Invited Keynote

The role of biofeedback in Central Nervous System plasticity
Bernard S. Brucker, Ph.D., ABPP, University of Miami School of Medicine, Miami, USA
Contact: BBrucker@med.miami.edu

It is well known that the brain, brain stem and spinal cord are composed of central nervous system cells. These cells are permanent, are formed before birth and are designed to last the lifetime of an individual. If something should destroy some of these cells such as a stroke, brain injury, brain stem injury, spinal cord injury, brain tumor, brain damage at birth, such as Cerebral Palsy, or certain neurological diseases, the destroyed cells cannot be replaced by the body, regardless of the age of the individual. This is why when someone suffers damage to the brain, brain stem, or spinal cord from any of these conditions they usually have some permanent loss of function. We do know that people can get somewhat better after damage to the central nervous system, usually up to about six months to a year, with therapy. After that, the remaining paralysis is usually permanent. Recent findings from the neuro and behavioral sciences have determined that many people who have damage to the brain, brain stem, or spinal cord do experience long term cell repair for many years after the initial damage, even though they tend not to get functionally better. It has also been discovered that individuals have many extra cells in the brain and spinal cord that are not normally used and that these cells could be used after damage to take over the function of damaged or destroyed cells. However, this does not occur automatically. The specific biofeedback techniques developed in my laboratory utilizes specialized forms of learning at the cellular level to teach individuals how to more efficiently utilize remaining and repairing motor cells after damage in order to regain function that would not otherwise occur. The data amassed in over 10,000 cases followed over many years demonstrate the potential for central nervous system plasticity that is normally not recognized in clinical medicine and rehabilitation. This presentation will explain the specific operant conditioning based biofeedback procedures for establishing learned specific control of motor neuron recruitment after substantial structural damage to the brain, brain stem and spinal cord and the outcome data which supports the plasticity of the central nervous system and the role that biofeedback plays in promoting central nervous system plasticity with its related functional outcomes.

Live demonstration

QEEG recording during voluntary pain control: live demonstration of piercing
Mitsumasa Kawakami, Yogi and Healer, Institute for Research of Subconscious Psychology, Fukuoka, Japan
09:00 – 10:00

Invited Keynote

The naked truth: lessons from the locker rooms. Techniques that enhance change and performance
Vietta S. Wilson, Ph.D., York University, Toronto, Canada
Contact: viettaw@yahoo.com
This session will review the components from meta-analysis or reviews of ‘therapy/treatment/performance enhancement’ literature that attempts to identify important components in helping individuals face and overcome problems or disorders; as well as those who wish to improve their performance in performing arts or business.
The literature from psychotherapy and social work will include reviews of the ‘common components’ controversy with suggestions for what works and does not work as well in therapeutic situations. Included in this section will also be the suggestions from literature on the use of forgiveness, motivational interviewing, and aha’s. Literature from medicine will include the problems of compliance and placebos. Performing arts literature will include common components for success in drama, music and sports. Business models will also be previewed that suggest how individuals or companies become successful.
This review of literature will be interspersed with personal experiences from the author’s working with elite athletes and business executives for the past 30 years. The use of ideas or techniques that have been beneficial include: male/female differences, advantages of groups, making individuals ‘normal but not average’, simplicity and chaos, confirmation of reality, perspective training, change of environments, goal setting, charting, and public reinforcement, and coaching.
10:00 – 11:15

Symposium:

**Sports Medicine & Peak Performance**

*Chair: Vietta Wilson, Ph.D.*

**Biofeedback and neurofeedback in enhancing performance**

Vietta Wilson, Ph.D., York University, Toronto, Canada; James Thompson, MSc, Penn State University, USA; Erik Peper, Ph.D., San Francisco State University, San Francisco, USA; Keith Reilly, Level 4 Curling Coach CCA, Canada

Contact: viettaw@yahoo.com

The Team had psychophysiological profiles, individual biofeedback and on-ice training in goal setting, breathing, attentional control and maintaining a perspective. Curlers rated breathing as best for anxiety, the neurofeedback and attentional training improved their focus, while BF/NF was best for self-awareness. Financial success provided reinforcement.

The Japanese Men’s Curling Team and a coach participated in mental training sessions as part of an extensive two month training program in Canada prior to Olympic Selection Trials. Included within the total program were comprehensive psychophysiological profiles, individual biofeedback training and single site neurofeedback training for attentional control. How the training modalities were chosen, based on individual differences and receptivity, will be outlined. The on-ice training was reinforced by the coach. Skills included specific goal setting, breath training, attentional control and maintenance of a productive perspective through ‘job reminders’. Questionnaires, athlete feedback, as well as profiles and neurofeedback screens will illustrate how a comprehensive performance enhancement training program was developed that had immediate benefits. How to use group dynamics to confirm and reinforce the skills within the program will also be illustrated. Curlers rated the breathing control training as being the most effective on-ice technique for anxiety control, the practical attentional training and neurofeedback improved their ability to focus while biofeedback was best for self-awareness. The changes to the assessment and training protocols that are necessary when there are second language complications are suggested. Financial success at the first bonspiel provided additional reinforcement for the program.

**Wired to win. The use of psychophysiological evaluation for optimizing performance in Special Forces units and elite athletes**

Henk Kraaijenhof, PT, BA, Technical Director Nemesis BV

Contact: henkra@xs4all.nl

The focus will be on stress testing and optimizing individual stress levels in order to increase performances in these fields where small margins can make a lot of difference. We also use psychophysiological methods to measure the effect of our interventions.

**Recent advances in EEG monitoring for sports performance**

Mark Griffiths, MB, BS, Research Fellow, University of Bristol, Bristol Oncology Centre (Biophysics Group), UK

Contact: mark.griffiths@doctors.org.uk

Detection of alpha activity with high immunity to muscular and electrical interference is now possible using a novel spectral analysis algorithm. Electrodes, needing only conductive gel, can be placed rapidly and retained by a sweatband or cap. Video clips of athletes and EEG recording during sporting activities will be shown.

Mental relaxation and focus can be as important in achieving peak physical performance as the physical skills alone. Studies using EEG monitoring in a variety of fields show that common spectral characteristics exist during heightened relaxation, notably increased alpha rhythm power. Learned skills and reflexes can be diminished by intrusive cognitive activity such as anxiety, language processing (listening to the coach) or trying to remember instructions. Reviewing EEG feedback with performance video recording promises to be a powerful coaching tool. A technique originally developed for clinical applications (hypnotherapy, sedation and unintentional emergence from general anaesthesia) is a novel approach that lends itself to improving EEG spectral monitoring during physical movement, with great potential benefit to sports medicine. The mainstay of the method is spectral
analysis based on an auto-correlation algorithm, now protected by UK and US patents. Improvements in front end amplifier design permit high electrode impedance with high immunity to electrical interference, muscular and eye-blink artefacts. Rapid placement of electrodes under a sweatband or cap without elaborate skin preparation is possible. Satisfactory signals can be obtained through thick hair using conductive gel alone. Examples of EEG recording during a variety of real and simulated sporting activities will be shown.

