

1997 SSNR Annual Meeting Abstracts

Abstracts of Presented Papers

Quantitative EEG Profiles of Children with Attention and Learning Disorders and the Role of QEEG in Predicting Medication Response and Outcome

Robert J. Chabot, Ph.D.

New York University School of Medicine

This presentation will focus on two recently completed studies involving the role of Quantitative EEG in the diagnosis and treatment of children with attention and learning disorders.

The goal of the first study was to document patterns of neurophysiological abnormality in children with attention deficit disorders. To this end, QEEG was collected during an eyes-closed resting period, from 407 children with possible attention deficit and learning disorders. Clinical measures documenting IQ, reading achievement, memory problems, hyperactivity, inattention, and impulsivity were also obtained. The QEEGs from this sample were compared to a data base of 310 normal children. Discriminant analysis using a small subset of QEEG features resulted in a specificity of 88% and a sensitivity of 93.7% for distinguishing normal children from those with attention problems. As a group, children with attention disorders could be easily separated from normal children as 92.6% had abnormal QEEG evaluations.

Two major neurophysiological subtypes were evident within the abnormal QEEG profiles encountered. The first was characterized by varying degrees of EEG slowing, especially in frontal regions, whereas, the second was characterized by an increase in EEG activity, especially in frontal regions. These QEEG findings indicate deviation from normal development rather than maturational lag as the source of the neurophysiological abnormality in the majority of these children. When taken in conjunction with recent MRI, PET, and regional cerebral blood flow studies, these results indicate neurophysiological dysfunction within the cortical and subcortical structures which serve the frontal/striatal system. Models suggesting both hypo- or hyper-arousal of these structures as possible causes of attention disorders are supported.

The goal of the second study was to use behavioral and QEEG indices to evaluate and predict treatment response to stimulant therapy in children with attention disorders. A sample of 132 children were

evaluated. This sample included 65 children with attention deficit hyperactivity disorder (49.2%), 48 children with attention deficit disorder without hyperactivity (36.3%), and 19 children with minor attention and memory problems (14.5%). Paired associate learning tasks were used to evaluate a test trial of stimulant medication. Connor's, DSM III rating scales, and Neurometric QEEG was obtained before the stimulant trial and 6-14 months after treatment with the selected stimulant.

Significant QEEG differences were found between the normal control population (N=310) and the children with attention problems, with the degree of abnormality greatest in those children reaching criteria for attention deficit disorder with or without hyperactivity. QEEG abnormalities involved increased theta power greatest in frontal regions, frontal theta hypercoherence, and posterior interhemispheric power asymmetry and were similar to the abnormalities described above. QEEG abnormalities in short-term responders (increased paired associate learning) to dexamphetamine or methylphenidate differed, and a QEEG based discriminant function resulted in a sensitivity of 68.7% and a specificity of 67.5% for distinguishing the dexamphetamine and methylphenidate responders. Of greater importance, was the finding that 20.4% of the children in this sample had previously exhibited an adverse reaction to either dexamphetamine or methylphenidate, with 83.9% of these children correctly classified by the QEEG discriminant function. Children who showed a favorable response to treatment had a greater likelihood of QEEG normalization, and those with an adverse behavioral response to treatment an increase in QEEG abnormality. Pre-treatment clinical and QEEG features could predict treatment response with a sensitivity of 87.1% and a specificity of 91.3%. We conclude that a combined behavioral and QEEG approach can be useful for following and predicting treatment response to stimulants in children with attention disorders.

Relevant references:

Chabot, R.J., and Serfontein, G. Quantitative EEG Profiles of Children with Attention Deficit Disorder. *Biological Psychiatry*, 40, 951-963, 1996.

Chabot, R.J., Merkin, H., Wood, L., Davenport, T., and Serfontein, G. Sensitivity and specificity of QEEG in children with attention deficit or specific developmental learning disorders. *Clinical EEG*, 27, 26-34, 1996.

Experiments on Brainwave Therapy for Alcoholism

Paul J. Kulkosky, Ph.D.
University of Southern Colorado

In 1989, E.G. Peniston and P.J. Kulkosky published an innovative therapy for the treatment of alcoholism and prevention of its relapse. This therapy combined systematic desensitization, temperature biofeedback, guided imagery, constructed visualizations, rhythmic breathing, autogenic training, alpha

theta brainwave biofeedback, and booster sessions to treat chronic alcoholism in male inpatients. This Peniston & Kulkosky Brainwave Neurofeedback Therapy increased alpha and theta brainwave production; normalized personality measures, prevented a rise in beta endorphin-levels; and produced a prolonged prevention of relapse, in comparison with traditionally treated and nonalcoholic controls. Subsequent internal replications demonstrated this therapy's effectiveness in treatment of inpatients symptoms of PTSD in association with alcohol abuse.

