

Scientific Program

February 20 and 21, 2008

12th BFE Meeting, Salzburg

The Scientific Program starts on February 20, 2008 after the workshops with a welcome snack and ends on February 21, 2008 at 8 p.m.

17:30-17:45

Opening of the 12th Meeting of the BFE
Erik Peper, Ph.D. President BFE Scientific Advisory Board
San Francisco State University, USA

17:45-18:00

Welcome Speech
Univ. Prof. Dr. Wolfgang Kimesch, Naturwissenschaftliche Fakultät Salzburg, AUT

18:00-19:00

Thermal Biofeedback, the Essential Ingredient in Self-Regulation
Patricia Norris, Ph.D. Holos University Graduate Seminary, Missouri, USA

19:00-20:00

The Pain is Gone! Psychophysiological Exploration and Demonstration of Healing
Norihiro Muramatsu, Japan
Introduction and Physiological Recording
Erik Peper, Ph.D. San Francisco State University, USA

9:00 - 14:15 Paper Session	BFE Meeting 2008		Scientific Program	Salzburg
09:00 - 10:45	PANEL 1 Specific Biofeedback Applications Pelvic Floor, EEG, HRV Chair: Donald Moss	POSTER SESSIONS	PANEL 2 Neurofeedback Chair: Lynda Thompson	
	Healing and Selfregulation of Emotions by HRV <i>Kees Blase</i>	Correlation between autonomic response and psychophysiological features of myofascial chronic pain <i>Ruvalcaba Palacios Gerardo, Dominguez Trejo Benjamin</i>	The Effects of Heart Rate Variability Biofeedback in Patients with Depression and in Healthy Controls <i>Martin Siepmann, Volkan Aikac, Jana Unterdörfer, Katja Pietrowski, Lothar Niepoth, Michael Mück-Weymann</i>	
	HRV Biofeedback in Cardiac Rehabilitation – Results of a Pilot Study <i>Daniela Klimov, Christian Brohet, Murielle Steenbergen, Jaques Dutrannois</i>	The Effects of Respiratory Sinus Arrhythmia (RSA) Biofeedback on the Symptomology of Posttraumatic Stress Disorder (PTSD) <i>Terri Zucker</i>	Efficacy of QEEG and Neurofeedback in the Assessment and Treatment of Post Concussive Syndrome: 24 Cases <i>Tanju Sürmeli</i>	
	Blood Pressure Lowering Effects of Biofeedback Treatment in Hypertension <i>Anastasia Lambropoulou, Eleni Kriakopoulou, Zoe Polychronopoulou, Spiro Diamantidis</i>	Investigating a metabolic BCI: can voluntary and involuntary responses be differentiated? <i>Stefanie Blain, Sarah Power, Alex Mihailidiss, Tom Chau</i>	The Effectiveness of Alpha Wave Neurofeedback in Depression <i>Choi Sung Won, Min Ji-Sun, Jaekal Eunju</i> <i>Co-authors: Kim Hyun-Taek</i>	
	To the Importance of Telemetric Biofeedback Technologies for the Development of Systemic Therapeutic Approaches <i>Petra Friedrich</i>	Does Heart Rate Variability Biofeedback help to reduce Depression? <i>Lutz Mussgay, Anke Reineke, Eva Mohnke, Richard Gevirtz, Heinz Rüdell</i>	Psychopathology, Affect Regulation and Neurofeedback <i>Sebern Fisher</i>	
	Lowering Blood Pressure with a new Telemedical Acoustic Biofeedback-therapy by using a Virtual Lab <i>Petra Friedrich</i>	A Psychophysiological Profile of an Australian Cohort of Vulvodynia Patients <i>Marek Jantos</i>	Effective Stress Management Using Neurofeedback + Biofeedback <i>Lynda and Michael Thompson</i>	
		The Effects of Asymmetry Training for Depression: Power Spectrum Analysis <i>Lee Ji Ha, Min Ji-Seon, Choi Seung-Won, Sung Gy-Hye</i>		
		Temperatur E-Electromyographic Biofeedback in the Treatment of Patients with Different Types of Headache <i>O.S. Shubina, L.A.Kuznetsova, O.A.Jafarova</i>		
10:45 - 11:15	Coffe Break and Poster Sessions	Coffe Break and Poster Sessions	Coffe Break and Poster Sessions	

11:15 - 13:00	PANEL 3 Biofeedback Applications Chair: Patricia Norris	PANEL 4 Specific Biofeedback Applications Chair: Karen Wise	PANEL 5 Effects of EEG Neurofeedback on Sleep and Sleep Disorders: A Documented Success Story Chair: Barry Sterman Part 1: 11:15 - 13:00 Part2: 14:00 - 16:30
	Biofeedback Approaches to Holistic Health <i>Monika Fuhs</i>	Vulvodynia: Development of a Psychosexual Profile <i>Marek Jantos</i>	
	Electrical Artifacts are Alive and Well: Check Your Cell Phone at the Door <i>I-Mei Lin, Marisa Cortez, Erik Peper</i>	Vulvodynia: A Psychophysiological Profile Based on Electromyographic Assessment <i>Marek Jantos</i>	SMR and Sleep Spindles, How it all Began: Studies in Animals and Human Subjects <i>Barry Sterman</i>
	Physiological Responses during Cell Phone Texting <i>I-Mei Lin, Erik Peper</i>	Cut-surface Dentistry and Applied Psychology <i>Elisabeth Adleff</i>	EEG Biofeedback in the Treatment of Insomnia: an Historical Perspective <i>Peter Hauri</i>
	Identifying Strategic Training Techniques in Biofeedback Therapy & Applied Psychophysiology <i>Bruno Kappes</i>	Biofeedback Therapy in Chronic Tinnitus: Effectiveness of a Psychophysiological Treatment <i>Kristin Heinecke, Cornelia Weise, Winfried Rief</i>	SMR Neurofeedback Training and Sleep Quality in Normal Subjects: A Randomized, Placebo-Controlled Study <i>Edwin Verstraeten</i>
	Anticipation - its Impact on Health and Stress Related Disorders <i>Ingrid Pirker-Binder</i>		Instrumental Conditioning of Human Sensorimotor Rhythm and its Impact on Sleep, Cognition, and Insomnia <i>Manuel Schabus, Kerstin Hoedlmoser, Wolfgang Klimesch</i>
13:00 - 14:15	LUNCH	LUNCH	LUNCH
	INVITED TALKS	INVITED TALKS	
14:15 - 15:15 Speaker 1	<u>Intro:</u> <i>Richard Gevirtz</i> Managing the "Difficult" Headache Patient <i>Steve Baskin</i>		Current and Future Perspectives on EEG Neurofeedback in the Treatment of Sleep Disorders <i>Wolfgang Klimesch, Michael Doppelmayr, Wolfgang Keeser</i>
15:25 - 16:25 Speaker 2	<u>Intro:</u> <i>Monika Fuhs</i> Stress Assessment by Transportable ICU Equipment <i>Sepp Porta</i>		Continuation of Talks and Round Table Discussion Lead by: <i>Wolfgang Klimesch, Michael Doppelmayr, Wolfgang Keeser</i>
16:30 - 17:00	Coffe Break and Poster Sessions	Coffe Break and Poster Sessions	Coffe Break and Poster Sessions
17:00 - 18:00 Speaker 3	<u>Intro:</u> <i>Barbara Timmer</i> Implementation of Psycho and Psycho-Physiological Tools in Educational System – Enhancing Resilience and Stress Management – A Study Done in 40 Schools <i>Daniel Hamiel</i>		
18:00 - 19:00 Speaker 4	<u>Intro:</u> <i>Erik Peper</i> Autonomic Mediators in Recurrent Abdominal Pain and Irritable Bowel Disease <i>Richard Gevirtz</i>		
	DINNER ON YOUR OWN / Restaurant Suggestions at the Registration Desk	DINNER ON YOUR OWN / Restaurant Suggestions at the Registration Desk	DINNER ON YOUR OWN / Restaurant Suggestions at the Registration Desk

12th Annual BFE Meeting Salzburg

SCIENTIFIC DAY OPENING

Wednesday, February 20th 2008

5 p.m.