Experience of applying local alpha-stimulation training for sportsmen
Valeri G. Tristan, Ph.D., Kseniya V. Tristan, Russian State University of Physical Education, Sports and Tourism, Moscow, Russia
Contact: vatri@mail.ru
For the last six years the Research Laboratory ‘Neurofeedback’ has been conducting the researches to prove the effectiveness of EEG BFB for the training more than 350 elite sportsmen. The Local Alpha-Stimulation Training (LAST) allows optimising the state of mind and body of sportsmen. In case LAST effectiveness is more than in 40% of sessions there are expressed changes in motivational, behavioural and emotional aspects of personality. It proves to be true by results of testing. Sportsmen were characterized by strengthening of persistence and strong-willed pressure in activity for achievement of object in views. On the data of test L. Szondi the basic changes occur in emotional sphere of the person. It allows him to reveal in the professional activity. The obtained results confirm the presence of predictors of alpha training effectiveness and positive post-training effects, being reflected in the growth of sport mastery, displaying more significant possibilities of pedagogic activity as a coach, loss of fear by executing of complicated motion compositions, feeling of self-confidence and decrease of emotional stress.

A Comparison of a SMR/Theta protocol and a Broadband inhibition protocol in Peak Performance Training:
effects of augmentation vs. suppression?
Rien M.H.M. Breteler (+), I. Litjens (+) & M. Arns (*)
+: Radboud University Nijmegen, The Netherlands; *: Brain Resource Company, Nijmegen, The Netherlands
Contact: r.breteler@psych.ru.nl
Background: Research into EEG-biofeedback applied in ADHD has focused on SMR/theta and Beta/theta ratio’s. In general, this research has met with varying success due to large variations in the protocols used, the number of sessions and the duration of treatment. Othmer (1994) reports at least 30% success in 20 sessions among ADHD patients.
Research Goal: To compare effectiveness of two protocols designed to improve attention and concentration: 1) a SMR/theta augmentation protocol, STP, providing specific feedback on the SMR/theta ratio (referential, Cz), 2) a Broadband inhibition protocol, BIP, providing general feedback on the power of the complete EEG spectrum, including the frequencies presumed to be responsible for deficient attention and concentration (referential, Fz).
Method: Six non-patients were randomly allocated to one of the two protocols. Twenty sessions of three times ten minutes were held three times each week during seven weeks, using a laptop with Biograph software. Data were recorded with a ProComp+ apparatus. In multiple regression analyses subjects were treated as variables, and average measurements per session were linked to the session number, thus allowing to establish a time effect.
Results: An increase in SMR/theta ratio per session was found for the entire group. Separate analyses only found a significant increase for the BIP (R² = 0.51). In the STP an increase of absolute SMR-activity was found, whereas in the BIP a decrease of absolute theta activity was found. Pre- and posttraining qEEG data are currently being analyzed.
Discussion: It may be easier to decrease EEG activity in general than increasing a ratio of frequency activity. Notably, inspection showed the STP to result in an increase of absolute SMR, suggesting an increase of attention. On the other hand, BIP resulted in a decrease of theta, indicating a decrease of attention deficit. Also, the instructional sets differed, directed at an increase in the STP and a decrease in the BIP. Reinforcement appeared less often in the STP (80%) than in the BIP (90%). Further research, in which reinforcement schedules and feedback interfaces are varied, is needed. Confirmation of these results in clinical populations is still needed.
10:00 – 11:15

Symposium:

**Stress and Pain management with Children and Adolescents**

*Chair: Daniel Hamiel, Ph.D.*

**Pharmacological vs behavioral treatment for children and adolescents with tension-type headache: preliminary data**
Licia Grazzi, MD, National Neurological Institute C. Besta, Milan, Italy  
Contact: liciagrazzi@mac.com

Recurrent headaches are common in children and adolescents. Most current investigations have employed limited modalities (either medication or behavioral) and few have included treatment comparisons. In this study relaxation training (provided in a limited contact format) and amitryptiline were compared for treatment of juvenile Tension-Type Headache.

Patients were treated by behavioral therapy (limited contact relaxation group training) (group A) or by amitryptiline (group B). The clinical improvement was significant for both groups at 1 year follow-up (days of headache/month: group A – 17.2 vs 4.5, group B – 17.6 vs 2.1). In the group B, 11 of the 27 patients refused medication for side effects and/or non-compliance. In the group A, 4 patients dropped and 27 completed the last follow up period. They came regularly for the sessions, practiced routinely, appeared to be compliant and accepting of treatment although we did not assess this formally. Although the clinical results are similar in both groups relaxation therapy seems to be more accepted than medication. The limited contact modality seems to be useful as other behavioral approaches which need more clinical meetings, has not side effects so unpleasant for young patients. Because the sample sizes are small, these conclusions are tentative. Data collection will continue on larger sample of patients.

**Heart Rate Variability biofeedback in Dutch and American schools**
Kees Blase, National Centre for School Improvement, Utrecht, The Netherlands  
Contact: k.blase@hetnet.nl

Test scores of the Minnesota Basic Standard Tests and Reading scores in the Netherlands have shown a remarkable improvement by a new learning technology, based on biofeedback of heart rate variability. Students were effectively able to positively modulate their physiological responses to emotional stress in real time. In the Netherlands twenty-five schools are succesfully experimenting with this new learning technology, applying it for examination stress, improving the quality of learning environment in the school, building emotional resilience and also in specific situations of hyperactive students and students learning to cope with emotional difficult situations.

Kees Blase, founder of the National Centre for Stress Management in the Netherlands - responding to teacher stress and a retreat centre for burnout - will present a program where students work with heartbased computer games (biofeedback) and physical exercises to influence HRV. Being as well a medical physicist and a trainer human resource management he will show the figures and results, recent results from neurocardiology and also he will teach the practice of the tools. He will introduce the Institute of HeartMath in California that developed tools to make use of this knowledge to manage clear thinking in emotional and stressful situations.

**Pain management for children in a private practice (special topic: pediatric headache)**
Ingrid Pirker-Binder, Mmag., Association for Int. Stressmanagement & Biofeedback & Coaching ASTI®, Vienna, Austria  
Contact: stress@pirker-binder.at

This presentation offers a model how to work with children with headaches in a private practice with biofeedback equipment using all variables (breathing, EMG, Heart Rate, SCL, temperature), using the Infiniti software. You will learn how to start and organize...
training sessions and create special stories supporting relaxation and temperature training. Working with children and adolescents is not the same as working with adults. Children are beautiful biofeedback learners, but they need a special training according to their age, to their learning styles and fantasy.