Although there have been several external case studies supportive of this novel therapeutic approach, there have been few controlled experiments published. To convince a skeptical general scientific and clinical audience to accept this alternative therapy, a large scale, external, direct replication must be published in a mainstream journal. Deviation from original procedures of Peniston and Kulkosky may preclude similar results. However, future research designs could also address the following: 1) the external, systematic replicability of the method results in diverse populations with traditionally treated matched control groups; 2) the essential components and durations in this multiple stage therapy required for therapeutic advantage; 3) extension via conceptual replication beyond alcoholism and PTSD to the treatment of other psychopathology and 4) the physiological and psychological processes of the therapeutic effects. For example, extensive research confirms that endogenous neuropeptides are physiological stimuli for the initiation and termination of alcohol ingestion. Newly approved pharmacological therapy for alcoholism is based on the neuropeptide control of alcohol intake. Future research on brainwave therapy for alcoholism can address how regulatory neuropeptides are affected by the procedures of biofeedback. Only carefully controlled experimentation can advance wide acceptance of brainwave therapy for alcoholism and related-disorders.

Visual Evoked Potentials and Explosive Behaviors: A Brain Signature Response

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Since 1990 our clinic has conducted over 1200 computerized electro-encephalogram (CEEG) and cortical evoked potential (EP) studies of children and adolescents exhibiting a variety of psychiatric disorders. Across the years, clinical observations suggested that when the occipital lobe showed a high amplitude response during pattern reversal visual evoked potential

(PREP) patients typically had histories of major difficulty in controlling emotional responses. This paper presents the results of a study conducted to determine if the amplitude of the P100 wave form predicts explosive behavior in children and adolescents.

CEEG and visual and auditory EP studies of all patients, age 6 to 18 years, seen during 1966 (N=177)

were compared based upon the presence or absence of explosive behaviors. (Analysis of other data is under way and will be addressed in future papers.) Logistic regression was used to evaluate the relationship of the amplitude of the P100 wave form recorded from occipital electrodes (O1/O2).

Patients who exhibited explosive, out-of-control behaviors were significantly more likely to have high amplitude P100s ($p < .0001$). Grouping individuals as high amplitude or not, based upon our clinical guidelines (high amplitude = greater-than-or-equal-to 11 uV) still showed a significant relationship with explosive behavior ($p < .005$).

These findings indicate that the use of PREP studies allows the identification of one subset of individuals who have organically based explosive behavior tendencies. It strongly suggests that much explosive behavior is biological and not the result of "bad" parenting skills. The information provided by this study allows more appropriate intervention and treatment strategies to be implemented, while providing a better therapeutic relationship with the patients and parents.

Binocular Vision and Mild Traumatic Brain Injury

John K. Nash, Ph.D.

Licensed Psychologist, <http://www.qeeg.com>

The primary cue to depth is binocular disparity. The images from the eyes must be precisely overlapped quickly and automatically; this is called fusion. The brain must then create the appearance of a depth field from the range of fused objects of varying binocular disparities. This is called stereopsis. Stereopsis is the visual equivalent of stereophonic sound.

Patients with mild traumatic brain injury routinely show severely impaired fusion and stereopsis. They may also experience accommodative disorders, meaning that one or both eyes fail to adjust rapidly to different viewing distances. Patients experience a range of symptoms from "eye socket" headaches and impaired ability to judge distances to frank diplopia - double vision - while reading or looking at nearby objects. The most common symptom is that the world loses its beauty and appears flat, one thing "stuck" on the next, much the way a stereo system sounds if switched to "mono."

Data will be presented on MTBI patients with these impairments and on their subsequent recovery of binocular visual function with a combination of orthoptic visual therapy and neurotherapy. Visual therapy is supervised by a developmental optometrist. Patients receive guided practice with a variety of binocular visual stimuli, gradually extending their ability to create normal fusion and stereopsis. Accommodative disorders can be treated through a combination of proper lenses and training procedures.

The recovery of visual function is often rapid (10-20 sessions) when visual therapy is coupled with

neurotherapy. Improving binocular vision is separate but complementary to improving memory, concentration and multi-tasking abilities. The improvement in vision causes a positive effect on a wide range of symptoms, including affect and attention. Patients report improved mood, confidence in spatial judgments and a great sense of relief and amazement that they can see in "3-D."

EEG Biofeedback Treatment for Vietnam Veterans Suffering from Post Traumatic Stress Disorder

**Ken Graap, M.Ed. 1, David J. Ready, Ph.D. 2, David Freides, Ph.D. 1,
Bob Danials, Ph.D. 2, David Baltzell, M.D. 1**

Peniston and Kulkosky (1991) reported outstanding results in relieving symptoms of PTSD with an EEG biofeedback based treatment. This study was undertaken in an attempt to replicate Peniston and Kulkosky findings in an outpatient setting. To this end, outpatient veterans who sought treatment for PTSD at the Atlanta, VA were screened for participation in a two group cross over design study. Ultimately, nineteen of the veterans participated in some part of the study and thirteen of them completed the EEG biofeedback training. Dependent measures including the Beck Depression Inventory (BDI), Minnesota Multi-phasic Personality Inventory (MMPI), Million Clinical Multi-Axial Inventory (MCMI), Clinician Administered Posttraumatic Stress Scale (CAPS), Mississippi Scale for Post Traumatic Stress (Miss) and 19 channel EEG recordings were collected on three separate occasions. Half of the sample was treated at Emory using the Lexicor Biolex system and half were seen at the VA using a Focus Technology system. All participants were also enrolled in therapy groups with their cohort. BDI and Mississippi Scale scores declined across the study interval while other variables did not systematically change.

