mine. After hearing her testimonial at the Safe Harbor meeting 3 years ago, on how she overcame bipolar depression and addiction by training with NF, Ms. Guyol interviewed the patient and wrote this chapter.

2. The second book presented is Evans' second book published by Hartford. It is related to the neurofeedback application. Among the chapters is one dedicated to the Roshi type of neurofeedback training.

Please find below excerpts from each of these books:

1) Healing Depression and Bipolar Disorder without Drugs
Gracelyn Guyol, Walker Publishing, August 2006 $14.95

Chapter 10: Choosing a Successful Non-Drug Therapy - Retraining Brain Waves with Neurofeedback

“Biofeedback is widely used for over 150 ailments by both mainstream and alternative doctors and is frequently covered by insurance. Neurofeedback, the most rapidly growing area of biofeedback, uses computers to help patients develop self-control over brain wave activity. It is effective regardless of whether brain dysfunction is triggered by traumatic experiences or physiological causes. It is used for depression, bipolar disorder, anxiety, attention deficit, Tourette’s syndrome, seizures, sleep disorders, stress, and substance abuse.

Sensors are attached to the scalp with a dab of thick cream. These are connected to an electroencephalograph (EEG) that is controlled by a high-speed computer. The computer records and analyzes the electrical activity of the brain, converting activity into sounds and display on the monitor. These tools assist patients in learning to deliberately control brain wave activity, but it is a process that may take several months. As treatment continues, medications can be gradually reduced or eliminated.”

“Longitudinal case study of Dr. Ibric’s follows in this chapter. For a copy of the study, please contact dribric@speakeasy.com.”

2) Neurofeedback: Dynamics and Clinical Applications
Edited by James R. Evans, and published by Haworth Press, Inc. August 2006

In this book is included the chapter “The Roshi in Neurofeedback.” This chapter introduces the reader to the history, the developments and applications of the Roshi generations. The author, Dr. Victoria Ibric presents results obtained in her clinic with a variety of clients using the Roshi type of neurofeedback. Some of her previous workshops on how Roshi works, presented over the last 6 years at various conferences such as ECNS, ISNR, AAPB, BSC, de Anza, Winter Brain and Roshi are also included.

The task of the Roshi is to “normalize” and stabilize a subject’s brain electrical activity, for an improved, clear and stable thinking and performance.
Compliance with evidential rules for Worker’s Comp procedures. My acupuncture friends, for example, just tried to get the WC Board to include them on the list of approved procedures by legislation. The legislation did not pass, so they are in the same boat as biofeedback. My chiropractor friends, on the other hand, say they have a strong lobby, but are not basing their practice on insurance reimbursement anymore, anyway. My nursing friends see it as a golden opportunity to give more credit to them, since they are the one who have developed and refined evidence-based treatment guidelines for almost all disorders. My medical physician friends are watching CMA and CMTA for signs they will re-instate good medical practice (not sure what you mean by “good medical practice”) for injured workers, if only to the same or equal level for medical treatment for non-injured workers. My lawyer friends are working harder, they say, but do not anticipate it will affect them much. Cases are won based on evidence (!) not on how many treatments were provided. As I was researching evidence-based procedures, I found a huge contrast: psychologists believe they will be excluded, while physical therapists expect to be included as approved evidence-based providers! I ran across several articles by psychology groups who felt that “evidenced-based” criteria by definition excluded them. These are practitioners of various feeling therapies, and psychodynamic approaches, where the evidence is all face-valid. (Actually there is 20 years of hard evidence from psycho physiological stress profiles, showing increases stress-resilience after successful depth therapies). On the other side, physical therapy techniques are pretty much a done deal, approved in principle for Worker’s Comp, or doctor’s tests, etc. I always do this, even if I get turned down. I have had few problems, perhaps because I would always include a stress profile or other physiological evidence with my report. The weakness of biofeedback is in the presentation of “evidence” that we collect on the physiology of our clients! Report writing is not required for BCIA certification. This makes the whole certification process passive and irrelevant. Why should someone pay you just because you have a certificate? So do lawyers! It’s what you present about a specific case that counts; using evidence-based procedures (and a bibliography) goes a long way towards being legitimate, or at least respected. Fortunately BCIA seems to be changing, and AAPB has been a big help in developing our evidence-based guidelines.

By the way, we have a workshop on report writing scheduled for our convention. See you in San Francisco in November!