Efficacy of using biofeedback game-based training in a stress-management program for undergraduates and secondary school students

Olga Jafarova, Ph.D., Research Institute of Molecular Biology and Biophysics, Novosibirsk, Russia

Contact: jafarova@soramn.ru

This stress-management program, which includes HRV biofeedback game-based training course, is aimed to help person learn new skills for monitoring and managing responses to stressors. The training is based on a set of computer games designed by the Russian Institute for Molecular Biology and Biophysics to learn self-regulation skills in a situation of modeled stress. Each game uses a special sensor connected to a personal computer to monitor a participant’s heart rate and record its changes in a stressful situation. The aim of the biofeedback session is to learn how to stay calm despite the challenges in a competing situation. The goal of the study performed was to evaluate the efficacy of the Program, which was provided for undergraduates of Novosibirsk University (40 volunteers of 16-18 years old) and 50 secondary school students of Grades 9-11 (13-16 years old) attended the optional courses of Psychology, Ecology, and Anatomy&Physiology. Training course contained 9 sessions of 30-40 minutes each, psychological assessment was done before and after the whole course, spectral analysis of HRV - at each session. Testing revealed significant decrease in state anxiety (p<0.001) and no changes in trait anxiety (STAI) in both groups, levels of concentration and performance evaluated by CPT test demonstrated strong rise as well (p<0.01). Groups were different in levels of anxiety; in adolescents it was higher significantly.

The students who passed the course reported that in several stress situations (examinations, public report) they could successfully use the skills of self-regulation obtained, lowered arousal levels and significantly improved performance.

Combining biofeedback, attention and mindfulness techniques with children and adolescents

Daniel Hamiel, Ph.D., Tel-Aviv Mental Health Center, Tel-Aviv University, Medical School, Cohen Harris Center for Trauma and Disaster Intervention, Tel-Aviv, Israel

Contact: d-hamiel@012.net.il

The implementation of biofeedback and psychophysiological techniques in cognitive behavioral therapy opens a whole new field. We have learned that in order to make a cognitive change, one must change his body state. In our clinic we use mindfulness and attention techniques in order to facilitate the cognitive work and help patients to change their focus of attention. We found this method to be very helpful in many psychological disorders but especially in Anxiety and Depression. Till recently we haven't applied this method to kids. In this short presentation I will demonstrate how this is working now in general and especially with kids and adolescents.
Symposium:

Biofeedback at the Worksite

Chair: Erik Peper, Ph.D.

Integrated group training with sEMG feedback to reduce discomfort at the computer: a controlled outcome study with a nine month follow-up

Erik Peper, Ph.D., San Francisco State University, San Francisco, USA; Vietta S. Wilson, Ph.D., York University, Toronto, Canada

Contact: epeper@sfsu.edu

Sixteen participants, 12 control participants, participated in six 2-hour group sessions of Healthy Computing. Results showed a reduction in body symptoms and increase in positive work style habits. An independent follow-up showed that 16 coaches trained more than 100 employees; departments with coaches had no workers’ compensation claims while those with the most claims had no coaches.

This study investigated whether group training, in which participants become role models and coaches, would reduce discomfort as compared to a non-treatment Control Group. Sixteen experimental subjects participated in six weekly 2-hour group sessions of a Healthy Computing Program while 12 control subjects received no training. None of the participants reported any adverse health symptoms to their supervisors nor were they receiving medical treatment for repetitive strain injury prior to the program. The program included training in ergonomic principals, psychophysiological awareness and control, sEMG practice at the workstation, and coaching by co-workers. Using two tail t-test analyses of the data, the Experimental Group reported 1) a significant overall reduction in most body symptoms as compared to the Control Group; and 2) a significant increase in positive work style habits, such as taking breaks at the computer, as compared to the Control Group (Peper, Gibney & Wilson, in press). A nine month independent telephone follow-up by the department of risk management showed that the 16 coaches trained more than 100 employees, departments that had no workers’ compensation claims had coaches in their units, and finally, the top three departments with the most workers’ compensation claims had no coaches in their units. This study suggests that employees can improve health and work style patterns of their peers using a holistic training program initially delivered in a group format and then followed by individual practice.


Two year follow up of an interactive training program for workers on a Visual Display Terminal

Silke Jahr, Ph.D., Klinik für Physikalische Medizin und Rehabilitation, Berlin, Germany

Contact: Silke.jahr@charite.de

Presentation of the 2 year follow up of an interactive training program for workers on a Visual Display Terminal (special designed exercise program or home sEMG-biofeedback device over 6 weeks).

We will present the results of the 2 year follow up of a prospective blinded randomized controlled study with 81 VDT workers with shoulder neck problems who performed on the working place 6 weeks a special designed exercise program or a biofeedback training program with a sEMG-home-device or served as control group. Before and after training the patients filled a pain questionnaire, Health Survey SF 36 and a standardized pain description questionnaire SES. Than clinical examinations, dolorimetry and sEMG over medium and upper M. trapezius were conducted. The results show in both training groups a significant pain reduction and improvement in the quality of life, in the clinical examination, dolorimetry and sEMG. All patients had than the possibility to receive either biofeedback therapy or training program. 2 years later patients filled again a questionnaire and clinical examinations were done.
These results were used to develop an interactive training program on CD for VDT workers. The CD includes videos and explanations of the exercises. The user will have different possibilities for integrating them in their working day schedule. Besides that the user will find information's about the source of muscular dysbalance connected to the work on a VDT, introduction in the muscular anatomy and physiology and descriptions of different therapeutic options.

**Computer-related disorders: a woman’s problem?**

**Ingrid Pirker-Binder, MMag., Association for Int. Stressmanagement & Biofeedback & Coaching ASTI®, Vienna, Austria**

**Contact:** stress@pirker-binder.at

A study from MMag. Ingrid Pirker-Binder and Mag. Manfred Kollegger

**Keywords:** stress, computer use, computer related disorder, neck and shoulder pain.

The purpose of this study was to examine complaints at the workplace. Despite the growing awareness in the workforce and ergonomic equipment, physical complaints still exists. Data was collected from 377 men and 181 women working in the public administration. They completed a 35-item computer usage survey. Erik Peper put the survey to our disposal. A variety of physical complaints were reported related to computer use. Multiple regression analyses were performed to predict self-reported physical symptoms from a variety of factors, including tiredness and concentration, stress load, eye complaints and the knowledge of preventive exercises. One of the key factors was to study differences between men and women. This study indicates the potential importance of knowledge of body awareness, stress management and resource training to prevent risk of repetitive strain injuries.
11:45 – 13:00

Symposium:

**Heart Rate Variability Biofeedback: Emotions and the Heart**

*Chair: Richard Gevirtz, Ph.D.*

Heart Rate Variability (HRV) biofeedback in cardiac rehabilitation
Richard Gevirtz, Ph.D., Alliant International University, San Diego, USA
Contact: rgevirtz@alliant.edu

Based on a preliminary study that we published in American Heart Journal last year, we are introducing HRV Biofeedback into the cardiac rehab milieu. Of particular interest is the possibility that the technique might be useful in restoring homeostasis in Congestive Heart Failure patients. Preliminary data and underlying rationale will be presented for the use of this technique.

Respiratory training and Heart Rate Variability biofeedback for anxiety disorders and functional disorders
Donald Moss, Ph.D., Saybrook Graduate School, San Francisco; Psychological Services Center, Grand Haven, USA
Contact: dmoss@chartermi.net

This workshop provides a psychophysiological framework for the assessment and treatment of anxiety disorders and functional medical disorders, integrating respiratory psychophysiology, capnometry, and heart rate variability (HRV). Research confirms the role of maladaptive breathing in anxiety. Biofeedback technology enables general (CNS and ANS) relaxation, respiratory retraining and the training of heart rate variability. The workshop reviews relevant respiratory and cardiovascular physiology, and presents a psychophysiological assessment process for anxiety, utilizing capnometry, autonomic baseline measures, and heart rate variability. Therapeutic measures include patient education, general biofeedback, respiration training with biofeedback, and heart rate variability biofeedback. The presenter will demonstrate HRV biofeedback training, using the Infinity software system.