Overall, the results indicated that applying the treatment described by Peniston and Kulkosky (1991) to the outpatient population did not lead to the same dramatic results as they reported. A discussion of the past research, the present study and the factors which may have lead to the failure to replicate is presented.

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The Case for Alpha-Theta: A dynamic Hemispheric Asymmetry Model

Tom Budzynski, Ph.D.

The Dynamic Hemispheric Asymmetry model (DHA) postulates a differential functional cortical arousal level range wherein the dominant hemisphere, with its critical screening capability, is diminished in this capacity at high and low arousal levels, however, the nondominant hemisphere is still able to function at these extreme levels. At the low end of the arousal continuum, images and/or verbal suggestions are processed without the full effect of the critical screening, and therefore, are more likely to be accepted and acted upon. Conversely, early memories, especially those traumatic in nature, tend to be brought to the surface during this low arousal condition which has been labeled the twilight state. Neurofeedback, in the form of alpha-theta training, provides the means to access and maintain this state.

The Effects of Single Session and Multi-Session Audio-Visual Stimulation (AVS) at Dominant Alpha Frequency and Two Times Dominant Alpha Frequency on Cortical EEG

Joel F. Lubar, Ph.D.

University of Tennessee, Knoxville

Audio-visual stimulation (AVS) at fixed frequencies has been shown to synchronize brain activity towards those frequencies. We have conducted two studies employing 19 channel EEG recordings to determine if a single 20 minute session of AVS stimulation had significant and lasting effects over baseline on the cortical EEG measured in the 19 standard 10-20 electrode locations. We then examined the effects of dominant and twice dominant frequency stimulation over 20 sessions assessing the EEG every 5 sessions and also 2 weeks after the termination of all stimulation. Measurements were compared with initial baseline measurements which were taken in eyes closed situation and also we evaluated the effects on an eyes open post baseline measurement compared with a pre-eyes open measure before any stimulation had been employed. All of the measurements were obtained on normal college students. They were ten individuals in each AVS group. In addition, another study was carried out over 20 sessions to evaluate the effects of stimulation at one half the dominant frequency (theta activity) on cortical EEG. In addition to the AVS-EEG measurements, we obtained an assessment of possible behavioral effects as measured by the Categories Test of the Halstead-Reitan battery, the NEO - a

personality assessment measurement, the Woodcock Johnson Psychoeducational Evaluation and a measurement of hypnotic susceptibility.

The most surprising findings of this research is that the effects of AVS are counter intuitive and far from simple. For example, stimulation at the dominant alpha frequency has relatively minor effects on alpha production and has much more profound effects on either theta and/or beta activity. Beta stimulation also has relatively little effect on alpha but effects slow activity as well as fast activity. The distribution of these effects in terms of cortical regions is also very complex. For example, there are far fewer effects in occipital regions and in temporal regions than there are in frontal regions.

The basic findings from this initial research will be presented as well as the implications of these findings for combining AVS stimulation with neurofeedback in order to enhance neurofeedback effects. Because the results are counter intuitive and very complex, clinicians should be extremely careful in the employment of this modality until they have a clear picture of which regions and which frequencies are effected by theta, alpha and beta auditory and visual stimulation. Various models of how the AVS might be combined with neurofeedback will be presented and should lead to some open dialogue as to the best paradigms.

Biophysical Integration of MRI, EEG and Cognition in Traumatic Brain Injury

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Departments of Neurology and Radiology, University of South Florida College of Medicine, the Bay Pines Foundation and the Walter Reed Army Medical Center, Washington, D.C.

Nuclear magnetic resonance (NMR) of brain water proton (1H) T2 relaxation times, measures of cognitive function and measures of absolute amplitude of EEG and EEG Coherence were obtained from 19 closed head injured (CHI) patients. Statistically significant relations between 1H NMR, EEG and cognitive function were conjointly observed. The relationship between QEEG and 1H NMR differed as a function of EEG frequency and neocortical gray matter versus white matter in which lengthened white matter T2 relaxation time was positively correlated with increased EEG amplitude in the delta frequency band (0.5 - 3.5 hz). In contrast, lengthened gray matter T2 relaxation time was most strongly correlated with decreased EEG amplitude in the alpha and beta frequency bands (7-22 hz).