Best regards,

Bob Grove, PhD, President

From the President

Continued from page 3

When I searched for evidenced-based PT protocols, all I found were those based on sEMG! Dennis Atare and Jeff Cram, two departed biofeedback-focused psychologists, independently spent their professional lives making “physical therapy” into “psychophysiological therapy,” now a direct benefit to our PT colleagues. So what about biofeedback? Do we have enough evidence to be approved? Yes. Of course. How can we not be? If any rehabilitation technique can yield objective evidence, it is biofeedback. Modern computer-aided biofeedback devices allow you to generate reports that first show the problem, and then the steps to a solution. We have our share of non-evidenced based protocols, but that is the nature of an inquisitive membership. You cannot have innovation without experimentation. Biofeedback has a long history of well-established, published protocols. That is the message BSC needs to project to the world of rehabilitation. We have more than enough evidence to demonstrate protocols that aid in a variety of disorders. My impression is that our membership is vaguely aware of these protocols, but not the mass of evidence behind them. I refer you to the BSC website, where you can download and review our white paper on Evidence-Based Biofeedback. Better yet, come to our convention.

Meanwhile, if you have a problem with reimbursement, don’t be passive. Write a report! First make sure you have collected evidence. It is so easy to perform a stress profile, or even a Q-EEG map. Add a simple physiological symptom diary, and attach copies of hospital

The female brain

Important Notice about CEUs

Continuing Education Units (CEUs) are no longer required for BSC Certification. The Board has suspended the certification process, recommending BCIA Certification instead (www.bcia.org). For those already certified, BSC can update your last certificate. Please contact the Executive Director for details at (415) 485-1345.
Neurofeedback Therapy As a Treatment

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ple deaths of significant individuals in her life. Karen had been given numerous incorrect diagnoses and prescribed numerous medications to control her seizures and associated symptoms (Tegretol, Lithium, Effexor, Neurontin, Lexapro, several benzodiazepines and others). In addition to the PNES, Karen presented to us with sleep disorder, depression and anxiety. These symptoms caused her difficulty at work, where they threatened her continued employment.

Prior to treatment, we assessed her with a QEEG (Q1) analyzed by both SKIL and Neuroguide databases and reporting software. In both cases, we found evidence of frontal hypercorrelation as measured by both coherence and comodulation. In the eyes closed recording, we also saw a finding that has become common in our PNES subjects: the presence of two frequency peaks in the alpha band. In her case, one peak showed at 8 Hz and we saw a second peak at 11 Hz. Figure 1a shows absolute amplitude and z score frequency distributions from the Neuroguide analysis (the same double peak was present in the SKIL analysis). We have come to regard the presence of two dominant frequencies in PNES subjects as indicative of psychogenic dissociation.

We chose a treatment protocol designed to break up the frontal hypercorrelation, reinforce SMR and suppress the lower peak at 8 Hz. Sensors were placed at sites C3-C4-F3-F4. On various 180-second (3-minute) blocks using the J&J C2+, and Sterman’s discrete trial 4-EEG training program, the subject was reinforced for raising one site while inhibiting a different frequency at another site (i.e. the subject was reinforced for producing 12-15 Hz at C3, while reducing 4 to 7 Hz at F4, or the corresponding inverse sites.

Following 20 sessions of neurofeedback, the subject reported that her psychogenic seizures had stopped. Her sleep pattern had returned to normal, her depression was much improved, and her employment was no longer threatened. She also found it possible to stop taking all medications. The client, in short, sees the neurofeedback therapy to date as a resounding success.

To determine whether the client’s QEEG had changed significantly as a result of neurofeedback training, we recorded another QEEG (Q2). Following this, we generated spectral results for the second QEEG recording and subjected them to analysis using Neurostat paired t-tests. Figure 1b shows the spectral amplitudes and Z-scores after 20 sessions of neurofeedback as described. Note that while the lower frequency peak at 7 to 9 Hz was reduced slightly in amplitude, after training the subject’s dominant frequency peak at 11 Hz more than doubled in amplitude. In addition, z-scores are closer to norms across frequencies.

Continued on page 16
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Introductory LENS Training – West Coast
Brisbane, CA October 6 – 9 by Len Ochs, Ph.D.