The objective of this workshop is to provide participants with a basic orientation to the use of relevant biofeedback modalities, breath training, and HRV biofeedback for anxiety disorders. Part 1 covers general biofeedback, respiratory physiology, and breath training. Part 1 also covers assessment procedures including a multi-modal psychophysiological baseline, and a capnometric evaluation of respiration with a hyperventilation trial. Part 2 covers cardiovascular physiology, HRV biofeedback, and hands on training with the Infinity HRV instrumentation, as applied to managing stress and anxiety disorders.

Biofeedback treatment for asthma
Paul Lehrer, Ph.D., University of Medicine & Dentistry of New Jersey, New Jersey, USA
Contact: lehrer@umdnj.edu

Study objectives: We evaluated the effectiveness of heart rate variability biofeedback as a complementary treatment for asthma.

*Patients:* Ninety-five outpatient paid volunteer adults with asthma.

*Setting:* The psychophysiology laboratory at UMDNJ — Robert Wood Johnson Medical School, and the private outpatient offices of participating asthma physicians.

*Interventions:* 1) a full protocol (heart rate variability biofeedback and abdominal breathing through pursed lips and prolonged exhalation), 2) heart rate variability biofeedback alone, 3) placebo electroencephalograph biofeedback, and 4) a waiting list control.

*Design:* Subjects were first prestabilized on controller medication and then randomly assigned to experimental groups. Medication was titrated biweekly by blinded asthma specialists according to a protocol based on NHLBI guidelines, according to symptoms, spirometry, and home peak flows.

*Measurements:* Subjects recorded daily asthma symptoms and twice daily peak expiratory flows. Spirometry was taken before and after each weekly treatment session in the heart rate variability and placebo biofeedback conditions, and at triweekly assessment sessions in the waiting list condition. Oscillation resistance was measured approximately triweekly.
Results: Compared with the two control groups, subjects in both of the two heart rate variability biofeedback groups were prescribed less medication, with minimal differences between the two active treatments. Improvements averaged one full level of asthma severity. Measures from forced oscillation pneumography similarly showed improvement in pulmonary function. A placebo effect influenced improvement in asthma symptoms, but not pulmonary function. Groups did not differ in occurrence of severe asthma flares.

Conclusions: The results suggest that heart rate variability biofeedback may prove to be helpful in treating asthma and may help reduce dependence on steroid medications. Further evaluation of this method is warranted.

Science of the heart in relation to stressmanagement
Kees Blase, National Centre for School Improvement, Utrecht, The Netherlands
Contact: k.blase@hetnet.nl
The University of Halifax (Canada) and the Institute of HeartMath discovered that the heart has its own nervous system inducing the brain. Research in neurocardiology shows the brain's response to the heart signals. New clinical research identifies Heart Rate Variability (HRV) as a key indicator of preventable stress and shows a broad range of related health problems. HRV is assessing moment-to-moment changes in the autonomic function and balance due to changes in mental or emotional states or stress. Case studies in USA and in the Netherlands show quick, remarkable improvements in coping with stress, transforming frustration, anger, treatment of depression and work-life balance. We will show how the program of the Institute of HeartMath is used for police officers after traumatic incidents in their work situation.
14:00 – 14:45

**Invited Keynote**

**Strategies in applied psychophysiology of respiration**
Jan van Dixhoorn, MD, Ph.D., Centre for Breathing Therapy, Amersfoort
Contact: vdixhoorn@euronet.nl

There are different categories of self-regulation strategies using respiration. They include timing parameters, instructions that couple breathing to movement, utilizing air passage, modifying the pattern of movement distribution and location, the focus of attention and feedback devices. These will be described following a model of a system’s view of breathing. It will appear that breathing is intimately linked to the physical and mental tension state. This interaction makes breathing instruction inherently complex. It follows that regulation needs to be alternated with a phase of non-regulation. Also, instruction has to specify the mental and physical conditions. Finally, it will be difficult to judge breathing patterns as functional or dysfunctional. The response to treatment has to be taken into consideration.

14:45 – 15:30

**Invited Keynote**

**Psychophysiological psychotherapy: the use of biofeedback and biological monitoring in psychotherapy**
Donald Moss, Ph.D., Saybrook Graduate School, San Francisco; Psychological Services Center, Grand Haven, USA
Contact: dmoss@chartermi.net

Sigmund Freud described dreams as the “royal road to the unconscious” for psychotherapy. Today psychophysiology can provide that royal road for psychotherapists. This presentation will describe a variety of applications of biofeedback instrumentation to support and augment the work of psychotherapy. Biofeedback assisted relaxation training can introduce low arousal states which enables optimal emotional awareness and expression. Physiological indices can guide the course of behavior therapeutic interventions, such as systematic desensitization. Biofeedback displays are useful in reducing therapeutic resistance, allowing the patient to draw conclusions about unrecognized affective reactions from the objective physiological feedback. Finally, biological monitoring during the course of dynamic therapy can provide a “window into the soul” – alerting both patient and therapist to attune to specific topics and life situations which activate somatic threat and distress reactions.
16:00 – 17:30

Symposium:

**Somatic Disorders / Chronic Pain & Muscle Rehabilitation**

*Chair: Richard Gevirtz, Ph.D.*

**Behavioral vs pharmacological treatment for chronic migraine with medication overuse and disability assessment: results at one year follow-up**
Licia Grazzi, MD, National Neurological Institute C. Besta, Milan, Italy

Contact: liciagrazzi@mac.com

This scientific talk overviews the most common forms of biofeedback (EMG and thermal biofeedback-assisted relaxation training) and related treatments (relaxation therapies and cognitive stress coping training) for primary headache disorders and provides a detailed look at the level of scientific support for each approach. The evidenced base review will focus on 2 data sources: evidentiary reviews conducted by groups such as the US Headache Consortium, the American Psychological Association, the Canadian Headache Society, the Association for Applied Psychophysiology and Biofeedback, and Cochrane and meta-analytic reviews conducted by various authors since 1980. Some of the future research directions concern dealing more effectively with patients thus far judged to be particularly difficult to treat and alternatives for delivering treatment in a more time and cost economical manner (such as limited contact and web-based).