These findings are consistent with clinical EEG studies in which white matter lesions are related to increased EEG delta amplitude and gray matter lesions are related to decreased EEG amplitude in the alpha and beta frequency bands. Decreased EEG coherence in short distance connections of the frontal and temporal lobes was also correlated with increased T2 relaxation time. Estimates of the severity of injury were obtained by neuropsychological measurements, in which lengthened T2 relaxation times in both the neocortical gray and white matter were correlated with diminished cognitive function. The findings imply a measureable biophysical link between the state of protein lipid structures of the brain,

the scalp recorded EEG and cognitive function.

Results of similar research in Alzheimer's Disease will also be presented. Finally, the beginning of an improved and more generalized suite of QEEG and QMRI discriminant functions will be discussed.

Slow Waves and Neurofeedback

John Gilbert, Ph.D.

PLACE

We will look at the QEEGs of several people to identify the brainwave pattern in the slow waves for a number of disorders and discuss possible interventions based on the QEEG.

A Gentle Approach to Neurofeedback

Frank Deits, Mary Deits, M.C.

This presentation offers an alternative to the operant conditioning model of neurofeedback. By engaging the client in a climate of self discovery, excitement and anticipation replace boredom and resistance. The implications for instrumentation and therapist skills will be discussed.

Theta: Don't Tread on Me

Marvin Sams Ph.D., R.EEG T, QEEGT, L. Ac.

Theta activity is defined by international Federation of Electrophysiology and Clinical Neurophysiology as a frequency band of 4-8 mHz. As is well recognized, however, various subsets exist in all EEG frequency bands; Theta is no exception.

Subset 1: Frontal Midline Theta (Fm Theta) is a specific EEG frequency seen in those subjects actively engaged in cognitive activity, such as solving math problems and playing Tetris™, a Nintendo™ game. the peak frequency is between 6.2 and 6.7 Hz and maximally present at Fz, but with a wide fronto-central distribution.

Subset 2: According to Cavanaugh (1972), 4 Hz Theta is associated with object naming, an important

aspect of memory.

Fm Theta is associated clinically with the ability to sustain attention over a time, an extroverted personality, low anxiety and low neuroticism.

Of importance, the administration of diazepam (Valium™) and the ingestion of alcohol increases Fm Theta. In a study of those with marked extroversion, Fm Theta was found, along with lowered platelet MAO activity.

Due to the favorable characteristics of Fm Theta and 4 Hz Theta, Theta should not be inhibited or decreased in Neurofeedback training. The one exception is statistically elevated Theta activity on a QEEG reference database.

Fm Theta is easy to train with Neurofeedback, with positive clinical outcome. Specific protocols will be discussed.

Digital Telephonic EEG Transmission and Receiving System

Harley E. Schear, Larry L. Woodard and Land B. Wilson

TeleDiagnostic Systems, San Francisco, CA

800-227-3224

TeleDiagnostic Systems, has been and continues to be the pioneer in the field of telemedicine with the development of telephonic EEG transmission system started some 25 years ago. TDS has recently received FDA 510(k) compliance for its new 16-24 channel digital EEG tele-transmission system. This new system uses digital computer technology to provide real-time transmission of high-resolution digital EEG over standard voice-grade telephone lines. This system uses patented proprietary processing techniques to provide the highest possible quality EEG at the receiving location. The phone line condition is constantly monitored and the system dynamically adjusts the EEG digital processing to accommodate line condition fluctuations. At the receiving location, digital-to-analog conversion is used to reconstruct the analog EEG signal. This allows the EEG receiver to interface to virtually any EEG recording/analysis system just as though the patient were physically present. This new system eliminates the need to transport patients for EEG testing and allows EEG labs to extend their services to remote facilities via telephonic link. In addition, transmitting facilities can send data to receiving centers for quantitative analysis (brain mapping - QEEG), and for neurointensive monitoring from ICU's and CCU's.

TeleDiagnostic Systems is not only the technology pioneer, but also the company to provide telephonic EEG services. We were the first, and the largest EEG service company in the world. TDS is once again offering EEG services using it's newly developed digital transmission system. With this new digital

technology, TDS can now provide clinical EEG diagnostic services which are up to the standard of practice for in-laboratory EEGs. In addition, TDS can now provide a wide range of monitoring and quantitative analysis services via telephonic link. A quantitative EEG (QEEG) measures and calculates absolute and relative power, symmetry and coherence to construct "maps" as well as numerical tables of the brains activities. It precisely defines the patient's individual EEG profile by evaluating hundreds of EEG variables. This procedure is extremely valuable in providing pre and post analysis of subjects EEG for neurofeedback professionals.

Workshop Abstracts

Workshop 1-

Introduction to QEEG

Jay Gunkelman, QEEGT

EEG parameters: amplitude, frequency, phase, coherence, symmetry

Montages: referential, sequential, source derivation, remontaging

Analysis techniques: Fourier, zero cross

Topographic display: traditional bands, single Hz. bands, scales, background vs episodes, coherence/phase/symmetry

Discriminates: use and misuse

Evoked potentials: VEP, P300, SEP, BAER

Database issues: Normals, Z-scores, passive vs task, eyes open/closed

Samples of ADD/ADHD

Questions

Workshop 2 -

Cognitive therapy and NF

Tim Tinius, Ph.D., Cassie Tinius, LICSW

Sauk Center, MN

This presentation will show techniques and procedures to combine the use of computer programs that facilitate cognitive retraining while at the same time providing EEG biofeedback or neurotherapy. We have used this training in our office for the past 18 months and have shown that the combination can reduce the number of sessions needed for treatment. It also allows us to make a better estimate of the number of sessions needed to complete treatment. We will briefly discuss the history and research with cognitive retraining/rehabilitation and review published outcome studies.