Welcome Speech
Erik Peper, Ph.D.
San Francisco State University, USA

5:15 p.m.

Welcome Speech
Univ.Prof.Dr. Wolfgang Klimesch
Naturwissenschaftliche Fakultät Salzburg
Salzburg, AUT

5:30 p.m. – 6:30 p.m.

Thermal Biofeedback, the Essential Ingredient in Self-Regulation
Patricia Norris, Ph.D.
Associate Professor at Holos University Graduate Seminary
Missouri, USA

Thermal biofeedback has an important role to play in the treatment of every condition and illness. If stress and anxiety are occurring, thermal training ameliorates and may eliminate it, making it invaluable for treating cancer, and catastrophic illness. It is of primary importance in the so called stress disorders, such as headache, irritable bowel syndrome, and hypertension. Cardiovascular problems, respiratory and digestive problems, circulatory problems and even neuromuscular problems are diminished. Thermal training plays a role in personal performance; athletic performance is enhanced, test anxiety is reduced, and scholarship is improved. A valuable contribution is, that it proves to a person the influence of their thoughts and emotions on their physiology, giving them confidence in themselves and their ability to perform and to heal. Although often dismissed by biofeedback providers, a rationale for its effectiveness will be included.

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6:30 p.m. – 6:45 p.m.

Introduction of the Healer Norihiro Muramatsu by Erik Peper, Ph.D.

6:45 p.m. – 7:30 p.m.

The pain is gone!

Psychophysiological Exploration and Demonstration of Healing

Norihiro Muramatsu, JP

Erik Peper, Ph.D., USA

More than 80% of pain patients treated by Mr. Muramatsu report immediate cessation of pain after energetic healing. How can this occur? What is going on? How does this fit with anatomical knowledge? This presentation may expand the boundaries of healing and provide a short overview of the preliminary clinical outcome and QEEG data that were recorded during healing. The major part of the presentation is an actual demonstration of energetic healing while physiological measures from healer and patients are recorded. The healing will be done by Mr. Norihiro Muramatsu, a 45-year old Japanese energetic healer, who at the age of 30 was given his healing power by spiritual epiphany. Since the day, this spirit has been with him all the time teaching how to heal other people. He has a microscopic vision for affected parts of body and understands what need to be done anatomically. He heals by light touching and invocations which you may not notice anything but warmth during session. Many pain patients experience direct relief of their pain and he reports to have healed numerous illnesses such as cancers, infertility, migraine, back problems, rheumatism and other health problems.

Keywords: Healing, QEEG, Pain

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SCIENTIFIC DAY

Thursday, February 21st 2008

PANEL 1

Specific Biofeedback Applications Pelvic Floor, EEG, HRV

Chair: Donald Moss, Ph.D.

9 a.m. – 10:45 a.m.

Healing and Self-regulation of Emotions by HRV

Kees Blase, Ph.D.

HeartMath

NL

Classifying in positive and negative emotions is past. We better classify in: emotions positive for the body and emotions negative for the body. Measuring the HRV (HeartRate Variability) in situations of demarcating aggression, short anger, remaining anger, frozen aggression, appreciation, joy and sadness give interesting new facts. With this knowledge HRV-biofeedback gives the possibility for self-regulation of emotions in healing processes (psychosis, social emotional problems, anger regulation, ADD, peak performance). In particular, impeding factors on body level, emotional level and mental level can be minimized by HRV biofeedback. For biofeedback, the HeartMath instrument eMWave is used as well as the CardioSense Trainer. The HRV will be shown of sufi mantra and buddist monks.

Keywords: Biofeedback, Heart Rate variability, Emotions

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HRV Biofeedback in Cardiac Rehabilitation – Results of a Pilot Study

Climov Daniela, Ph.D., C. Brohet, MD, M. Steenbergen, & J. Dutrannois

Bruxelles, B

The purpose of this pilot study was to analyze the feasibility and to evaluate the effects of a HRV based stress management programme in coronary heart disease patients. The study involved 18 patients in two groups (biofeedback and control) who attended 5 training sessions during a 3-week period, using the Freeze-Framer stress management program developed by the Institute of HeartMath. Heart rate, blood pressure, depression and anxiety were assessed at baseline and at the completion of the training for both

groups. Although the sample size was small, a significant improvement was noted for the blood pressure (p -value < 0.10) for the biofeedback group as compared to the control group. The treatment effects for depression and anxiety scores were better for the biofeedback group compared to the control group, but this was not significant. Overall, these results suggest that further work in HRV biofeedback as a complementary treatment in cardiac rehabilitation is necessary.

Keywords: Biofeedback, Heart Rate Variability, Cardiac Rehabilitation

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Blood Pressure Lowering Effects of Biofeedback Treatment in Hypertension

*Lambropoulou Anastasia, MD, Kyriakopoulou Eleni, MD, Polychronopoulou Zoe, MD, Diamantidis Spiro, MD
Panhellenic Biofeedback Centre, GR*

A clinical study was conducted by the Panhellenic Biofeedback Centre to examine the blood lowering effect of biofeedback on essential hypertension patients. The method of release of chronic accumulated muscular tension, including identification and desensitization from the stressors involved, was applied with very significant decrease of systolic and diastolic blood pressure. 20 patients with hypertension longer than 4 years were included in the study. All patients attended the training program conducted by Panhellenic Biofeedback Centre in Athens. The method of releasing chronic accumulated muscular tension was applied and EMG, THERMAL, GSR and respiration monitoring assisted by computer analysis was used to ensure the objectivity required for the correct assessment of trainees' progress and desensitization. Blood pressure charts were kept by each patient. Results indicated that 65% of the trainees accomplished reduction of the median systolic blood pressure by 10-15mmHg and of median diastolic blood pressure by 10-20mmHg. After the completion of the biofeedback sessions, 85% of the patients demonstrated very significant decrease of the frequency of acute hypertension crises and were able to shorten the duration of hypertension episodes. (Biofeedback training significantly contributed to the control and management of both systolic and diastolic blood pressure via identification of the Autonomic Nervous System responses involved in essential hypertension and desensitization of the patient from the factors triggering or affecting these responses) Is this a hypothesis or a finding? If it is a finding, it should be in past tens. Furthermore, Biofeedback presents significant effects on the prevention and control of hypertension attacks.

Keywords: Hypertension, Biofeedback, Desensitization

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To the Importance of Telemetric Biofeedback Technologies for the Development of Systemic Therapeutic Approaches

Petra Friedrich, Dipl. Ing.

Technical University Munich, GER

It is a well-known fact that patient compliance diminishes between consultations. Automatic monitoring of vital parameters and contacting the patient regularly between visits or contacts fills an information gap for the attending physician. Moreover, the individualized care probably raises compliance. Mobile telemedical microsystems can measure and transmit patients' health parameters automatically. Profiles can be drawn for any desired monitored periods, thereby permitting systematic diagnosis and improved treatment. Such personalized sensor-aided information systems provide patients with the necessary diagnostic certainty as well as quick, cost-effective intervention if needed. Not only the elderly but also a growing number of chronically ill, or people feeling temporarily indisposed, require automatic knowledge-based systems for self-diagnosis and assistance in the healing and therapy processes. Combined with knowledge-based feedback systems, this technology can also offer concrete advice regarding behavior, medication and therapy. We are developing personalized biomedical measuring systems and set up a knowledge-based telemedical assistance system via database systems, the Ambient Medicine® platform. This platform generates comprehensive systemic data in an authentic environment, permitting for the first time developing concepts for systemic therapies. Biofeedback in any form offers access to systemic therapy approaches and structures accordingly. This possibility of systemic therapy is not to be confused with classic alternative or anthroposophical therapies. Contrary to the latter the data gathered in authentic surroundings yield parameter-oriented feedback structures. The next step then is development of selective parameter-oriented therapy structures.