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A placebo is usually a sugar pill that looks identical to the medication being tested. It can also be a physical manipulation such as a chiropractic adjustment or a sham form of psychotherapy or acupuncture. In studies where the placebo is used, they are often double blind, where both the patients and the researchers are unaware which group each patient is in. Asbojorn Hrobjartsson (2003) conducted a meta-analysis of 130 studies that included placebo in the form of pharmacological, psychological or physical treatment. He found that the placebo effect was best observed in those studies where subjective measures were considered, particularly with pain. In these studies, the conclusions/results were partially dependant upon the report from the patient.

For psychological disorders, particularly depression, it has been shown that pill placebos are nearly as effective as active medications. While it is accepted that real psychotherapies are more effective than psychological placebos, Wambold, et al (2005) found that when properly designed, psychological placebos can be as effective as accepted psychotherapies.

These and other recent research studies have questioned the value of using placebos in research design. Because placebo patients’ results have been similar to those who have taken the trial medication, it poses the question - Are the responses to the real medications a “placebo” effect as well? For example, one takes an antidepressant and feels better within the same day - even though the effects shouldn’t be felt for two weeks on average. The response feels so real to the patient, but because it is medically unexplained, it’s labeled as a placebo effect by the clinician.

In yet another meta-study, which included studies with antidepressant
Biofeedback As a Placebo Effect?
Continued from page 3

medications, Kirsch and Sapirstein (1998) came up with the following formula: one quarter of medication response is based upon the actual ingestion of the medication; one half is placebo effect and the final one-quarter effect of the response was unclear to them. If the efficacy rate of biofeedback were based upon the one-quarter / one-half / one-quarter equation that Kirsch and Sapirstein claim most antidepressant medications work, then we could say: one-quarter of actual physiological change is due to voluntary regulation; one half is due to placebo effect and the unknown last one-quarter may possibly be based upon the clinician’s manner and relationship with the client (the clinician/patient relationship could account for this last ¼ effect in medication trials as well). This puts biofeedback's efficacy rate equal with the most oft-prescribed antidepressant medications.

These findings pose another question - placebo or not, if it helps the patient, should it not continue to be used? Just as the term psychosomatic has lost its negative connotation, maybe it’s time to rethink the idea of placebo. Historically, both terms have had negative implications. The term psychosomatic used to conjure the idea that one is making up the physical symptoms – that it was “all in their head.” Physical symptomatology of psychological phenomena is real and can now be measured with modern scientific and objective tools. One way this can be exemplified is by the many studies that have been done showing that the same amount of pain applied causes differing subjective responses from the subjects.

Biofeedback has often been criticized as being a modality that induces a placebo effect that is not long-lasting and valuable. If the patient’s response to biofeedback is a placebo, just as a patient’s response to a prescribed medication may also be a placebo, does either constitute better medicine? In his article, The Mysterious Placebo, John Dodes (2003), also posed these questions: Does a positive response to a placebo mean the patient’s problem is imaginary? Does a patient have to believe in the therapy for a placebo effect to work? And, are placebos harmless? He suggested that belief, operant conditioning and suggestibility played the biggest role in the effectiveness of...
placebos. All of these play an important role in the biofeedback protocol. Have you encountered the skeptic patient, who will thwart the development of self-regulation skills as a tool to improve his or her wellness simply because he or she expects something exogenous to “fix” him or her? The mechanical changes that occur in the body need the support of the psychological, spiritual and motivational drives or these drives will override the mechanical changes.

What isn’t addressed in a large portion of the research literature is the idea that the mind is a powerful ally (albeit still immeasurable). We respond to that which we have faith and belief in. The feelings we are feeling are real - whether “conjured” by the mind, a physiological adaptation to the effects of a medication, or with biofeedback and/or another form of therapy. Often, the physiological manifestation of one’s psychology looks exactly like the physiological manifestation of one’s physiology. Carolyn Myss (2003) illustrated this concept when she wrote, “Our biography becomes our biology.” While I know of no published studies that can back this idea, it feels intuitively and profoundly correct.

Many of the forces that reject biofeedback as a viable modality continue to call it a placebo. Yet these same forces are very much aware of the complications the placebo effect has on their beloved medication trials. The unfortunate double use of the term placebo – as negative and positive, allows one to choose its meaning, depending upon the nature of the argument. Just as the term psychosomatic has taken a different meaning over time, maybe the term placebo should as well. After all, the mind is a very powerful thing.

References:
Your Turn: BSC Members Speak

Jan R. Markle, MA, BCIAC

“Do you think the field of biofeedback should be licensed by the state? What could be gained from such a license? What could be lost?”