We will present a detailed explanation of procedures that include the rationale for selecting cognitive training programs, length of the cognitive training exercises, and when exercises (audio or visual) are presented to facilitate treatment. We will show a brief video of how the office is set up and how a session is completed. We will discuss available programs (private and public domain) that are available for use. We have used this technique for treating children and adolescents with a diagnosis of ADD and Head Injury. Interesting outcome cases will be used to promote discussion.

Workshop 4 -

Performance/Life Enhancement Training Integrating EEG Biofeedback

R. Adam Crane

One of the most promising trends to emerge in mental health is assisting functional people in becoming more functional and the treatment of subclinical symptoms. The educational specialty popularly known as Performance Enhancement will probably grow exponentially in the near future. Neurofeedback opens an extraordinary niche in this field. Many practitioners long to expand into this area and to that end we have developed The Process.

This workshop will describe a Performance/Life Enhancement EEG program designed to appeal to the "Actualizer" segment of the Value Added Lifestyle Survey and targeting businesses, sports, education, arts, and personal growth. "Actualizers" are trend setters, practice builders and the group most responsible for the evolution of neurofeedback, and integrative and alternative medicine.

This innovative strategy seeks to solve the problems attendant to delivering Neurofeedback Performance

Enhancement Training to the public in small groups using qualified practitioners, inexpensive personal EEG trainers and a powerful, heuristic program designed to stand on its own with or without EEG biofeedback.

Problems of doing EEG training in groups will be discussed as well as techniques for working with individual clients for whom EEG training is difficult. Integration of computerized neurofeedback and Synchrony training will be discussed and, if possible, demonstrated depending on time and equipment availability.

Adam Crane has been training professionals in neuro and traditional biofeedback for 28 years and has developed several organizations dedicated to training, technological innovation and equipping professionals. Health Training Seminars provides accredited certification training in EEG and traditional biofeedback and includes the director of the Center for Enhanced Performance at West Point Military Academy on its distinguished faculty. Adam began training clients in Biofeedback assisted Performance Enhancement in the early 1970s (executives, writers, musicians, actors, models, athletes, etc.) and has developed a combination of strategies which are embodied in The Process and will be presented in abbreviated form.

Workshop 5 -

Using Evoked Potentials in Clinical Practice

Don Bars, Ph.D.

This workshop will address the clinical interpretation of visual and auditory evoked potentials in relation to psychiatry, psychology, and education. An overview will be presented to familiarize the audience with what an evoked potential is and how it is recorded. Different wave forms generally identified and evaluated will be discussed in relation to the primary areas of the cortical surface where they are recorded and what research has suggested are their function in data processing and behavior. A major "block" in psychiatric treatment is denial. While most individuals "know" that they have problems, many do not want to recognize this fact for fear of being thought "crazy". The results of evoked potentials help cut through denial and show that the individual is not crazy but rather is influenced by biologically based brain signature response patterns.

Data from an on-going research project will highlight differences in morphology and amplitudes between individuals presenting with several behavioral difficulties. An entire clinical evoked potential paradigm from four groups of individuals, based upon specific electrophysiological activity and clinical experience, will form the basis for the discussion.

Participants will be able to identify wave forms associated with different stimuli and begin to see how

clinical relationships to behavioral and educational difficulties can be arrived at and incorporated into treatment planning. Individuals will learn electrical patterns normally seen and how unusual patterns underlie behavioral and learning difficulties. While treatment strategies are still not fully understood in relationship to the electrophysiological information found, the discussions will focus on how information gained through evoked potentials can result in more appropriate interventions with more successful and shorter treatment times.

In the future, biofeedback may address changes in evoked potential response patterns, even though the feedback itself is based upon the brain's frequency band distribution.

Workshop 7 -

Learned Self-Regulation (LSR) for Performance Enhancement; Nuts & Bolts of Optimal Performance Under Stress

Vietta E. 'Sue' Wilson, Ph.D.
York University

This workshop presents the basic research supported "how to" techniques to facilitate performance when under stress. The presenter has taught sport psychology, counseling, motor learning and learned self-regulation at York University for over 25 years. Her research has been in the application of psychological skills to performance enhancement with the latest work being in QEEG investigations of the distinction between kinesthetic and visual imagery. Her clinical work includes teams or athletes at every Olympics since 1972 as well as working with corporations and educational institutions. She also has experience in a Counseling and Development Center and in a medical clinic specializing in children with cerebral palsy. She is the president of 2Balance which focuses on providing individuals with knowledge, skill and coaching support for maintaining health and balance in one's life.