Keywords: Telemetric monitoring

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Lowering Blood Pressure with a New Telemedical Acoustic Biofeedback-Therapy by Using a Virtual Lab

Petra Friedrich, Dipl. Ing.

Technical University Munich, GER

For successful diagnosis and therapy, it is essential to obtain comprehensive data about the course of a disease. In other words, patients' relevant physiological parameters should be measured over a certain period of time under authentic conditions, i.e. apart from medical consultations, anywhere and anytime. To achieve these objectives, we have built a virtual telemedicine laboratory, the so-called "virtual lab", based on the telemetric personal health monitoring platform, automated data transfer, gathering and analysis. Furthermore, it includes customized feedback and intervention options. Additionally we are developing a new acoustic biofeedback therapy to lower blood pressure and analyze the possibilities and limits of biofeedback treatments using this virtual lab. The virtual lab permits obtaining authentic data patterns in the patient's personal surroundings and, in this manner, for the first time to get an immediate impression of the intervention structures. Any sort of intervention is feasible through the bi-directional transmission path via language or data communication in the form of text, image and sound between the physician and the patient or vice versa. We like to present the design, the setting and the results of our field trial with these systems. Thereby we focus on the examination of the individual cases. As the system is not limited to

measuring blood pressure, any desired physiological data can be gathered and transmitted. The virtual lab environment, therefore, is an ideal development and test platform for personalized treatment.

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PANEL 2

General Biofeedback Applications

Chair: Lynda Thompson, Ph.D.

9 a.m. – 10:45 a.m.

The Effects of Heart Rate Variability Biofeedback in Patients with Depression and in Healthy Controls

Martin Siepmann, MD, Volkan Aikac, Jana Unterdörfer, Katja Pietrowski, Lothar Niepoth, Dipl.Psych., Michael Mück-Weymann, MD, MA, Ph.D.

Clinic for Psychosomatic Medicine and Psychotherapy, Medical School Carl Gustav Carus, Technical University, Dresden, Germany & Institute for Behavioural Medicine and Prevention, University for Health Sciences, Medical Informatics and Technology, Hall, AUT

Decreased vagal activity and increased sympathetic arousal have been proposed as major contributors to the increased risk of cardiovascular mortality in patients with depression. It was aim of the present study to assess the feasibility of using heart rate variability (HRV) biofeedback to treat moderate to severe depression. This was an open-label study in which 14 patients with different degrees of depression (13 f, 1 m) aged 30 years (18 to 47; median; range) and 12 healthy volunteers attended 6 sessions of HRV biofeedback over two weeks. Another 12 healthy subjects were observed under an active control condition. At follow up BDI was found significantly decreased (BDI 6; 2-20; median 25%-75% quartile) as compared to baseline conditions (BDI 22; 15-29) in patients with depression. In addition, depressed patients had reduced anxiety, decreased heart rate and increased HRV after conduction of biofeedback ($p < 0.05$). By contrast, no changes were noted in healthy subjects receiving biofeedback or in normal controls. In conclusion, HRV biofeedback appears to be a useful adjunctive for the treatment of depression, associated with increases in HRV.

Keywords: Heart Rate Vairability, Depression, Biofeedback

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Efficacy of QEEG and Neurofeedback in the Assessment and Treatment of Post Concussive Syndrome: 24 Cases

Tanju Sürmeli, MD, Ayben Ertem, Ph.D.

Living Health Center for Research and Education

Istanbul, TR

Mild traumatic brain injury is associated with damage to frontal, temporal and parietal lobes. Post concussion syndrome has been used to describe a range of residual symptoms that persist 12 months or more after the injury, often despite a lack of evidence of brain abnormalities on MRI and CT scans. The cluster of symptoms reported by these patients is referred to as post-concussion syndrome. The reported symptoms are: (a) attention deficits and difficulty sustaining mental effort, (b) fatigue and tiredness, (c) impulsivity, irritability, temper outbursts and changes in affect, (d) learning and memory problems, (e) impaired planning and problem solving (f) inflexibility, concrete thinking and lack of initiative, (g) dissociation between thought and action, (h) communication difficulties, (i) socially inappropriate behaviors, (j) self-centeredness, lack of insight and poor awareness, (k) impaired balance and (l) headaches and personality changes. QEEG has been shown to be highly sensitive (96%) in identifying post-concussion syndrome. The approach is to determine and assess who has post-concussive syndrome and to see if subjects with post-concussive syndrome will benefit from neurofeedback.

Evaluation measures include CGI, pre and post QEEG analysis with Nx-Link Data bank, MMPI, T.O.V.A, SA-45 Questionnaires and Dr. Amen's ADD Questionnaires and subjects and their family interview with videotaping. Nx-Link data bank used to determine post-concussive syndrome with clinical history of subjects. In Neurometric QEEG Analysis all QEEG variables are calculated as z-scores which means -1 to $+2$ standard deviation for age is normal. The magnitude of the standard deviation represents the severity of neuropathology and abnormality. Our hypothesis was that neurofeedback treatment would most benefit those patients who normalize the z-score on their QEEG. Lexicor QEEG signals were sampled at 128 Hz. 30 minutes neurofeedback sessions were completed in between 40 to 120 sessions. Electrodes were sited according QEEG analysis.

24 subjects (10 male, 14 female), ranged between 18 to 54 years old. 22 out of 24 subjects showed improvement according to CGI, MMPI, T.O.V.A, AMEN's ADD Questionnaires, QEEG Neurometric analysis, SA-45 Questionnaires and subjects' family interview with videotaping. Z-score normalization help improvement of their symptoms of those 22 cases. Neurofeedback treatment may be promising intervention in post-concussive syndrome. Further control studies are warranted.

Keywords: QEEG, Databank, Neurofeedback, Post-concussive Syndrome.

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The Effectiveness of Alpha Wave Neurofeedback in Depression

Choi Sung Won, Ph.D., Min Ji-Sun, BA, Jaekal Eunju, BA

Co-authors: Kim Hyun-Taek, Ph.D

Seoul, ROK

The purpose of this study was to develop a treatment protocol for modifying EEG asymmetry of depressive patients. The author investigated whether the asymmetry neurofeedback(NF) could cause alleviation of depressive symptoms. The NF training consisted of five weeks (two sessions per week) and each session took 50 minutes. All participants (n=23) which met DSM-IV criteria of mood disorder were randomly assigned to two groups. Twelve of them participated in NF and eleven of them were in the control group. NF training increased motivation and libido, as well as decreased dysphoria, somatic symptom, anxiety and social discomfort. Moreover, executive functions was enhanced by NF training. The 50% of participants who received NF training were classified as responders but none of the control group were classified. The results suggest that Alpha Asymmetry neurofeedback training might be an effective adjunct to psychotherapy and pharmacotherapy in the treatment of certain types of mood disorders. Findings from this study show the close causal relationship between alpha asymmetry and depression.