Patients with chronic migraine and medication overuse are particularly difficult to treat. Purpose of the study was to determine 1) the clinical course of a sample of chronic migraine patients with medication overuse 12 months following two different treatment interventions and 2) whether functional impairment, assessed by the MIDAS questionnaire, improved upon treatment. 103 chronic migraine patients with medication overuse were studied; after inpatient medication withdrawal one group (A) was treated by behavioral approach (limited contact group relaxation sessions) plus pharmacological treatment for migraine prophylaxis, the second group (B) was treated only by pharmacological treatment. Follow-up were fixed 3, 6, and 12 months after treatment. The patients of both groups at the 12 months follow up (15 in group A and 27 in group B) significantly improved: days of headache per month decreased (group A: 28.9 vs 17.4; group B: 29.6 vs 12.6) and 2 measures of functional impact from the MIDAS questionnaire (MIDAS total score: group A 80.9 vs 32.6; group B 84.5 vs 38; frequency of headache: group A 62 vs 49.5; group B 66.3 vs 38.7). Chronic migraine with medication overuse led to considerable disability prior to treatment. However, notable improvement both in headache parameters and in disability measures occurred after treatment. No significant clinical differences were found between the groups; longer follow up is needed for determining if the behavioral approach prevents medication overuse relapses.

**Development of a sensor-based biofeedback-system for guided extramural training and rehabilitation**
Fabian Kohler, Dipl.-Ing., Helmholtz Institute, RWTH Aachen, Germany; Günter Rau, Univ.-Prof., Helmholtz Institute, RWTH Aachen, Germany; Catherine Disselhorst-Klug, Dr.rer.nat., Helmholtz Institute, RWTH Aachen, Germany

Contact: kohler@hia.rwth-aachen.de

**Summary:**
The number of people requiring rehabilitation is increasing. To maintain the best therapy-outcome without extending demands on physiotherapists, it is necessary to enable patients to perform the rehabilitation-exercises extramurally. A feedback-training-system ensuring accuracy of the movement performed has been developed, which can be adapted to individual needs of the patient.

**Abstract:**
After orthopaedic intervention, rehabilitation and postoperative care improve the chance of the patient continuing to live independently. The performance of physiotherapeutical exercises is strongly correlated with the recovery process of patients. Optimally, exercises should be done several times a day over a longer period of time. That implies that exercises have to be done at home with fewer ambulant patient consultations and thus less guidance by physiotherapists.
An intelligent user-tailored training facility allows patients to train in their home environment. It provides the patient with a biofeedback to ensure the quality of the performed movement and to give guidance through his/her individual training plan. The benefit of the biofeedback has been evaluated by 3D upper extremity movement analysis using infrared light reflecting markers being attached to the skin. The calculation of joint-angles is based on a rigid body model [Schmidt, 1999]. Preliminary results show, that there is a clear increase in the reproducibility of the movement performed when using the biofeedback compared to unguided exercises.

Securing a high degree of reproducibility is an indispensable prerequisite for implementation of advanced extramural training. Additionally, a more personalized training becomes possible when the training device gives the patient detailed guidance or feedback.

**An sEMG view of muscular dysfunction**

**Gabriel Sella, MD, BSc, MSc, MPH, Ph.D., West Virginia School of Medicine, Morgantown, USA**

**Contact:** Paris10@aol.com

Until relatively recently, muscular dysfunction could be recognized to some extent clinically, but there was no technique available able to recognize different components in an objective, reliable manner. sEMG offers a number of possibilities to help in the objective diagnosis of various functional aspects of muscular dysfunction. Protocols have been developed for the diagnosing of myofibrillar 'fatigue', via the investigation with the median frequency analysis. Dynamic and static protocols with statistical backup have been developed and standardized for the identification of skeletal muscle dysfunction. They rely on the classic ROM range for all the joints and regions. Those protocols are applicable to PT/OT investigation of the muscle pain, weakness, fatigue as well as joint loss of ROM. They are also applicable to neurologic investigation, myofascial investigation and forensic neuromuscular investigation. sEMG testing & results enables the objective formulation of the neuromuscular rehabilitation or re-education program as well as the ergonomic planning for muscular optimization.

**Postural sway feedback for patients with impaired balance control**

**Lyudmila Chernikova, MD, Ph.D., Research Institute of Neurology, Russian Academy of Medical Sciences, Moscow, Russia**

**Contact:** Luda_chernikova@mtu-net.ru

167 patients with impaired balance control were learned to control position of the center of pressure (CP) with visual feedback during several computer games. The study revealed that postural disorders in the patients with some neurological diseases can be reduced as a result of the feedback postural sway training.

**Objective:** The aim of this study is to determine the effect of the postural sway feedback on the upright posture stability in patients with poststroke hemiparesis (PH), Parkinson’s disease (PD) and spinocerebellar ataxia (SCA).

**Subjects:** A total 167 patients including 55 patients with PH, 56 patients with idiopathic PD (prevalence of rigidity and hypokinesia) and 56 patients with SCA were investigated. All patients were randomly divided into two groups: the basic group of 148 patients who received complex therapy including postural sway feedback training and the control group of 39 patients who did not train the postural sway feedback.

**Method:** The patients stood on a force platform and learned to control position of CP with visual feedback during several computer games. A daily session lasted 20 minutes. The balance training consisted of 10 sessions.

**Results:** The patients of the basic group improved their postural stability significantly more than the patients of the control group.

**Conclusion:** The results suggest that postural disorders in the patients with PH, PD and SCA can be reduced by biofeedback postural sway training. They also indicated that the including of the balance training in rehabilitation programs improves the cognitive and emotional state of the patients.
16:00 – 17:30

Symposium:

Biofeedback and Beyond: Complementary Methods and Skills to enhance Success

Chair: Monika Fuhs, Mag.rer.nat.

Audio Visual Entrainment (AVE) in addition to biofeedback in the treatment of fibromyalgia – a case report
Donald Moss, Ph.D., Saybrook Graduate School, San Francisco; Psychological Services Center, Grand Haven, USA;
David Siever, C.E.T., Mind Alive Inc., Edmonton, Canada
Contact: dmoss@chartermi.net and dave@mindalive.com

Audio Visual Entrainment (AVE) is a complementary therapy based on a history of empirical research dating to Pierre Janet and the early days of the 20th century. Visual stimulation gained attention in psychophysiological research on the “flicker following response.” Clinical application began in the 1950’s and 1960’s using flickering visual stimulation to induce hypnotic trance. Audio stimulation—throbbing sound—combined with strobing light enhanced the power of this technique and today “light and sound machines” are widely used in both health care and the self-help arena. Presentation of a light and sound stimulus strobing at a frequency above or below the brain’s current dominant frequency can serve to “entrain” cortical activity, guiding cortical rhythms in a desired direction to enhance activation or induce relaxation/sedation. Research is emerging showing some efficacy for a wide range of disorders. Applications range from sleep induction, to enhancing attention, to raising mood and energy, to quieting the musculature. This presentation will briefly review available instrumentation, outcome literature for various disorders, and the known risk factors for this technique. The presenter will describe a dramatic case, involving enhancing alertness and energy and reducing pain in a fibromyalgia patient, but will end with cautions for responsible practice.

State of the art biofeedback and ‘Sofrologie’ techniques in relation to stress management and psychosomatic disorders
Nicole Vandeweghe, Academie voor Sofrologie & Management, Brugge, Belgium
Contact: abz@skynet.be

‘Sofrologie’ is a scientific school, developed by Prof. A. Caycedo. It is a study of the phenomenons of the consciousness, it’s ‘the force to integrate the values of the existence’.

