

NEUROFEEDBACK and BRAIN MAPPING

Keith Zukiwski, Ph.D., R.Psych. (780) 982-6856 www.drzukiwski.com
Suite 770, First Edmonton Place, 10665 Jasper Avenue, Edmonton, AB T5J 3S9

EEG brain mapping:

Quantitative or statistical analysis of an electroencephalogram (qEEG) recording is the comparison of the brain activity to an age matched database of "normal" EEG activity.

Certain characteristic patterns of brain activity have been identified in many cognitive and emotional disorders. The EEG can assist in differentiating between students with ADHD, learning disability, depression, head injuries, and seizure disorders. Learning disabled population have slower patterns of brain activity with excess delta frequencies (1-3.5 Hz) over the central and parietal lobes. Low blood perfusion in the frontal areas in ADD/ADHD shows as an idling frequency of alpha (8-13 Hz) and/or theta (4-7 Hz). The qEEG can differentiate between forms of ADD/ADHD, each of which respond to different therapies.

Low Resolution Brain Electromagnetic Tomography (LORETA) uses surface EEG activity to find the location of abnormal activity in the structures of the brain (grey matter).

The qEEG assessment is used to create individualized neurofeedback treatment plans to improve function, and normalize EEG.

Neurofeedback:

Real-time computer based feedback of brain wave activity can be used to effectively train healthier brainwave wave patterns in children and adults. This training is called neurofeedback, neurotherapy or electroencephalogram biofeedback.

One or two electrodes are positioned on the scalp and electrodes are placed on each ear. Brainwaves are displayed on a computer screen a few thousandths of a second after they occur. Software is used to provide reinforcement – a sound or visual signal – when the right brain frequencies are produced. Through operant conditioning, brain frequencies that are in excess are reduced, and those with a deficit are increased.

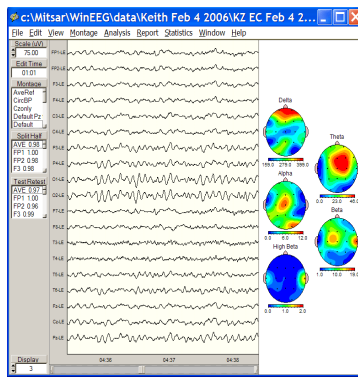
Children and adults with ADHD can be taught to stabilize the activity at the motor strip of the brain to calm down hyperactivity, take the brain out of an idle state (suppress theta and alpha) and increase normal thinking beta wave activity. Normalizing connectivity between sites in the brain can be effective for treating learning/reading disabilities and epilepsy.

Disorders:

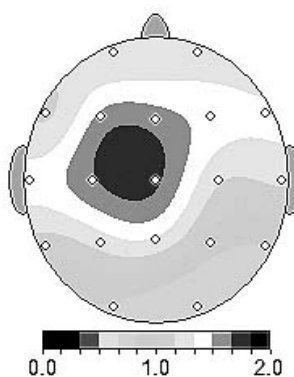
- ADHD
- Learning Disabilities
- Epilepsy
- Brain Injury
- Fibromyalgia
- Anxiety
- Depression
- Addictions
- Alcoholism
- PTSD
- Obsessive-compulsive disorder
- Insomnia
- Cognitive dysfunction related to aging
- Autistic Spectrum Disorders
- Chronic Fatigue
- Academic and sports performance enhancement



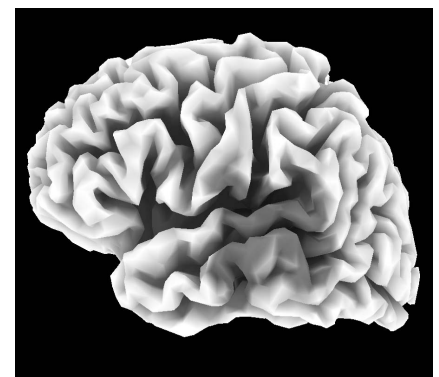
Elastic cap places 19 electrodes on scalp to measure brain activity



Clinical and statistical analysis is aided by sophisticated software



Comparison with normative database reveals abnormalities



LORETA analysis localizes the source of problem in the brain

“EBF (Neurofeedback or Electroencephalogram biofeedback) meets the American Academy of Child and Adolescent Psychiatry ‘Clinical Guidelines’ for treatment of ADHD, seizure disorders, anxiety (eg, obsessive-compulsive disorder, generalized anxiety disorder, posttraumatic stress disorder, phobias), depression, reading disabilities, and addictive disorders. This finding suggests that (neurofeedback) always should be considered as an intervention for these disorders by the clinician. . . . Because of this high level of empirical support, the use of (neurofeedback) for ADHD will (with the publication of the second RCT) meet the most stringent American Psychological Association criterion of efficacious and specific. . . . Specific recommendations based on the body of empirical evidence currently available suggest that (neurofeedback) be considered by clinicians and parents as a first line treatment of ADHD when parents prefer not to use medication and as an empirically supported treatment choice when significant side effects or insufficient improvement occurs with medication.”

Hershberg, et al. (2005) Emerging brain-based interventions for children and adolescents: overview and clinical perspective. *Child and Adolescent Psychiatric Clinics of North America*, 14, 1-19.