Keywords: Neurofeedback, Depression, Asymmetry

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Psychopathology, Affect Regulation and Neurofeedback

Sebern Fisher, MA

Massachusetts, USA

We see our emerging understanding of neurofeedback through many lenses including attention, arousal and regulation, cognition and memory. This lecture will present the argument that neurofeedback should be seen primarily through the lens of affect regulation. The field of psychotherapy is finally coming to a consensus that affect regulation is a common factor in positive therapeutic outcomes. In his work, *Affect Regulation and the Origin of Self*, Schore argues that the mother's ability to attune with her infant's affect is fundamental to the development of "self" in the child. van der Kolk, the well respected trauma researcher has said that regulation of affect was "the key to the kingdom" (Harvard, 2006). And Linehan's behavioral treatment, Dialectical Behavior Therapy, is in essence a skill based approach to affect regulation. Neurofeedback regulates affect. We see this every day in clinical practice. Fear may be the affect of greatest concern, particularly in severe psychopathology, and neurofeedback can quiet fear. Affect regulation then can be seen as neurofeedback's single greatest gift to the endeavor of psychotherapy. Affect regulation also provides important bridge language between the fields of neurofeedback and psychology.

Keywords: Neurofeedback, Psychotherapy

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Effective Stress Management Using Neurofeedback and Biofeedback

*Lynda Thompson, Ph.D. & Michael Thompson, MD
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There are electroencephalographic (EEG) signatures as well as psychophysiological correlates for stress. Stress induced anxiety and emotional intensity may correlate with ruminating and can correspond to bursts of high frequency beta activity or beta spindling (23-35 Hz). We call this a busy-brain pattern. There is corresponding low amplitude SMR and/or less high frequency alpha activity at FCz. LORETA often showed the origin of this activity to be anterior cingulate (Brodmann area 24). These EEG changes are found in conjunction with psychophysiological indicators including: poor respiratory sinus arrhythmia (RSA); heart rate variability (HRV); shallow, frequent, irregular respiration; increased heart rate; drop in skin temperature; rise in electrodermal response (EDR); and an increase in muscle tension. We reviewed the initial training EEGs of 165 consecutive adult clients who had come to the centre with stress related complaints and a desire to improve their ability to self-regulate and enter a zone characterized by a relaxed, calm, alert, focused concentration in order to optimize their performance. The results of that review will be presented. Intervention for these clients requires designing individualized training programs for mind and body. These training programs are based on EEG assessment and a psychophysiological stress profile. Clients are asked to experiment with feedback to find how their mental states correlate with specific EEG frequency band amplitudes and to find how these correlate with psychophysiological variable changes. Clients are trained to self-regulate those variables that correspond to feelings of anxiety, tension and stress. They are taught how to generalize control of those variables that correlate with stress to their every day living. This training can lead to improved stress management at both work and home. Examples of the feedback used and the strategies taught will be outlined.

Keywords: Stress Management, Neurofeedback, Biofeedback

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<p style="text-align: center;">Coffe Break and Poster Sessions 10:45 a.m. - 11:15 a.m.</p>

POSTER PRESENTATIONS

Correlation Between Autonomic Response and Psychophysiological Features of Myofascial Chronic Pain

*Ruvalcaba Palacios Gerardo MSc & Dominguez Trejo Benjamin Ph.D.
Mexico's National Autonomous University (UNAM), MEX*

The present study examined, on chronic myofascial pain patients, the relationship between autonomic activity and: cognitive-emotional state; physical features of myofascial trigger points and; pain intensity. The experiment was designed to test whether decreases in autonomic activity correlate with decreases on the aforementioned variables. 30 female randomly assigned at: A) Biofeedback-assisted relaxation training; or B) Health education group. Participants were evaluated before and after the intervention: Autonomic activation using surface electromyography and peripheral temperature records; cognitive-emotional state using Beck Anxiety and Depression Inventory; physical features of trigger points and pain intensity through a Numeric Analog Scale. Intervention in both groups consists of 10 one-hour weekly sessions. The results showed that Group A had a significant reduction on autonomic activation as well as on the three dependent variables measured, whereas group B showed increases in all measures, indicating that the absence or increases on autonomic activation were correlated with increases on physical and psychological symptoms.

Discussion

Previous research has shown that a relationship exists between autonomic function and psychophysiological state on acute pain (Rainville, et al, 2005). The present findings extend this line of work by demonstrating that decreases on autonomic activation correlates with decreases on psychophysiological symptoms on chronic pain patients. This suggests a strong influence of the autonomic response in development and establishment of muscle chronic pain.

Keywords: Cognitive-Emotional Modulation Of Pain, Autonomic Response, Myofascial Pain

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The Effects of Respiratory Sinus Arrhythmia (RSA) Biofeedback on the Symptomology of Posttraumatic Stress Disorder (PTSD)

Terri Zucker, Ph.D.

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San Diego, USA

Intervention studies for posttraumatic stress syndrome (PTSD) have focused on psychotherapy and psychopharmacology treatments but have neglected ones for underlying neurobiological alterations. Research indicates that a salient physiological component of PTSD is low amplitude heart rate variability (HRV). This study is one of the first to assess whether a therapy that targets autonomic homeostasis can improve treatment outcome for trauma symptoms. Thirty-eight adults meeting PTSD eligibility criteria were randomized to a respiratory sinus arrhythmia (RSA) biofeedback experimental condition or a progressive muscle relaxation (PMR) control procedure during a 4-week intervention period. The groups were comparable with regard to trauma severity, gender, medication, age, ethnicity, and education. Repeated measures analyses of variance (RM ANOVAs) assessed PTSD symptomology, trauma-related, and HRV measures. Pearson product correlations were calculated to assess influences of change in HRV.

Both groups significantly reduced PTSD symptomology. The BDI measure showed a significant interaction ($p < .01$), with decreased depression in the RSA group. Main effects were found on other trauma-related measures for both groups. Assessing the standard deviation of all normal-to-normal RR-intervals (SDNN), a significant interaction ($p < .05$) was found for HRV, with increased HRV amplitude for the RSA group. Increase in SDNN was highly correlated with a decrease in trauma for the two primary PTSD diagnostic measures, the PCL ($r = -.636$) and for the RSA group on the PTS-T ($r = -.578$). Trauma survivors psychologically and physiologically benefit from RSA biofeedback. Changes in trauma-related symptomology may be mediated by sympathovagal mechanisms.

Keywords: Posttraumatic Stress, Heart Rate Variability, Biofeedback

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Investigating a Metabolic BCI: Can Voluntary and Involuntary Responses be Differentiated?

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Conventionally, brain-computer interface technology has focused on electroencephalographic (EEG) signals as the input access pathway. Alternatives to EEG-based BCIs explore other physiological signals, including the neural hemodynamic response (as measured by NIRS) and electrodermal activity (EDA). One significant barrier that must be overcome to utilize these signals for robust access is to distinguish between voluntarily elicited signals and involuntary responses generated by arousing stimuli (e.g. startling noise). Method: In a case study with one healthy individual, NIRS and EDA signals were recorded as the individual performed three tasks: (1) alternating at 20-second intervals between resting and performing music imagery, (2) listening to 5 distinct startle stimuli at random intervals, and (3) a superposition of tasks (1) and (2). Analysis: Characteristic features for both EDA and NIRS, including response latency, amplitude and first difference, were extracted from the filtered signals for both voluntary and involuntary responses. Features were compared between conditions using statistical and parametric tests. Furthermore, parameters extracted for each condition were investigated for their potential in classifying responses generated in task (3). Results and Conclusions: Features of the NIRS and EDA signals can be used to differentiate between voluntary and involuntary responses.

Keywords: Brain-Computer Interface, Peripheral Autonomic Signals, Near-Infrared Spectroscopy

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Does Heart Rate Variability Biofeedback help to reduce Depression?