Body-mind-emotion: it uses Western and Eastern methodologies to harmonize mind and body. ‘Sofrologie’ can be described as a science, a methodology, a philosophy, an art. There are different degrees of consciousness that are studied in ‘sofrologie’. It has a phenomenological basis. The origin comes out of Raja Yoga, Boeddhistic meditation, Zen meditation, discovering of the energy. Typical for ‘Sofrologie’ is the return to the phenomenon without judgement. In the Caycedian school we respect the discovering of the values of life and the existence. After the period of the foundation and structuring - a period of scientific research started. Later on a school of Caycedian ‘Sofrologie’ was established. The methodology is applicable in therapy, in education, in sport, in art and in social world. Each discipline has its specific exercises.

In stress management and communication training we coach an integration of basic exercises. In this way we stimulate the harmony in body and mind, we let feel the possibility to develop the well-being, the reason, the intuition, the perception and senses, the reality, the spirituality and the imagination.

Helping the heart with Audio-Visual Entrainment
David Siever, C.E.T., Mind Alive Inc., Edmonton, Canada
Contact: dave@mindalive.com

Irregularities in heart rhythm are synonymous with generalized anxiety. When the breathing of someone with generalized anxiety, is paced at 10 second breathing cycles, as recommended with heart-rate variability (HRV) therapy, there is sure to be an abreaction at roughly three minutes into the exercise. However, if that same person is undergoing simultaneous audio-visual entrainment (AVE) in the alpha range, the HRV typically becomes “smooth and cyclic” with great reductions in autonomic
The theory of HRV and case results of several anxious people, pre-post treatment with alpha, white-light AVE will be shown, as measured with the “Freeze Framer.” Also, a new technique for pacing the breathing using an AVE ("DAVID") device will be shown. Hypertension is a life-threatening condition affecting many American adults. Lifestyle changes and drug therapy are typically recommended for treating hypertension. An 8-week study of 28 hypertensives (under drug therapy) was conducted to test the effectiveness of audio-visual entrainment (AVE) in the sub-delta frequency (0.5 - 1 Hz) and alpha frequency ranges. Blood pressure, depression and anxiety were measured throughout the study. Alpha frequency AVE has shown strong effectiveness in reducing depression and anxiety. However, the group was neither depressed nor anxious so the benefits of alpha AVE were uncertain. Surprisingly, sub-delta, white-light AVE had marked effects on blood pressure, reducing the systolic by 20 points and the diastolic by 15 points. In non-anxious, non-depressed persons, it is possible that sub-delta, white-light AVE directly impacts physiological functions (via the hypothalamus) rather than psychological ones.

Experiences and patterns during alpha-theta training
Knut Berndorfer, Ph.D., Centre for Knowledge Management, University of Linz, Linz, Austria
Contact: knut.berndorfer@utanet.at
The Alpha Theta Training poses still a lot of questions – especially in the context of enhancing intuition, insight and creativity. The recent work of John Gruzelier with musicians - although successful - has not really increased my understanding regarding the process itself. A definite help in advancing this issue has been Francisco Varelas latest work (He is a well known neuroscientist). He proposes to use not only third person methods/data but also first person methods/data for research in various fields – especially in the neurosciences. The intention of this presentation is to present the findings of my recent basic research. I will start with a review of the work of people like Budzynski, Stoyva, the Greens in the sixties and seventies, also adding more recent knowledge about the intuitive process. My focus will then be on the evaluation of about 60 sessions of personal alpha-theta training. The exploration will look both at inner/subjective states and outer/objective data - mainly EEG data- showing various patterns during a session and between sessions. Also the protocol/screens, the setting and conclusions will be discussed. This work should be seen as part of a larger research project for developing intuition & inner knowing in the realms of business/organizations, research and inner development.

Putting yourself into your client’s shoes with biofeedback’s help
Using physiology to identify the client’s internal process
Monika Fuhs, Mag.rer.nat, Dipl.Psych., Holistic Learning Institute, Vienna, Austria; Erik Peper, Ph.D., San Francisco State University, San Francisco, USA
Contact: holistic-learning@gmx.at
What really occurs within a client during a therapy session? Does the exterior reflect what is going on inside or is it just a mask or deception? Emotional and somatic reactions are sometimes invisible so that the therapist is unaware of the client’s somatic response. The ongoing internal changes may become visible and reveal the emotional reactions through physiological monitoring. The physiology may indicate to the therapist that an emotional reaction is occurring of which the client is unaware. The therapist can then use this information to guide the therapeutic process and speak for the client’s internal experience. Integrating speaking for the client into a YES set usually increases rapport and allows the client to feel understood which may induce relief and relaxation. Combining this approach with reframing the subjective expectancies may transform helplessness and resignation into hope and possibilities. These components are illustrated through clinical examples.

Hypnosis and Slow Potential Topography: the concept of Spot Activation
Giselher Guttmann, Ph.D., Univ. Prof., University Vienna, Faculty of Psychology, Vienna, Austria
Contact: Giselher.Guttmann@Univie.ac.at
The hypnotic state has long been the subject of numerous physiological investigations. But almost all show that quite dramatic changes of consciousness such as hypnotic analgesia are not accompanied by comparable variations of physiological variables – not even of the most sensitive indicator of the functional state of the brain, the EEG. Our studies of slow cortical potentials (CD potentials) however showed that hypnosis does not directly affect the central nervous information input but brings about changes in the excitability of cortical areas. A strong hypnotic movement suggestion e.g. results in an isolated focal excitability of the motor area accompanied by an almost complete deactivation of other regions. The finding of the phenomenon of “spot activation” can satisfactorily account of many paradoxical neurophysiological results in hypnosis research.
18:00 – 18:45

**Invited Keynote**

**Biofeedback and related treatments for recurrent headache: current status and future directions**
Frank Andrasik, Ph.D., Institute for Human and Machine Cognition, University of West Florida, USA
Contact: fandrasik@ihmc.us

This scientific talk overviews the most common forms of biofeedback (EMG and thermal biofeedback-assisted relaxation training) and related treatments (relaxation therapies and cognitive stress coping training) for primary headache disorders and provides a detailed look at the level of scientific support for each approach. The evidenced base review will focus on 2 data sources: evidentiary reviews conducted by groups such as the US Headache Consortium, the American Psychological Association, the Canadian Headache Society, the Association for Applied Psychophysiology and Biofeedback, and Cochrane and meta-analytic reviews conducted by various authors since 1980. Some of the future research directions concern dealing more effectively with patients thus far judged to be particularly difficult to treat and alternatives for delivering treatment in a more time and cost economical manner (such as limited contact and web-based).