Bill Barton, PhD, Clinical Psychologist, San Francisco, CA

Biofeedback is a tool and a technique and having a rigorous certification to demonstrate a basic level of competence is preferable to trying to turn its use into a licensed profession that is regulated by the Board of Behavioral Examiners in Sacramento. We need stronger efforts to educate third party payers as to the value of our current certification and gain higher reimbursement for biofeedback services than for a similar length session of psychotherapy.

I would like to see the California Psychological Association pushed to demand certification in biofeedback for its members who use the tool. There is the existing caveat that a licensed professional always operates within one area of competence, yet there needs to be in the CPA code some description of what competence in use of this tool consists of and reference to the BCIA. While I am blowing my horn, I feel strongly that the personal training requirement needs to be increased from 10 hours to 20 hours with a certified practitioner (and ideally, at least two different practitioners).

Margaret MacDonald, M.D., BCIA-EEG, Attention Disorders and Biofeedback, San Jose, CA

Licensure of the field of biofeedback would be a big step, but I would be in favor of it. In an ideal world, anyone needing biofeedback services would be able to turn to a duly licensed professional, knowing that there was a certain standard that had been met for their training and practical experience. Most of us don’t go looking for physical therapy or OT services, or even massage therapy, from just anyone—we want to know that the person is duly qualified in their field. This would hopefully also mean that there existed actual academic programs where a person could go to get the necessary training and practical experience, and that there would be some kind of examining body, and requirements for ongoing education and updating of knowledge.

BCIA goes a long way toward this now, but it may soon be time for the field to mature into a “real” field in which the practitioners can be recognized and respected for the knowable, edgeable and capable professionals they are. Maybe they shouldn’t be licensed in “biofeedback,” but rather in “psychophysiology.” With licensure would more likely come acceptance of the field and better insurance reimbursement. What might be lost is the irresponsible practice of “biofeedback” by those who are not properly trained. This would only strengthen the reputation and public trust for the field.

Leslie Hendrickson-Baral, M.Ed., California Neuro-Education, San Diego, CA

I would be in favor of licensure but in an abbreviated form. We could develop our core technologies and our “standards and code of ethics,” require certain training and experience, give a credential document, have a newsletter and professional network but NOT try to provide discipline of those providing biofeedback without our license or discipline of those with our license who we hear are practicing inapropriately. Maybe we could just send a letter noting the complaint and some general warning since they would have signed our code of ethics. I feel it is the discipline piece that is the can of worms. However, without it we probably couldn’t be paid as providers under most insurances -- maybe more likely with a referral from a licensed clinician if we do not have a license.

Patricia Grijalva, Certified Biofeedback Therapist, Marriage and Family Therapist Intern, Covina, CA

Licensing by the state would open up third party payment for biofeedback, separate from psychotherapy. State regulation would back up and validate standards set in place by BSC and BCIA. Biofeedback could be raised to specialty status instead of an “alternative” modality.

Doyle Edson, Psychologist, Faculty & Staff Counseling Center, University of California, Irvine, CA

I would be in favor of licensure but in an abbreviated form. We could develop our core technologies and our “standards and code of ethics,” require certain training and experience, give a credential document, have a newsletter and professional network but NOT try to provide discipline of those providing biofeedback without our license or discipline of those with our license who we hear are practicing inapropriately. Maybe we could just send a letter noting the complaint and some general warning since they would have signed our code of ethics. I feel it is the discipline piece that is the can of worms. However, without it we probably couldn’t be paid as providers under most insurances -- maybe more likely with a referral from a licensed clinician if we do not have a license.

Adding EEG Biofeedback tools to the menu of my educational therapies private practice in 1994 certainly has been both a wondrous adventure and, at the very same time, an arduous discipline. EEG Biofeedback is a scientific art form and, as such, must be committed to both spirit and mind. This discipline asks the clinician daily to be observant, interactive, whole-brain present (left=linear + right=creative) and absolutely results-oriented. Any clinician with great results will continue to thrive and the rest will not. The squeeze-hold molding process of state licensure would severely limit, distort and possibly break the essential spirit of the neurotherapeutic craft, therefore losing sight of the goal. I vote “NO” to licensure.
Steven C. Kassel, MFT, BCIA-c, BCIA-EEG, Newhall, CA

Licensing would make our profession legitimate in the eyes of the public, the health plans and other licensed professionals. We would need to designate who can do what by the use of specialties areas; a counselor would not be able to do neuromuscular rehab and a physical therapist would not be able to do psychological work with biofeedback, but could if they showed specialized training.