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The study aims to investigate the effects of heart rate variability (HRV) biofeedback as an alternative or complementary treatment for depression. Altered hemodynamic and autonomic nervous system (ANS) dysregulation have been associated with depressive symptoms. Thus, by altering the autonomic functioning, especially increasing parasympathetic tone through HRV, the study aims to understand the connection between autonomic dysregulation and depression, and tries to assess if the intervention helps to reduce the symptoms of depression. The experimental group (EG) is compared with an attention placebo group (quasi-false EEG biofeedback)(PCG) and a control group (standard cognitive therapy)(SCG). Participants are recruited from the Psychosomatische Fachklinik St.-Franziska-Stift. All subjects (age 18-65 yrs.) meet the criteria for ICD-10 diagnoses (F32.0, 1, 2; F33.0, 1, 2; F34.1). Patients are assigned randomly. EG, and PCG receive ten training sessions (45 min each). During the 1st (T1), 5th (T2), and 10th (T3) session, blood pressure, HRV, baroreflex-sensitivity (BRS) and breathing rate are collected. BRS was estimated from heart-rate and blood pressure power spectra applying the CARSPAN-methodology. At follow-up after 3 month (T4), depression is assessed with questionnaires. Up to now, 54 patients have completed the protocol. At the conference the final results will be available.

Keywords: Depression, Autonomic Regulation, HRV-Biofeedback

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A Psychological, Sexual and Physiological Profile of a Cohort of Vulvodynia Patients

Marek Jantos, MA

University of Adelaide, AU

The poster summarizes the findings of a retrospective review of a sample of 744 Australian vulvodynia patients who were referred for therapy by tertiary specialists between 2001 & 2006. After establishing an age specific distribution of patients and identifying their age at time of symptom onset, a subgroup of 529 patients was selected on the basis of age (range 16-46) for a psychophysiological profile based on electromyographic (EMG) assessment of pelvic muscles. Analysis of data shows that the highest prevalence of vulvodynia in this clinical sample occurred before the age of 25 years, with significant impact on the emotional, social and sexual well-being of women. The psychological distress associated with

vulvodynia symptoms correlated with the level of pain experienced. No correlation was found between severity of pain and EMG readings at rest. A negative correlation between EMG amplitude at rest and duration of pain may point to a progressive quieting of electrical activity which is commonly associated with the development of a functional contracture. Early diagnosis and conservative therapy in conjunction with qualified sexual counselling can reduce the negative impact of vulvodynia on quality of life and assist in restoring normal sexual function.

Keywords: Vulvodynia, Physiological Profile, Electromyography

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The Effect of Asymmetry Training for Depression: Power Spectrum Analysis

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We examine how asymmetry training for depression affects brain wave activity. Results show no significant group (neurofeedback, placebo) X time (pre-training, post-training) X site (F3, F4) interaction in any frequency band. However statistical trend in alpha absolute power of neurofeedback group implies increased left than right cortical activity after training. This study purposes to demonstrate how asymmetry training affects brain wave activity of depressive patients by spectrum analysis. Although there have been some research about asymmetry training effect, its influence on brain activity has seldom been addressed. Twenty-two patients who met DSM-IV criteria of depressive disorder were randomly assigned to 2 groups: 11 in neurofeedback group and 11 in placebo psychotherapy group. Only neurofeedback group got asymmetry training consisting of two sessions per week for five weeks. Quantitative electroencephalogram was measured before and after training with eye-opened condition. Frequency bands were divided into delta(0.5-4Hz), theta(4-8Hz), alpha(8-13Hz), beta(13-38Hz), gamma(38-45Hz) using FFT. With absolute power as a dependent variable, three-way repeated measures analyses of variance was used to examine group (neurofeedback, placebo) X time (pre-training, post-training) X site (F3, F4). The results show no significant group X time X site interaction, but statistical trend in alpha absolute power of neurofeedback group [$F(1,10)=4.254, p=.066$]. Different from placebo group whose alpha power increases in both hemispheres, neurofeedback group shows alpha powers increased in right and decreased in left. This implies relatively more increased left than right cortical activity. Asymmetry training seems to affect only alpha absolute power as its original purpose.

Keywords: Spectrum Analysis, Neurofeedback, Depression

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Temperature-Electromyographic Biofeedback in the Treatment of Patients with Different Types of Headaches

Olga Shubina, Ph.D., L.A.Kuznetsova, OlgaJafarova, Ph.D.

Neurologists in their practice often meet with difficulties in diagnostics of headache type because of vasodistonic component in cases of tension type headache and high level of muscle tension in cases of vasodistonic headache. We suppose that traditional EMG-temperature biofeedback can be effective as a combined method of treatment. The aim of study: to determine the changes of main electroencephalographic frequency bands, EMG level of frontal muscles and temperature of leading hand's finger during electromyographic-temperature biofeedback. Subjects: inpatients (N-34) with tension headache (N-19) and vasodistonic headache (N-15). Course of BFB consisted of 8-12 sessions. Patients were instructed to increase temperature of finger and to decrease electromyographic level. EEG was monitoring at F-4 and O-2 locations during a session. Pre-training value of integral EMG in a group with tension headache (TH). ($17, 69 \pm 2,18 \text{ мкВ}$) was significantly higher ($P < 0,05$) then in a group with vasodistonic headache (VH) ($13, 29 \pm 0,84 \text{ мкВ}$). Average value of temperature before training in a group with VH ($82,48 \text{ F} \pm 1,58$) was significant lower then in a group with tension headache ($88,7 \text{ F} \pm 0,94$). Base values of alpha-wave amplitude, obtained by EEG signal on-line filtration in 8-12Hz band, didn't differ in both groups. Average values of beta-wave ($13,04 \pm 2,73 \text{ мсВ}$, 14-20Hz) and theta-wave ($18,59 \pm 4,55 \text{ мсВ}$, 4-8 Hz) in group with TH were significant higher then in a group with VH ($8,67 \pm 1,07 \text{ мсВ}$ & $8,86 \pm 1,2 \text{ мсВ}$), $P < 0,05$. Temperature increased significantly in both groups after the first session. After the first session the difference between EMG values in compared groups disappeared, difference of TMP, power of beta- and theta-rhythms between groups retained. At the last sessions of the biofeedback course no significant differences in pre-session levels of TMP, power of beta and theta in groups were revealed. After the last session, these parameters didn't differ either. In the HV group, the value of alpha increased significantly during the last session, EMG level became significant lower. Temperature grew in both groups. We should mention that average scores of pain intensity (visual analogue scale, assessed before and after the first and the last sessions) decreased significantly after EMG-temperature training in both groups even at the first session.

Summary: Temperature-EMG biofeedback training can be considered as an universal effective bibehavioral method in the treatment of headache of combined type.

Keywords: Headache, EEG, Temperature

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PANEL 3

Biofeedback Applications

Chair: Patricia Norris, Ph.D.

11:00 a.m. – 01:00 p.m.

Holistic Healing Approaches with Biofeedback to Treat Patients as Whole!

Monika Fuhs, Mag.rer.nat.

Holistic Learning Institute, AUT

Health is more than purely the absence of symptoms and pain.

Over the centuries modern medicine more and more has become an exercise of doing (removing symptoms, curing diseases...) , while real healing is a process of being.

Being a health professional therefore creates a need to focus more in depth and realize what a patient is really experiencing and what would be needed to feel better. Interestingly this is often something you would never have expected. Open conversation would be needed to find out the real needs for healing. Usually there is a communication blockade besides symptoms as we have not learned to deal with sick persons over the decades. The focus of a sick person usually is much less on the physical part than the emotional experience of the change. This means for the therapist or the caregiver that they need to develop a more emotional dialogue and collect more information about the patient.

Empathy and social skills tools to improve success by observing Psychophysiology can support and help in a very effective way.

Looking back to a decade of spiritual learning and having been a close caregiver for patients with many different diseases it came to a kind of summarizing of what could be helpful and how Biofeedback can contribute to the holistic healing process.

Some case descriptions will be offered, similarities and differences outlined and discussed in the group.