This workshop is applicable to almost all performance situations including sport, school, work, fine arts, and interpersonal relationships. The Brief LSR skills, which are to be integrated into the performance setting to prevent disruption of previously learned skills or enhance new skills, will be practiced. The Deep LSR skills, which are used for regeneration or recovery will be discussed but time does not permit practicing. The role of EEG for assessment and biofeedback will be suggested but not demonstrated.

Tentative Outline:

I. Motivation

- A. Goal Setting & Image Projection
- B. Feedback (achievement, support)
- C. EEG for motivation

II. Body Control

- A. Breathing (roller coaster)
- B. Muscles (muscle awareness training MAT)
- C. Blood Flow (arteriole vasodilatation)
- D. EEG for body control

III. Mind Control

- A. Attention
 - B. Emotions
 - C. EEG for mind control
-

Workshop 8 -

Alpha Theta Training with Couples

Ellen Saxby, R.N.

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The benefits of Alpha Theta training for treatment of addictions and Post Traumatic Stress Disorder have been well documented. Many clinicians with extensive use of this protocol have attempted to define for themselves what the most potent active ingredients are so that this powerful tool can be used in other applications. This is important in adapting the therapy to an outpatient setting.

With the level of divorce and the level of domestic violence steadily rising, clinicians reach out for tools that could have an impact on healing the ills of relationship. The work with couples seeks to utilize the power of Alpha Theta to help uncover and resolve unhealed wounds from early childhood. The work also gains its strength from the delicate, highly sensitive altered state which Alpha-Theta produces. This workshop is a description of a protocol that utilizes a specific framework based on the developmental process. It includes:

a review of the basics of Alpha-Theta training Use of the MCMI to create a direction for the work
concepts that underly work with couples a range of techniques experiences unique to couples work
factors that affect the outcome

Workshop 9 -

Quantitative EEG Profiles of Children with Attention and Learning Disorders

and the Role of QEEG in Predicting Medication Response and Outcome

Robert J. Chabot, Ph.D.

New York University School of Medicine

The workshop will just examine how to evaluate individual children for ADHD and treatment response using QEEG. Refer to the abstract under "Presented Papers Abstracts" (above) for specifics of the applications of neurometrics to diagnosis and treatment of ADHD.

Workshop 10 -

Neurometrics/QEEG Update

R. W. Thatcher, Ph.D.

University of South Florida

This workshop will present the uses of a QEEG normative database and a QEEG discriminant function analysis for TBI in clinical work. Basic concepts of QEEG, such as Coherence, Phase, Amplitude Asymmetry and the construction of a Lifespan normative database will be discussed and illustrated. The use and validation of a discriminant analysis for traumatic brain injury will be illustrated and explained.

Workshop 11 -

Listening to Nature; New Approaches to Neurofeedback Training

Marvin Sams, Ph.D., R.EEG T, QEEGT, L. Ac.

Neurofeedback Centers of America

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Historically, Neurofeedback Practitioners have focused on enhancing attention by training two EEG frequencies at three different electrode sites, namely, so-called SMR and Beta training at Cz, C4 and Cz.

Neurofeedback can be much more than attention training; using specific training techniques, inefficient and dysfunctional electrical brain activity can be remediated with symptoms alleviated. Cerebral function has been effectively restored or improved, for example, in such neurological issues as specific learning disabilities, ADD/ADHD, depression, closed head injury, and OCD.

Techniques will be described which use the increase of natural brain frequencies known for their presence in those with adequate to superior cognition (namely, 40 Hz, 13 Hz, and 11 Hz frequency bands)' the decrease of inappropriate slow waves that dampen attention and blunt cognitive ability (delta activity that increases under task), and the correction of electro-physiological inefficiencies (inappropriate coherence and phase relationships). The importance of training multiple electrode sites in certain frequency bands will be stressed.

The proposed new neurofeedback training objective, therefore, is to address and remediate the root cause of the clinical problem, rather than to train for alleviation of symptoms.

Workshop 12 -

Interrelationship Between Changes in EEG, Stages of Learning, and Long-term Success in Neurofeedback for the Treatment of ADD/HD

Joel F. Lubar, Ph.D.

University of Tennessee, Knoxville

Judith O. Lubar, L.C.S.W.

Southeastern Biofeedback and Neurobehavioral Institute

A long-standing debate central to the concept of biofeedback is that unless there is an underlying change in the physiological measure being trained, any change in behavior that is observed is primarily due to nonspecific i.e., placebo factors or will result in relatively short term gains. In the case of employing neurofeedback for the treatment of ADD/HD, we have accumulated data over a 20 year period. A large number of children, adolescents, and adults that clearly support this position.

We will demonstrate in this workshop how patients are evaluated for neurofeedback training and how their success is tracked session by session through graphing their data: specifically microvolt levels of the rewarded frequency, microvolt levels of the inhibited frequency, percentage time they obtain feedback for the reward frequency, ratio of reward to inhibit activity, threshold settings, and percentage and microvolt levels of EMG activity measured from the active electrode sites.