Blue Cross will not allow me to see any of their patients for biofeedback as they claim it is not in my scope of practice. Despite my 21 years of certification and continuing education they would rather refer their patients to a biofeedback shingle-hanging Ph.D. who has never had a class in biofeedback. They have threatened to cancel my provider contract if I agree to have one of their enrollees pay me for my services AND they will not allow me to be an employee or a co-owner of a corporation if biofeedback is part of my business! This would never happen if biofeedback was a licensed profession!

A licensed biofeedback therapist would be compelled to represent the profession responsibly or face losing his or her license. As it stands now, many things are passed off as biofeedback, are reimbursed as biofeedback and are not “the stuff” we learn about at conferences.

Kathy Bender, BCIAC, Senior Fellow, Oakland, CA

I think licensure is needed at this point since many insurers either prefer or insist on referrals to licensed practitioners. This seems to be a bigger problem in CA than in some of the other states. I am a provider for several carriers, including some Blue Cross plans, yet Blue Cross of CA will not refer to me since I am not licensed in another field.

Hershel Toomin, ScD, Biocomp Research Institute, Los Angeles, CA

You may well know biofeedback licensure was extensively studied for AAPB many years ago. It was of sufficient interest to be explored all the way to the California legislature. The end result was that the cost of bribing a congressman to get it before the legislature was more than the membership could afford. This was when the membership was much larger than it is now. That was the era when insurance companies were funding many hospitals for relaxation therapy. When that was stopped many members found other employment. We do, after all, have the best government money can buy.

*Prices include basic sensor s: 2×EEG/EMG/ECG, plus Temp, SC
Comprehensive Pain Management

Caroline Grierson, RN

43 year-old male with RSD
Left Leg

- Back injury on the job
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- Delayed medical attention
- Several surgeries
- Major depression and pain disorder
- Severe PTSD
- 16 medications daily

This patient, a merchant marine, sustained a severe back injury as he cast off the final rope for his ship as they were leaving the dock. The captain refused to go back to dock and the patient stayed in his cabin with unbearable pain for three days before the ship reached the next port. He was then taken to the hospital. In spite of two surgeries and two years of medical care, including a failed spinal cord stimulator and several lumbar sympathetic blocks, his pain persisted and increased with symptoms of PTSD (Post Traumatic Stress Disorder) developing, relating to his suffering from the pain while in his cabin. Because of the duration of his symptoms and the complications of chronic pain, his insurance company assigned him a very good and very patient nurse case manager who, after two years, was able to refer him to the Comprehensive Pain Management Program. He was unable to work, could do very little around the house and could help minimally with his three young daughters.

Even with a working spinal cord stimulator, his symptoms still included severe pain in his back, radiating and burning in his legs, severe anxiety and panic. The left leg was especially affected and had such severe sensitivity that he could not wear long pants or tolerate anyone or thing in the vicinity of 18 inches. Because of the weakness in his leg, he used a cane. In the neuro-biofeedback office, he could sit for only very short periods of time in a straight chair and had to stand and walk up and down while the assessment was done. The TOVA (Test of Variable Attention) had to be postponed to the next day. I chose the TOVA as a measure of how the central nervous system was working at the time given the severity of the pain and quantity of medication the patient was on. The TOVA showed Standard Scores of -1053, 105, -176 and –196 due to pain, medication, flashbacks and sympathetic over arousal. He was able to relax with the Freeze Framer only minimally.

This kind, well-educated man was very co-operative and dedicated. Staying in the hotel, near the program practitioners’ offices, was extremely difficult.
due to terrible dreams, constant flashbacks and being away from his family, especially his wife who helped him through the dreams at night. He often slept only one hour per night. He completed 2 four-week programs over three months. After the first month he was walking the 8 or 10 blocks between clinicians, was beginning to tolerate regular pants for short periods, was sleeping 4 to 5 hours per night, was experiencing perhaps one dream per week and one flashback only every few days. His leg pain was rated +7.5 to +5, back pain +7 to +5.5, and anxiety at +1 (0 being best and 10 being worst). Hypersensitivity to the leg was severe but less than it had been. Besides the MD, PT, neurotherapist, and psychotherapist, he also saw a psychiatrist who did “exposure therapy” for the PTSD.