Keywords: Empathy and Mindfulness with patients, the role of Biofeedback in supporting real healing

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Electrical Artifacts are Alive and Well: Check Your Cell Phone at the Door

I-Mei Lin¹ , Marisa Cortez² and Erik Peper² , Ph.D.

¹*National Chung Cheng University, Taiwan*

²*San Francisco State University, USA*

The purpose of this study was to investigate the possible effect of electromagnetic interference (EMI) (electrical artifact) on physiological recordings when cell phones are activated. The procedure consisted of placing the cell phone at varying distances from EMG and EEG sensors and electrodes. The results indicated significant EMI during cell phone activation (ringing/sending) -- large EMG and EEG recorded signals-- (electrical artifacts) when the cell phone was placed near the sensor or electrodes. The EMI artifacts were minimized at distances greater than 1 meter. This study suggested that in order to reduce EMI artifacts client and therapist's cell phones MUST be turned off when monitoring psychophysiology.

Keywords: Electromagnetic Interference, EEG, EMG, Artifact

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Physiological Responses During Cell Phone Texting

I-Mei Lin¹ and Erik Peper², Ph.D.

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²*San Francisco State University, USA*

This study investigated the psychophysiological patterns associated with cell phone text messaging (texting). College students who were very familiar with text messaging were monitored with surface electromyography (SEMG) from the shoulder (upper trapezius) and thumb (abductor pollicis brevis/opponens pollicis); blood volume pulse (BVP) from middle finger, temperature from index finger, and skin conductance (SC) from the palm of non-texting hand; and respiration from thorax and abdomen. The counter balanced procedure consisted of a 2 min pre-baseline, 1 min receiving text messages, 2 min middle baseline, 1 min sending text messages and 2 min post-baseline. The results indicated that all subjects showed a significant increase in arousal during text messaging with increased respiration rate, heart rate, SC, and shoulder and thumb SEMG as compared to baseline measures. Subjectively, most subjects were unaware of their physiological changes. After text messaging, subjects' post-baseline data returned to similar values as the pre-baseline measures. The study suggests that frequent trigger of these physiological patterns (freezing for stability and shallow breathing) increases muscle discomfort symptoms and participants should be trained to inhibit these responses to mobilize health.

Keywords: Texting Messages, Biofeedback, Electromyography, Respiration, Cell Phones

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Identifying Strategic Training Techniques in Biofeedback Therapy & Applied Psychophysiology

*Bruno Kappes, Ph.D.
University of Alaska, USA*

One of the primary goals in biofeedback and applied psychophysiological therapy is to teach patients to self-regulate normally unconscious physiological processes into normal consciousness. Biofeedback therapy aims to assist patients in recognizing their innate ability to influence specific psychophysiological processes and essentially modify patients' biopsychosocial health. Understanding multiple training methods and appreciating the underlying rationales improves successful interventions. This presentation examines several strategies that are instrumental to achieving systematically defined results. How do patients move through: unconscious incompetence, conscious incompetence, conscious competence and finally unconscious competence? This presentation identifies and proposes specific strategies and respective stages in biofeedback therapy that address essential psychophysiological states of competency. Implementing strategic training sequences facilitates Education, Acquisition, Discrimination, and Self-Efficacy. These specific training protocols provide specific goal direction, identifiable developmental tasks and an underlying theoretical rationale for each of the unique learning phases of self-regulatory skill development.

Keywords: Biofeedback Rationale, Protocols, Strategies, Instruction

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Anticipation - its Impact on Health and Stress Related Disorders

*Ingrid Pirker-Binder, MA Sc, MA Ed.
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Anticipation has an important impact on our body/mind balance, attitude, life style and life energy. Negative or fearful anticipation as well as perfectionism and the feeling of being constantly under time pressure are steps to burn out. A passive stress testing with biofeedback can help the clients to imagine the impact of anticipation on their stress related disorder.

Keywords: Anticipation, Stress, Burn Out, Passive Psychophysiological Testing, Impulse Control, Openness, Regeneration, Relaxation, Stress Management, Stress Related Disorder

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PANEL 4

Specific Biofeedback Applications

Chair: Karen Wise, Dipl.Psych.

11:15 a.m. – 01.00 p.m.

Vulvodynia: Development of a Psychosexual Profile

Marek Jantos, MA

University of Adelaide, AUS

This presentation will provide a psychosexual profile of vulvodynia patients focusing on age of onset, age distribution and analysis of the impact of vulvodynia on the emotional, social and sexual wellbeing of sufferers. The psychosexual profile was developed via a retrospective review of 744 patients who provided written consent for their files to be used for research purposes. The study was approved by The University of Adelaide Human Research Ethics Committee. The highest prevalence of vulvodynia in the study sample occurred before the age of 25 years, with 75% of the 744 patients being under the age of 34. A comparison of primary (early onset) and secondary (later onset) vulvodynia patients showed the average age of symptoms onset to be 19.1 years for primary cases and 25.0 years for secondary cases. There were significant differences between the two groups in duration of symptom onset; age of first sexual intercourse; and the number of sexual partners, even when controlling for age. Marriage provided an effective buffer against depression and anxiety. Vulvodynia can affect women in all age groups but appears to have the greatest impact on young women and couples in the formative stages of social and sexual relationships. Given the psychological distress associated with vulvodynia, it is essential for early diagnosis, and treatment needs to focus not only on the medical aspects but also on the psychosexual implications of this pain syndrome.

Keywords: Vulvodynia, Psychosexual Profile

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Vulvodynia: A Psychophysiological Profile Based on Electromyographic Assessment

Marek Jantos, MA

University of Adelaide, AUS

Objective: To study the mechanisms by which psychological and physiological processes interact with the aetiologies of vulvodynia and to investigate strategies for the management of chronic vulvar pain.

Study Design: A retrospective review of premenopausal women presenting with vulvodynia via analysis of questionnaires, psychometric tests, sexual history, surface electromyographic (sEMG) assessments, and clinical notes.

Results: Five hundred and twenty nine patients with vulvodynia (mean age 27.7 years) were studied. The average age of symptom onset was 22.8 years and the average duration of symptoms was 5.0 years. Patients scored higher than controls (normative test data) on several dimensions of the Symptom Checklist - 90 Revised (SCL-90R), including anxiety and depression, which correlated with severity of pain. sEMG data confirmed an association between pelvic muscle dysfunction and chronic vulvar pain. A negative correlation between pain duration and sEMG resting baselines was demonstrated, providing physiological evidence for the development of a functional muscle contracture characterized by muscle shortening and progressive electrical quieting of muscle tissue.

Conclusion: Vulvodynia should be evaluated from a psychophysiological perspective which recognizes the potential contribution of psychological and physiological variables in the aetiology of chronic vulvar pain. The use of sEMG to normalize pelvic muscle function and the use of dilators to reverse the functional contracture in pelvic muscles, in conjunction with sexual counselling can assist in restoring normal sexual function.

Keywords: Vulvodynia, Electromyographic Assessment

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Cut-surface Dentistry and Applied Psychology

*Elisabeth Adleff, Mag. & Thomas Schindler, MD
Salzburg, AUT*

Talking about temporomandibular disorders (TMD) we have to recognize that there are effects on the chewing-system as well as on the neuronal ache-matrix of the patient. Our interdisciplinary concept of treatment is based on the holistic model of Thure von Uexküll and the principles of biokybernetics: The concept takes both of those effects into account. A broad functional dental and psychological diagnosis is the cornerstone on which the therapies are based. By means of a case-report this interdisciplinary concept will be explained.

