Some basic definitions (3)

1- What is Biofeedback?

Biofeedback has evolved from a fascination in the 1960s and 70s to a mainstream methodology today for treating certain medical conditions and improving human performance. This evolution has been driven by years of scientific research demonstrating that the mind and body are connected, and that people can be taught to harness the power of this connection to change physical activity and improve health and function. Public interest in biofeedback is growing, and with it the need for a clear answer to the question, “what is biofeedback?” The leading professional organizations representing the field have answered with the following standard definition:

Biofeedback is a process that enables an individual to learn how to change physiological activity for the purposes of improving health and performance. Precise instruments measure physiological activity such as brainwaves, heart function, breathing, muscle activity, and skin temperature. These instruments rapidly and accurately "feed back" information to the user. The presentation of this information — often in conjunction with changes in thinking, emotions, and behavior — supports desired physiological changes. Over time, these changes can endure without continued use of an instrument. From: www.aapb.org

2- What is Neurofeedback?

Like other forms of biofeedback, neurofeedback training (NFT) uses monitoring devices to provide moment-to-moment information to an individual on the state of their physiological functioning. The characteristic that distinguishes NFT from other biofeedback is a focus on the central nervous system and the brain. NFT has its foundations in basic and applied neuroscience as well as data-based clinical practice. It takes into account behavioral, cognitive, and subjective aspects as well as brain activity.

1 Nicholas, Suite 1508, Ottawa, Ontario, K1N 7B7
Tel: 613-454-5332 ext./poste 2 Fax: 613-686-3140
www.drsdupont.com francois@drsdupont.com

NFT is preceded by an objective assessment of brain activity and psychological status. During training, sensors are placed on the scalp and then connected to sensitive electronics and computer software that detect, amplify, and record specific brain activity. Resulting information is fed back to the trainee virtually instantaneously with the conceptual understanding that changes in the feedback signal indicate whether or not the trainee's brain activity is within the designated range. Based on this feedback, various principles of learning, and practitioner guidance, changes in brain patterns occur and are associated with positive changes in physical, emotional, and cognitive states. Often the trainee is not consciously aware of the mechanisms by which such changes are accomplished although people routinely acquire a "felt sense" of these positive changes and often are able to access these states outside the feedback session.

NFT does not involve either surgery or medication and is neither painful nor embarrassing. When provided by a licensed professional with appropriate training, generally trainees do not experience negative side-effects. Typically trainees find NFT to be an interesting experience. Neurofeedback operates at a brain functional level. It modulates the brain activity at the level of the neuronal dynamics of excitation and inhibition which underly the characteristic effects that are reported. Research clearly demonstrates that neurofeedback is an effective intervention for ADHD and Epilepsy. Ongoing research is supporting the effectiveness of neurofeedback for other disorders such as Autism, headaches, insomnia, anxiety, substance abuse, TBI and other pain disorders, and is promising.

Being a self-regulation method, NFT differs from other accepted research-consistent neuro-modulatory approaches such as audio-visual entrainment (AVE) and repetitive transcranial magnetic stimulation (rTMS) that provoke an automatic brain response by presenting a specific signal. Nor is NFT based on deliberate changes in breathing patterns such as respiratory sinus arrhythmia (RSA) that can result in changes in brain waves. At a neuronal level, NFT teaches the brain to modulate excitatory and inhibitory patterns of specific neuronal assemblies and pathways based upon the details of the sensor placement and the feedback algorithms used thereby increasing flexibility and self-regulation of relaxation and activation patterns. From: www.isnr.org

3- What is qEEG / Brain Mapping?

Electroencephalography (EEG) is the measurement of electrical patterns at the surface of the scalp which reflect cortical activity, and are commonly referred to as “brainwaves”. Quantitative EEG (qEEG) is the analysis of the digitized EEG, and in lay terms this sometimes is also called “Brain Mapping”. The qEEG is an extension of the analysis of the visual EEG interpretation which may assist and even augment our understanding of the EEG and brain function.

Quantitative Electroencephalography (qEEG) is a procedure that processes the recorded EEG activity from a multi-electrode recording using a computer. This multi-channel EEG data is processed with various algorithms, such as the “Fourier” classically, or in more modern applications “Wavelet” analysis). The digital data is statistically analyzed, sometimes comparing values with “normative” database reference values. The processed EEG is commonly converted into color maps of brain functioning called “Brain maps”.

The EEG and the derived qEEG information can be interpreted and used by experts as a clinical tool to evaluate brain function, and to track the changes in brain function due to various interventions such as neurofeedback or medication.

Quantitative Electroencephalography (qEEG) processing techniques and the use of modern analytic software to processes the EEG/qEEG gives us the ability to view the dynamic changes taking place throughout the brain during cognitive processing tasks, and this novel approach can be used to assist us in determining which areas of the brain are engaged and processing efficiently.

Various analytic approaches exist, from commercial databases to database free approaches, such as EEG phenotype analysis or the more classic European Vigilance model of Bente (1964) are used in modern clinical application of the EEG/qEEG. The use of advanced techniques such as Independent Component Analysis (ICA) and neuro-imaging techniques such as Low Resolution Electromagnetic Tomography (LORETA) can map the actual sources of the cortical rhythms. These advanced approaches are changing our understanding of the dynamics and function of the human brain. From: www.qeegsupport.com