We will show how these parameters are directly effected by factors outside of the neurofeedback session, i.e., everyday life experiences, traumas, positive experiences, family interactions and events taking place in the community or in the school. We will emphasize the importance of rather than mechanically employing neurofeedback how the integration of neurofeedback with parent skills training and family dynamics in therapy is crucial for long term success and follow up.

Workshops 14 and 16 -

The Clearest and Simplest Neurofeedback for Concentration: FrontalWide-Band Suppression

Jonathan D. Cowan, Ph.D., BCIACEBP

NeuroTechnology, Inc.

I have developed a protocol for training one-pointed focus that is much more sensitive and selective than any previous concentration protocol. My clinical experience indicates that, within the first 3-4 minutes, almost every naive trainee can understand that visually focusing on a small screen object makes it move reliably in a particular direction. Soon afterwards, usually within the first 6 minutes, they learn to reliably produce these changes, and can then do so for longer and longer time periods.

Within the first session, most trainees can also learn to focus their attention on specific parts of their body or subtle details of conversation. This is in contrast to other neurofeedback protocols, which take longer to learn because they are far less clearly related to concentration.

This new neurofeedback protocol rewards the trainee for suppressing a wide frequency band of EEG at the frontal location (Afz) that overlies the anterior cingulate formation, which has been suggested to be the central portion of the Executive Attention Network (by Posner and Raichle in Images of Mind). It was developed by adapting the studies of Dr. Barry Serman on B2 bomber pilots and other subjects doing continuous performance tests. He uncovered a cycle between a low-voltage, non-specific pattern during intense focus, followed by a theta burst soon afterwards. This may be related to the frontal midline theta rhythm found by several Japanese researchers during problem solving, but it is clearly the suppression of theta that corresponds to intense, one-pointed focus.

Workshop participants will have the opportunity to experience this new neurofeedback using the Peak Achievement Trainer, which simplifies and speeds up hookups by using the saline-based SensorPhone and SensorBand electrode systems.

Workshop 15 -

Advanced topics in QEEG

Jay Gunkelman, QEEGT

Physiological generators and pathways
Phase/Coherence definitions and displays

Fourier assumptions
Windowing: Hanning/Hamming/triangular
Bands or single Hz frequency displays
Database issues: activation/task/eyes open
Evoked potentials: VEP/P300/SEP/BAER
Epilepsy: episodic vs background
Certification/ societies positions on QEEG
Discriminates: use or misuse
Patterns seen in clinical practice
Artifacts in QEEG: EOG/EMG/Pulse/Glosokinetic/Comet effect
Leakage-Gibbs/smearing/harmonics

Workshop 17 -

Business Opportunities In Peak Performance Training

Bob Moroney, M.A., D.A.

Every human being can benefit from peak performance training. Developing a thriving business depends on matching the background and interests of the peak performance specialist with a like-minded population group. E.G., a former football trainer has developed a successful peak performance practice with football players.

In addition to outlining a number of training protocols, I will teach participants how to identify and recruit populations of prospects with compatible interests and objectives to the background and interests of the peak performance trainer.

Workshop 18 -

The Thinking Cap Brain Blood Flow Modality: An Affordable PET Scan

Hershel Toomim, Sc.D.

Dianne had the most woebegone look I had ever seen as she sat across my desk. She had just come from the hospital after 9 days in a coma from her latest suicide attempt. After 16 years of psychiatry and drug therapies she gave up. Her depression was just too much to bear any longer. After 13 Thinking Cap therapy days spread over a month she had a job. She had her first date!

The workshop introduces Brain Blood Flow to Neurofeedback practitioners. Join in the exciting new visions of neuroscience. Evaluate the lessons for brain therapy introduced by the PET method of constructing 3 dimensional views of the active living brain. You will have a hands-on experience in voluntarily controlling your own brain blood oxygenation with the new neurofeedback modality, the "Thinking Cap" (TM). The new technique of blood flow measurement provides a theoretical foundation which helps predict the what, where and how to the practice of Neurofeedback.

WORKSHOP OBJECTIVES: The relationship between EEG and blood flow as measured by the Thinking Cap is explored. Case studies as well as an ongoing controlled study of the effects of the Thinking cap will be examined. The workshop begins with a hands on experience of the Thinking Cap. This experience is followed by an exploration of brain imaging with color pictures of typical PET brain scans relating brain blood flow in active areas to brain functions. You will gain an appreciation of the locations and small sizes of brain areas used in living functions. You will appreciate the importance of blood flow enhancement at specified locations for treatment of various brain disorders. You will see an example of blood flow exercise increasing brain vascularity. You will understand its importance in remedying low flow conditions in many brain disorders. The Relationship of Blood flow to EEG is explored with reference to the large experimental data base showing the way these two measurements effectively complement one another. A simple brain scan helps the therapist select the appropriate treatment position. Guide lines are presented for evaluating EEG recordings to locate the most efficient treatment sites. A hands on demonstration will show the importance of meaningful personal challenges in determining the useful treatment sites.