Keywords: TMD, Interdisciplinary Diagnoses, Interdisciplinary Therapies

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Biofeedback Therapy in Chronic Tinnitus: Effectiveness of a Psychophysiological Treatment

*Kristin Heinecke, Dipl. Psych., Cornelia Weise, Dipl. Psych., & Winfried Rief, MD
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Psychophysiological factors in maintaining distress have been emphasized in current tinnitus models. Maladaptive stress reactivity in chronic tinnitus patients is considered to result in hyperreactivity in the autonomous nervous system. This is supposed to hinder adaptation processes and might contribute to maladjustment to tinnitus symptoms in the long run. According to this, biofeedback treatment targeting autonomic / physiological activity is supposed to reduce tinnitus annoyance and facilitate the adaptation processes.

Subjects: In our study, we offered a manual-based psychotherapy developed for chronic tinnitus sufferers (randomised clinical trial) to 130 patients. 105 patients completed the treatment. The program consisted of 15 sessions of cognitive behavioural therapy combined with psychophysiological treatment via biofeedback.

Methods: Physiological changes and psychological treatment effects were correlated with tinnitus annoyances at post-treatment phase.

We found high treatment effects for biofeedback therapy in chronic tinnitus. Tinnitus annoyance was markedly reduced. Physiological changes during treatment were slightly to moderately correlated with changes in tinnitus annoyance during biofeedback therapy.

Discussion: Biofeedback should play an important role in treatment of tinnitus patients and seems to be an effective complement to common cognitive behavioural strategies.

Keywords: Psychophysiology, Tinnitus,

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NEUROFEEDBACK SYMPOSIUM

Neurofeedback on Sleep and Sleep Disorders: A Documented Success Story

Chair: Barry Sterman, Ph.D.

11:15 a.m. – 05:00 p.m.

SMR and Sleep Spindles, How it all Began: Studies in Animals and Human Subjects

*Chair: Barry Sterman, Ph.D.
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The discovery of an EEG rhythmic pattern in the sensorimotor area of cortex in alert but motionless cats, dubbed the Sensorimotor Rhythm, or SMR, was of particular interest because of its similarity to the unique “spindle-burst” pattern seen in the EEG of cats and humans during quiet sleep (Sterman et al., 1967). Both were in the 12-15 Hz frequency range over this general region and both were associated with the absence of spontaneous motor behavior. Additionally, the SMR appeared when animals were trained to suppress a learned motor response. To test the possibility that the changes in motor regulation in both states were related, a study was carried out in which cats were trained to produce

the SMR directly in an operant conditioning paradigm, and sleep EEG and structure were measured before and after this training. When compared to an alternate EEG training condition in a counterbalanced, crossover design sleep spindle density was significantly increased and the duration of sleep periods prolonged only following the SMR training condition. It was subsequently discovered accidentally in a separate study that following the SMR training condition animals injected with a convulsant agent were uniquely and significantly resistant to ensuing seizures. As a result of these observations

investigations were carried out in both control and epileptic human subjects, with sleep monitoring an important part of the study designs. One study found that epileptic subjects with motor seizures had significantly attenuated 12-15 Hz and increased 4-8 Hz activity during stage 2 sleep compared to controls. Another comprehensive study, with random assignment and double-crossover design, provided SMR and control EEG training conditions to epileptic subjects and found that seizures were reduced only during periods of reward for SMR activity. Further, sleep studies before and after these training periods revealed a significant and unique increase in sleep spindle density among

SMR- trained subjects. Collectively, these findings suggested a functional link between the SMR and sleep-spindle EEG patterns that has been explored by others on this panel. Today, we can integrate advancements in brain imaging and cellular biology to better understand the mechanisms underlying this link and their potential for the study and treatment of sleep disorders.

EEG Biofeedback in the Treatment of Insomnia: a Historical Perspective

Peter Hauri Ph.D.

Mayo Clinic

Rochester, MN., USA

Well into the 1960's, it had been assumed that all insomnia was secondary either to psychological or to medical problems (e.g. anxiety, stress, restless legs.). By the 1970's, it became clear that there were some severe insomniacs that had neither obvious psychiatric nor diagnosable medical problems. The 1979 ASDA Classification of Sleep Disorders labeled such patients "Childhood Onset Insomniacs" (COIs), defining them as having "... a distinctive history of (unexplained) development (of insomnia) before puberty and persistence into adulthood....distinguished by the relative absence of ...conditioning or psychopathological factors. In 1980, we reported that COIs had difficult-to-score PSGs (long periods of REM-looking sleep without any eye movements) and an increased number of "soft" neurological signs such as diffuse abnormalities on the wake EEG or a diagnosis of "minimal brain damage."(Hauri and Olmstead, Sleep, 59-65). The 2005 AASM sleep nosology then reclassified such patients as "idiopathic insomniacs" and speculated that this disorder may "arise from...aberrations in the sleep-inducing or arousal system of the brain".

When Sterman, Howe, and MacDonald (1970, Science, 167:1146-1148) demonstrated that instrumental conditioning of the sensorimotor rhythm in cats led to an improvement in their sleep, the question arose whether human insomniac could also be so trained. At that time, SMR neurofeedback in humans was done with analog equipment, which reported amplitude in the SMR both with an analog light and rewarded the patient with a light flash and a "ping" when a threshold level of SMR was produced in the absence of muscle artifact or excessive alpha waves. In an initial study (never reported) we found that 10 severe insomniacs had significantly more difficulties producing these reward "pings" than 10 matched good sleepers (<.01).

To assess the clinical usefulness of biofeedback training in insomniacs (Hauri, Archives of Gen Psychiat, 1981, 752-758), 48 psychophysiologic insomniacs were randomly assigned to one of 4 groups: feedback from frontalis EMG, or from frontal theta EEG, or SMR, or no treatment control. Patients were classified as having received either "appropriate" or "inappropriate" biofeedback. EMG feedback and theta feedback were deemed appropriate for insomniacs with high tension states (high initial EMG or high anxiety scores), while SMR feedback was thought appropriate for those who were already relaxed initially but still could not sleep. Those who received "appropriate" biofeedback significantly improved their sleep on logs and in the lab, those who received "inappropriate" or no feedback training did not.

In a replication study (Hauri et al, Biofeedback and Self-Regulation,1982, 223-233), another group of 16 insomniacs were randomly assigned to either theta feedback or SMR feedback and trained in a double blind fashion. The previous results were replicated: tense and anxious insomniacs benefited from theta, but not from SMR feedback, while those who were relaxed at intake but still could not sleep benefited from SMR, but not from theta feedback.

When the above studies were done in the early 1980's, SMR biofeedback was cumbersome (needing up to 40 sessions in the lab to get to criterion) and the equipment too expensive for home training. We therefore gave up using SMR neurofeedback as a clinical treatment for insomnia. It appears that now, with digital equipment and better training methods, the question of widespread treatment of insomnia with SMR neurofeedback should be re-examined, especially in light of the studies presented in this symposium.

SMR Neurofeedback Training and Sleep Quality in Normal Subjects: A Randomized, Placebo-Controlled Study

Edwin Verstraeten, Ph.D.

Swansea University, UK

NeuroMind, NL

Pioneering research in cats has demonstrated that SMR feedback training results in a higher sleep spindle density and less sleep stage changes. This beneficial effect has been confirmed in insomnia patients to some extent. The present study investigates whether EEG neurofeedback training has a significant influence on sleep quality in healthy sleepers.

A blinded randomized placebo-controlled study was performed. After diagnostic workup, twenty healthy subjects (11M/9F) participated (mean age = 24.1 SD 3.1), randomized over three conditions: SMR (12-15 Hz), alpha/theta feedback, and sham control with non-contingent feedback. Both the EEG recorded during wake time and the sleep EEG was recorded from C4. This within-subject design was counterbalanced using a 1 week interval. Two consecutive EEG-feedback sessions of 30 min. each were carried out the evening prior to sleep recording. Sleep was blindly scored by neural network software, measuring sleep latency, sleep efficiency, wake after sleep onset, slow wave sleep, number of arousals, number of micro-arousals, and micro-arousal index.