18:45 – 19:30

**Invited Keynote**

**Psychophysiology: investigating altered states of consciousness and accompanying psychotherapy**
Giselher Guttmann, Ph.D., Univ. Prof., University Vienna, Faculty of Psychology, Vienna, Austria
Contact: Giselher.Guttmann@Univie.ac.at

A very sensitive indicator of the functional state of a certain cortical area is the slow potential (DC-potential). Increased neuronal activity results in negative-going slow potentials changes. Thereby the cortical activity distribution can be monitored by mapping the DC-amplitudes. The possibility of DC-based neuroimaging was used by the Viennese Team for mapping the topography correlating with certain cognitive activities and with altered states of consciousness such as sleep, hypnoses, trance, relaxation, and meditation. Results of these studies will be presented. Successful control of the DC-potential by use of acoustical or optical feedback was shown as early as 1977 in Vienna. Slow potential changes also show high correlations with other indicators of activation which are more suitable for practical work. Case studies will illustrate the potentialities of applied psychophysiology as therapy-accompanying tool.
Posters

Application of biofeedback in the process of competitive stress control
Hrant Avanesyan, Ph.D., Daniel Zoalkefl, Yerevan State University, Yerevan, Armenia
Contact: armgrant@freenet.am
In our investigation the stress reactions were considered to take place in these systems: vegetative, behavior and cognitive. The work was carried out at a combined-team of wrestlers of 25 persons. In the process the athlete’s psychological training for the competitions we applied variants of verbal methods of suggestion and autosuggestion: aimed at over coming the training tasks and adapting to the competitive situation. The psycho regulation was carried out combined with the biofeedback, the exponents of which reflected the efficiency of each suggestion stage: Each psycho regulation seance consisted of 3 stages. The BFB complex included the following parameters: electro skin resistance, alpha rhythm, electromyography, skin temperature and pulse. All the exponents were fixed on the light-table at the same time. On the screams the apparatus visually gave were fixed immediately before the relaxation and after each above-mentioned séance stages. The device we worked out is intended to registries a number of sensomotor parameters of sport activities and thus gives us the possibility in receive the needed information’s about the training level of the sportsman and also follow the dynamic changes of his psychological state.
The BFB parameters are the indicators of the relaxation seance efficiency for the athlete.

Biofeedback in the treatment of somatoformic disorders
Olga Shubina, MD, Research Institute of Molecular Biology and Biophysics, Novosibirsk, Russia
Contact: olga__22@mail.ru
The aim of the study was to research neurofeedback effectiveness during the treatment of a number of psychosomatic disorders. Alpha stimulating training was used in a complex therapy of 60 persons taking inpatient care (among them there were 45 women, 15 men at the age from 27 to 65 years). From 8 to 15 training seances were carried out. The patients had following diagnoses: tension headache (30 persons), irritable bowl syndrome (15 persons), and lumbar ischialgia (15 persons). All the patients were considered as patients suffered from the somatoformic pain disorder (DSM-IV) with dysthymia. Training was evaluated as an effective one if in the end of a seance alpha rhythm power increased by 10% from the initial level. A depression level estimated on visual analogous scale after each seance decreased in the mean of 20%. It was proved clinically and also by the results of the electroencephalographic mapping (alpha rhythm power decreasing in the investigated cerebrum areas). The most effective training was observed in the group of patients with the irritable bowl syndrome. The patients with tension headache had the lowest values of alpha rhythm power, and the rate of an effective training was the lowest. Alpha stimulating training promoted alexithimia overcoming due to visceral perception development and acquirement of skills of internal feelings differentiation and emotions realization by a patient. According to the results of the training course the level of alexithimia decreased for sure estimated on the scale TAS-20 as the level of depression estimated on the scale BDI.

Psychological profile and treatment with EDR biofeedback of children with headaches
Tatjana Zorcec, University Children’s Hospital, Skopje, Macedonia
Contact: hospital@soros.org.mk
Headache is a very common complains in school children. This study is focused on a group of 36 children, selected by chance, 14 girls mean age 10 ± 2.32 years and 22 boys mean age 10.22 ± 2.13. Aim was to evaluate the psychological characteristics of these children and to investigate how the treatment will impact on the symptoms. The psychological assessment was obtained in the following way: CBCL (Child Behavior Check List) for the parents of the children and GAS (General Anxiety Scale) and EPQ (Eysenck Personality Questionnaire) for the group of children. For the treatment of these children we used EDR biofeedback therapy. The results of the psychological assessment in the group of girls confirmed presents of depressive mood, moderate level of anxiety, extroversion and moderate neurotic manifestations. In the group of the boys presents of psychosomatic complains, extroversion, moderate neurotic manifestations and a big need for social acceptance was found. The treatment with the EDR biofeedback therapy for these patients has verified to be very satisfactory. We have found significantly statistical difference between the first and the last EDR session.
Game-like biofeedback as a criterion of peak performance
Olga Grebneva, Ph.D., Olga Jafarova, Ph.D., Research Institute of Molecular Biology and Biophysics, Russia
Vasily Freze, Novosibirsk Military Institute, Novosibirsk, Russia
Contact: biosystems@soramn.ru
Immersion of a person into psychophysiological model of stress situation similar to a competition one clearly reveals peak performance abilities, especially if biofeedback technology is conjunct.
Subjects of the study were students of The Novosibirsk Military Institute – the candidates for the team for military decathlon of The Russian Armed Forces (16 males of age 18-20). In July 2003 this team won the competition. Cardiointerval game-like biofeedback sessions (“Vira!” and “Rally”) were performed as stress-test: there was an obligatory goal – one had to win.
Standard psychological inventory and psychophysiological CPT tests were applied. The whole group was homogeneous in all physiological characteristics, as well no significant psychological distinctions were revealed by nonparametric statistics.
Principal component analysis of effectiveness coefficients, LF/HF ratio, total power of HR spectra increase applied to RR-data of “Vira!” and “Rally” made it possible to separate group of high performance from the poor one. This classification has been in full accordance with the results of team performance at decathlon.
Detailed consideration revealed that the best players were those ones who are excreted from the main group in efficiency of behavior in a simulated stress situation combined with well-balanced regulation of ANS (LF/HF). We should mention that these players had high abilities of self-regulation skills learning as well.

Biofeedback in hypertension: the promises of new approaches
Lutz Mussgay, Ph.D., Psychosomatic Hospital, St.-Franziska-Stift, Bad Kreuznach; Center for Psychobiological and Psychosomatic Research (FPF), University Trier, Germany
Contact: l.mussgay@fskh.de
Hypertension is a medical condition bearing many risks for severe subsequent cardiovascular complications. In early stages non pharmacological treatment approaches may be of considerable value. Review articles on traditional biofeedback approaches, however, did not reach a favorable verdict. When strict methodological criteria were applied, anti-hypertensive effects turned out to be rather limited. Nowadays the technical progress is offering new approaches. The poster first gives a short overview over the available results. Then, on the basis of the schematic representation of short-term blood pressure regulation, starting points for alternative treatment approaches are illustrated. As new approaches the measurement of continuous finger blood pressure, the slow breathing approach of R. Gevirtz, and finally attempts to directly influence baroreflex-sensitivity are presented. Especially promising are feedback of finger blood pressure as well as slow breathing.