A. Hands on. Do it.

1. Control your own brain blood flow
2. Discuss results

B. Understand it.

1. Blood oxygenation, light absorption, and Thinking Cap
2. Blood flow and mental disorders
3. Brain growth and vascularity
4. PET (Positron Emission Tomography)?
 - a. PET and blood oxygenation
 - b. Volume of detected tissue
5. Types and examples of Pet studies

C. Use it in therapy

1. Test for baselines and treatment locations
 - a. T.O.V.A.
 - b. Brain Scan
 - c. Micro-Cog
2. Treatment procedure
 - a. Segment Duration
 - b. Segment number
 - c. Treatment frequency

Poster Abstracts

Specificity of Neurofeedback for Cognitive Deficits

David A. Kaiser, Ph.D.

The specificity of various EEG neurofeedback protocols for the remediation of cognitive deficits was examined. Protocols varied on electrode placement, montage, and reward frequency bands, among other factors. This was a retrospective study of 64 children with attention problems (8-14 y, mean 10.2 y). All subjects received a minimum of 20 sessions of SMR/Beta (12-15 Hz/15-18 Hz) reward training with theta and high-beta inhibits. All children received an extensive battery of neuropsychological tests before and after training.

It was found that on specific cognitive tests, results were significantly improved if as little as 20% of training involved frontal sites along with training at sensorimotor strip. Also, it was generally found advantageous to train on both hemispheres, as opposed to training on the midline or training solely on one hemisphere. Certain cognitive skills benefited preferentially from higher frequency training (15-18 Hz) and from training on the left hemisphere. Protocols that focused on reward of the lower frequencies tended to be driven more by behavioral issues such as hyperactivity and sleep, as well as right-hemisphere functions; both of which were less quantifiable by cognitive testing.

Increasing refinement of EEG neurofeedback through protocol specificity are indicated by these early promising results.

Reflexology and It's Effect on the EEG

John A. Putman and Merle Sunde

EEG Spectrum Encino, CA

Reflexology is an ancient holistic healing technique that has been practiced as far back as the Egyptian Era and is currently used throughout the world. It's basic premise is that specific reflex points on the hands and feet correspond to different glands and organs in the body. When stimulated, the body's own healing abilities are engaged resulting in improved health and feelings of well being. The purpose of this

project was to examine how these positive changes, resulting from a single reflexology session, would manifest in the EEG of 14 volunteers (adults ranging in age from 23 to 63).

We used an 8 channel multi-modality biofeedback system in which 2 channels were dedicated to the EEG measurement. Electrode placement was at C3 and C4 where sensory input is registered. Other measures used were temperature, skin conductance and heart rate. The EEG measures taken were amplitude, power, % power and % synchrony. Bandwidths examined were theta (3.5- 7.4 Hz), alpha (7.4- 12.1 Hz) and beta (12.2 -42 Hz) with subsequent bandwidth redefinition in order to check for trends in narrower bands.

All but 2 of the subjects found reflexology to be a very pleasant experience. Of the 14 subjects, 11 had useable data. (Combining EEG with "hands on" treatment techniques brings with it a particular set of liabilities with respect to artifacts), Of these 11 persons, 10 showed significant increases, over the course of the session, in one or more of the following measures: alpha amplitude, theta amplitude, % alpha synchrony and % theta synchrony. All increases in amplitude were bilateral. Only one person showed no increases. Additionally, and perhaps more importantly, there was a substantial drop in these measures immediately following the baseline period when the hands on portion of the session began. This may have important implications with respect to the role of healing touch in cortical stimulation.

EEG Coherence Training Based on QEEG Abnormalities in Patients with Closed Head Injury

J.E. Walker, M.D.

Anecdotal reports indicate that EEG biofeedback to correct coherence abnormalities on QEEG may remediate memory loss and cognitive problems in patients with mild closed head injury. We report our successes and failures in remediating the symptoms of mild closed head injury in our first twenty-three patients using this approach. In each case a QEEG was obtained.

The most highly significant intrahemispheric or interhemispheric coherence abnormality was addressed with ten sessions of EEG biofeedback. If mild or no improvement was noted, the next most significant coherence abnormality was addressed with biofeedback training. If little or no improvement was again obtained, the 3rd most significant coherence abnormality was addressed.

Overall, using only coherence training, 19 of the 23 patients experienced at least a 50% improvement in their symptoms. 5-30 sessions were required. Training to increase beta coherence seemed particularly effective and produced more rapid improvement than central beta power training (Walker 1966). Frontal and central placements seemed particularly effective.

Milder benefit was noted with training to theta and beta coherence in the majority of patients, as well as

with training to increase alpha coherence. A minority of patients improved with training to increase theta coherence. Adverse effects were noted in a few patients, and these will be reviewed. Whether coherence training with these placements would have similar results if no QEEG were done or if no abnormalities were present in these areas is not known.

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