SMR training significantly reduced sleep latency (19.9 vs. 29.8 min.) and the wake time after sleep onset (56.3 vs. 80.4 min.). As a result, sleep efficiency also improved (87.2 vs. 81.3 %). No other differences were found between SMR or alpha/theta feedback versus sham control.

Two sessions of SMR training versus placebo-control in normal sleepers significantly improved sleep latency, wake after sleep onset, and sleep efficiency.

Instrumental Conditioning of Human Sensorimotor Rhythm and its Impact on Sleep, Cognition and Insomnia

*Manuel Schabus, Ph.D., Kerstin Hoedlmoser, Ph.D., Wolfgang Klimesch, Ph.D.
University of Salzburg, AUT*

Early findings by Sterman, Howe and MacDonald (1970) as well as Amzica, Neckelmann and Steriade (1997) demonstrated that instrumental conditioning of EEG oscillations in cats during wakefulness could be transferred into sleep. The present study sought to clarify the effects of conditioning of sensorimotor rhythm (SMR; 12-15Hz; sleep spindle frequency) by neurofeedback training (NFT) on sleep quality and duration during a 90min midday nap as well as declarative memory performance. Subjects (14 male; mean age \pm SD: 23.4 \pm 3.02) were randomly assigned to either a SMR-conditioning protocol (experimental group; n=15) or to a randomized-frequency-conditioning protocol (control group; n=11). Whereas the experimental group was trained to enhance the amplitude of their SMR-frequency during 10 NFT sessions - each consisting of eight 3min periods SMR-NFT - within 2 weeks, the control group participated in a randomized-frequency-NFT (i.e. every session a different frequency bin between 6 and 20 Hz). Before and after this training period subjects had to attend the sleep laboratory to take a 90min (2pm-3:30pm) nap including complete polysomnographic montage and additionally performed a declarative memory task. It could be demonstrated that subjects of the experimental group compared to controls i) were able to significantly increase their relative SMR band power over the 10 NFT sessions ($p=0.019$, $d=0.6$) and ii) enhanced various sleep parameters (spindle number [$p=0.006$, $d=0.6$], weighted spindles [$p=0.030$, $d=0.5$], total sleep time [$p=0.009$, $d=0.7$], sleep efficiency [$p=0.009$, $d=0.8$], sleep latency [$p=0.010$, $d=0.6$]) during the second nap session and iii) exhibited increased declarative memory performance ($p=0.014$, $d=0.7$) after 10 SMR-NFT sessions. To our best knowledge, these results could replicate early findings by Sterman et al. (1970) regarding enhancement of sleep quality by SMR-conditioning in cats for the first time in a healthy human population. We could therefore demonstrate that successful SMR-training is effective for sleep quality and duration as well as declarative memory performance.

LUNCH

01:00 p.m. – 02:15 p.m.

Current and Future Perspectives on EEG Neurofeedback in the Treatment of Sleep Disorders

*Wolfgang Klimesch, Ph.D., Michael Doppelmayr, Ph.D., Wolfgang Keeser, Ph.D.
Discussants
Salzburg, AUT and Munich, GER*

Abstract missing

INVITED TALKS

02:15 pm – 03:15 p.m.

Managing the "Difficult" Headache Patient

*Steve Baskin, Ph.D.
Director, New England Institute for Behavioral Medicine
Stamford
Connecticut, USA*

This lecture reviews the challenges in managing the more complicated headache patient. These patients often have chronic daily headache or high frequency disabling migraine. Some patients have problems adhering to treatment regimens, which may reduce treatment efficacy and in some patients lead to medication misuse and overuse. Medication overuse may transform headache to daily and reduce the effectiveness of acute and preventive behavioral, psychophysiological and pharmacological therapies. There is an elevated risk of mood and anxiety disorders in migraine, with even greater risk in chronic migraine. Personality disorders may further compromise treatment efforts. Assessment and treatment recommendations will be offered.

Keywords: Headache, Psychiatric Comorbidity, Migraine

Communication should be addressed to:

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03:25 p.m. – 04:25 p.m.

Stress Assessment by Transportable ICU Equipment

*Sepp Porta, Univ. Prof., Dr.med.
Institute of Applied Stress Research
University of Graz, AUT*

Catecholamine effects, like changes in lactate, buffer systems, blood gasses and electrolytes are determined out of 100 microliters of blood, using transportable ICU equipment and a special CSA (Clinical Stress Assessment) software. Results of investigations of differently stressed groups are shown and discussed along with over compensatory reactions.

Abstract:

Transportable ICU (Intensive Care Unit) equipment, able to determine about 15 different parameters out of 100 micro liters of capillary blood is used to assess the stress situation of a person: After introducing a

small amount of blood from the finger or earlap into a NOVA CCX device via a capillary, pH, pCO₂, HCO₃, BE, pO₂, O₂ sat., blood glucose, lactate, hemoglobin, hematocrit, Na, Ca, K and Mg basal values are determined within 2 minutes. The same procedure is carried out following a moderate ergometric workload.

All data are compiled online, using CSA (Clinical Stress Assessment) software, which automatically draws graphs, calculates SEM values and t tests and linearly correlates every parameter with each other, automatically distinguishing significant values. Moreover, all data are transferred into data banks, from where they can be collated into arbitrary groups. Basal values mostly depict the state of mental stress, which e.g. increases lactate values, decreases buffer capacity and changes electrolyte shifts a.s.o., revealing typical individual patterns. Bodily exercise mostly yields similar changes on top of the basal levels. The stress reaction elucidated by physical stress can be juxtapositioned to the - mostly mentally - triggered stress levels of the basal situation, thus enabling us to distinguish mental from physical stress compatibility. All those reactions can be seen as catecholamine effects, which we could show in a number of papers already. The results of some group – investigations are shown, whereby the possible use of overcompensatory reactions as a marker of exhaustion (burnout?) thresholds is discussed.

Keywords: Stress Assessment, Intensive Care Equipment.

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Coffe Break and Poster Session

04:30 p.m. – 05:00 p.m.

05:00 p.m. – 06:00 p.m.

Implementation of Psycho and Psycho-Physiological Tools in the Educational System - Enhancing Resilience and Stress Management.

A Study done in 40 Schools

Daniel Hamiel, Ph.D.

Cognitive-Behavioral and Psychophysiological unit

Tel-Aviv University, IL

Over the last two years, we have examined (in a control study) a resilience and stress management program in 40 schools (3rd to 10th grades). We have simplified psychological and physiological tools to fit the abilities and the atmospheres of the educational system. This program was done by the school teachers. We demonstrated a significant decrease in psychiatric symptoms and documented an improvement in parameters related to quality of life of both the individual student and of the class. In this presentation, I will introduce an explanatory video describing the program and some of it's highlights.

Keywords: Stress Management, Education

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06:00 p.m. – 07:00 p.m.

Autonomic Mediators in Recurrent Abdominal Pain and Irritable Bowel Disease

*Richard Gevirtz, Ph.D.
Distinguished Professor of Psychology
International University
San Diego, USA*

Progress in studying “mind/body disorders” such as Irritable Bowel Syndrome (IBS) or Recurrent Abdominal Pain (RAP) has been impeded by the lack of models that include physiological mediators. With increased knowledge of the parasympathetic nervous system and the measurement tools offered by heart rate variability (HRV) analyses, we are beginning to make progress in the understanding and treatment of these disorders. In this presentation, I will trace the background information pertaining to HRV and its role in IBS and RAP and share data from recent studies that supports the idea of “vagal withdrawal” as at least one of the mediators in IBS/RAP.

Keywords: Irritable Bowel Disease, Autonomic Meidation, Heart Rate Variability

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