He trained 30 to 40 minutes of neurofeedback per session using Neurobernetics equipment which included training at the following locations: P3-P4, P4-T4, T4-FP2, T3-FP1, CZ-FZ. All of the trainings rewarded 0-3 Hz with wide inhibits of 2-13 Hz and 14-30 Hz. In addition, FPO2 was rewarded at 3.5-6.5 Hz using the same inhibits. The patient used several feedback games but ended up preferring the maze display. Any attempt at Alpha/Theta training initially brought on severe flashbacks. Before each neurofeedback session, biofeedback tools were implemented. He learned relaxation and practiced his skills with the assistance of a relaxation CD twice per day at the hotel. He was taught good diaphragmatic breathing and heart rate variability (HRV) using the J & J 1-330 C2 and, then, outside the clinic he used the Freeze Framer daily to further his HRV training. EMG was used occasionally to supplement the work done in physical therapy and to indicate if he were bracing against the pain. However, the use of sensors was impossible on his sensitive skin, so the affected limb was not monitored. He was made aware of peripheral temperature changes as his relaxation progressed. He used the Alpha-Stim at the hotel for anxiety, after flashbacks and for pain in his back. By the middle of the second four weeks, he was ready to do Alpha/Theta and was extremely pleased with it. Clearly the neurofeedback and the exposure therapy had stabilized him enough to deal with the lower frequencies without bringing up the PTSD images. Additionally, his TOVA scores improved.

The patient has greatly improved and his pain is often 40% less on a good day, although it may still flare to a +7. Although he still relies on a driver, the end results are that the patient has reduced his pain levels substantially, his TOVA scores have greatly improved, he is able to attend classes on a modified scale and he is able to come to neurofeedback once or twice a month for maintenance. His insurance settled in a way that he can use it as required.

**T.O.V.A. Standard Scores for 1 patient before, during and after 2 four week comprehensive pain management programs**

![T.O.V.A. Chart]

**The Certificate Program in Imagery**

This is an innovative 4-phase, 110 hour certificate program offering in-depth training and direct experience in the exciting mind/body modality that teaches how to harness and utilize the power of the imagination for health/healing. In Phase I, you learn the fundamental principles and core concepts of Integrative Imagery. Taught are skills and techniques for pain/symptom control, surgery preparation, promotion of healing, and cancer care. These can be directly applied in the clinical setting and are integral for self-care. Phase I is open to all healthcare professionals. 21.5 contact hours are available for all RNs, approved by the American Nurses Association, an accredited approver by the American Nurses Credentialing Centers Commission on Accreditation (#432). This course also meets the qualifications for continuing education credit for MFTs and LCSWs as required by the California Board of Behavioral Science (#PCE3201) and the BCIA.

This program is endorsed by The American Holistic Nurses Association. The next course dates are September 29-October 1, 2006 (Sept. 29, 8:00am-5:00 PM and Sept 30, Oct. 1, 8:30am-4:30pm) at the Santa Sibina Retreat Center in San Rafael, CA. For more information, contact 650-570-6157 for registration or imagine@integrativeimagery.com.
Neurofeedback Therapy As a Treatment

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A series of paired t-tests was generated by Neurostat comparing absolute power, relative power, amplitude asymmetry, coherence and phase lag between recordings Q1 and Q2. The differences were highly significant in both absolute and relative power at 10 and 11 Hz (p < .001). The reduction in amplitude of the lower frequency peak was not statistically significant. Significant differences were also seen in inter- and interhemispheric amplitude asymmetry and coherence.

We believe that the overlap between EEG changes across the pre- and post-treatment QEEGs and the client’s reported clinical improvement is unlikely to be coincidental. Twenty sessions of targeted neurofeedback resulted in significant changes to the client’s brain wave patterns and to significant abatement in her clinical symptoms. We conclude that these results show a profound potential for treatment of PNES, and we plan future, more rigorous studies to substantiate this claim.

William A. Lambos, Ph.D. Bill is an experimental and behavioral psychologist who now specializes in neuropsychology and mental health disorders. Charles (Dick) R. Stark, M.D. has practiced medicine for over 30 years and for 17 years worked at the National Institutes of Health in Bethesda, Md. Cognitive Neuro Sciences, Inc. is a Tampa, FL-based group that includes licensed physicians, psychologists and other mental health professionals and provides services in all these areas. Neurofeedback is the cornerstone of our practice.