The effect of neurofeedback training on the central poststroke pain
Liana Lanskaya, Ph.D., Research Institute of Neurology, Russian Academy of Medical Sciences, Moscow, Russia
Contact: luda_chernikova@mtu-net.ru
10 patients with CPSP received audio neurofeedback training to increase of 8-12 Hz alpha activity. Electrodes were placed on damaged hemisphere at F4 – O2 sites. Neurofeedback training resulted in increase of alpha-activity with simultaneous decrease of theta-activity (3-7 Hz), decrease of pain index and reduction of affective disturbance level.
Introduction: Central poststroke pain (CPSP) is often associated with affective disturbance. CPSP is usually difficult to treat with medications. The aim of this study is to determine effect of neurofeedback training on CPSP. Patients: 10 patients with CPSP (median age 53 years, range 40 to 62) participated in study. Median pain score (VAS) is 7(range 5 to 10) and median depression score (Hamilton Depression Rating Scale) is 28 (range 22 to 39). Imaging studies revealed damage of deep structures of right hemisphere with involvement of thalamus. Method: Pretraining electroencephalogram found alpha attenuation and theta activity increase in right hemisphere. Neurofeedback training aimed at increase of 8-12 Hz alpha activity was conducted with usage of audio feedback. Device “Boslab” (Russia) was used. Electrodes were placed on the damaged hemisphere at F4 – O2 sites. Threshold values were set according to background level of patient’s alpha-activity at the beginning of each session. Session duration was 30 minutes; training took place 2-3 times per week during a month. Results: Neurofeedback training resulted in increase of alpha-activity (8-12 Hz) with simultaneous decrease of theta-activity (3-7 Hz). These data were correlated with decrease of pain index (VAS) and reduction of affective disturbance level.
sEMG feedback training in precision grip in poststroke patients
Maria Gusarova, Research Institute for Neurology, Russian Academy of Medical, Moscow
Gusarova M.V., ’Ioffe M.E.,MD, Ph.D., Lanskaya L.D., Chernikova L.A., MD, Ph.D.
‘Institute of Higher Nervous Activity and Neurophysiology, Russian Academy of Sciences, Moscow, Russia
Contact: luda_chernikova@mtu-net.ru

10 patients with poststroke paretic arm were trained with visual biofeedback to keep the SEMG amplitude thenar in 20%, 40% and 60% out of maximal amplitude of voluntary contraction in precision grip task. Training consisted of 10 sessions and resulted in an improvement of precision movements of paretic arm.

Objective: The aim of this work was to investigate the effect of SEMG feedback training on the precision grip performed by paretic arm in patients after ischemic stroke. Subjects: 10 poststroke patients (median age 53, range 45 to 65; median duration disease 8 months, range 6 months to 2 years; median degree of paresis 11 (MAS), range 9 to 13 score; median degree of spasticity 1 (Ashworth Scale), range 0 to 2 score) were studied.

Method: The visual SEMG feedback training was performed with the “Boslab” (Russia) device. EMG electrodes were placed on thenar and on m.flexor carpi ulnaris. The patients were training to keep the SEMG amplitude in 20%, 40% and 60% of maximal amplitude of voluntary contraction in precision grip task. The training consisted of 10 sessions. Results: The training resulted in an improvement of the functions of paretic arm (MAS), decrease of EMG amplitude during relaxation (p=0,007), increase of the amplitude of maximal voluntary contraction (p=0,05) and increase of precision of the EMG amplitude according to the template level. Conclusion: SEMG feedback training is efficient for improvement of the precision of paretic arm movements in poststroke patients.

Clinical applications of HRV biofeedback: preliminary data on fibromyalgia and depression
Paul Lehrer, Ph.D., University of Medicine & Dentistry of New Jersey, New Jersey, USA
Contact: lehrer@umdnj.edu

Purpose:
Autonomic nervous system (ANS) dysfunction is thought to play an important role in depression. Although other forms of biofeedback have been proven effective in the treatment of depression, HRV biofeedback is unique in its capacity to treat ANS dysfunction. HRV Biofeedback is a standardized treatment that is simple with specific targeted effectiveness to physiological changes. It can be learned easily by most individuals. HRV biofeedback training involves slowing the breathing rate to the frequency (“resonant frequency”) at which, in each individual, amplitude of HRV is maximized. Although for most people, RSA amplitude is maximized when breathing at the rate of 6 breaths per minute (.1Hz.), the exact resonant frequency varies among individuals. when people try to maximize their HRV they inevitably breathe at their resonant frequency thereby making this the easiest way to increase HRV. This, in turn, should directly produce more effective blood pressure modulation and indirectly, through the anatomical projections from the baroreceptors to the hypothalamus and limbic system, should increase modulation of emotionally and autonomically-mediated reflexes throughout the body. Fibromyalgia syndrome (FMS) is often accompanied by depression and sleep disorders. This study examined the effectiveness of HRV biofeedback on symptoms of FMS: depression, sleep disorder, pain, and daily functioning.

Results:
Depression: Data collected at the first session was repeated at the fourth, seventh, and tenth sessions. Pilot data collected from an on-going, uncontrolled 10-week HRV Biofeedback treatment for MDD (n=5) reveals a trend towards a decrease in overall depression severity from data collected at baseline, sessions 4, 7, and 10. Three out of the four participants who have completed the 10-session protocol to date, have evidenced at least a 50% improvement from baseline while the third participant exhibited a 46% improvement.

Fibromyalgia: There were clinically significant decreases on the BDI-II, between Sessions 1 and Session 10. Two major cognitive components on the BDI-II also were significantly reduced. There also were significant reductions in PSQI global sleep scores, improvements in quality of life (The Fibromyalgia Impact Questionnaire), and pain (the McGill Pain Inventory).

Conclusions: This work will expand the field of HRV biofeedback by exploring this non-pharmacological adjunctive treatment in patients with MDD and fibromyalgia.
Introduction: Facial muscle dystonias are rare and patient experiences suggest that they are poorly appreciated in the medical community. From the time they first see a practitioner with symptoms of facial dystonia, patients typically wait 2 years and see many practitioners before a correct diagnosis is made. Stress may be a factor in the symptomatic onset of this condition. Social interaction, including speech and nonverbal communication, may be one of the concomitant stress factors. Over the last two decades Botulinum toxin seems to be effective in the management of facial spasm, blepharospasm and Meige syndrome. Infrequently, some people have secondary unpleasant side effect from those treatment. Adjunctive oral drug therapy, including minor tranquillisers as well as eyelid surgery, is sometimes prescribed. EMG biofeedback and relaxation training produce improvement in focal dystonia.

Aim is to report the cases of two women, suffering from chronic blepharospasm around both eyes, in whom treatment with Botulinum toxin was interrupted after six months for side effects. No minor tranquillisers were subsequently prescribed. By chance, both women received information on BFB treatment possibilities.

Method: Both underwent cognitive behavioural assessment including questionnaires (CBA-2.0). Level and spasm frequency were monitored during baseline, at end of treatment and at 1 year follow-up.

Treatment: Electromyographic (EMG) feedback (BFB) using a MyoTrack single channel device was applied with electrodes placed over the frontalis muscle. An audio feedback threshold was selected. A set of exercises (eyes region practice) following the Jacobson relaxation method was proposed. After three BFB sessions the patients were instructed to use the BFB device at home while repeating the specific exercises.

Results: A very marked decrease in both EMG level and spasm frequency was progressively observed which was generalized throughout their social everyday life. At the end of treatment, patients were asymptomatic. At 1-year follow-up complete improvement persisted.

Conclusion: EMG BFB in blepharospasm appears a solid treatment permitting re-learning control over the eye muscle region.