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A Proactive Position on qEEG in Neurotherapy

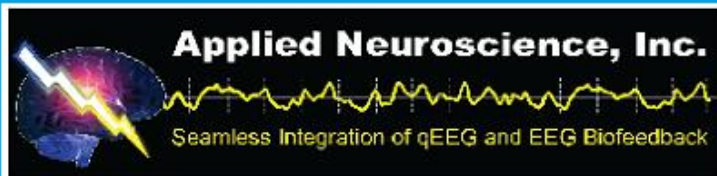David L. Trudeau MD

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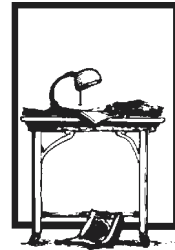
A Proactive Position
on qEEG in Neurotherapy

This issue of the *Journal of Neurotherapy* contains a position paper by the International Society for Neuronal Regulation entitled "Standards for the Use of QEEG in Neurofeedback," by Hammond et al. (2003). This paper was authored by a committee appointed by the ISNR board of directors composed of individuals who were all highly experienced in using qEEG in neurofeedback, but who did not have financial interests in any products. After a number of rewrites incorporating editorial review by six consultants who are expert in quantitative EEG, and finally editorial review by the board, the paper was unanimously accepted by the ISNR board.

This paper goes beyond the position paper on qEEG by Hoffman et al. (1999) that was published in response to the American Academy of Neurology and American Clinical Neurophysiology Society paper on qEEG (Nuwer, 1997). The paper by Hoffman et al. essentially defined the role of qEEG in neurotherapy in a somewhat defensive posture. "In

summary, the report edited by Dr. Nuwer, AAN/ACNC, is misleadingly negative regarding the current status of quantitative EEG and is discouraging for the development of other related fields. There have been many excellent studies that show that QEEG can be useful for the evaluation and understanding of mild traumatic brain injury, learning disabilities, attention deficit disorders, alcoholism and other types of substance abuse as well as other psychiatric disorders."

In distinction, the new ISNR position paper by Hammond et al. (2003) was written, "Because of the distinctive manner in which QEEG is most commonly used in the field of neurofeedback, it was agreed that we need to have our own standards. The committee was in further agreement that a position paper was needed to encourage high standards among neurofeedback practitioners who utilize QEEG." In other words, the use of qEEG in neurotherapy is specific and unique to that field, and has an altogether different, though sometimes overlapping, orientation than the use of medical diagnostic qEEG. It is the responsibility of neurotherapists to define and apply the standards for the unique applications of qEEG to neurotherapy.

It is quite appropriate that this position paper follows on the heels of the double issue of the *Journal of Neurotherapy* (Volume 7, 3-4) on qEEG databases edited by Joel Lubar, PhD. This special issue brings up to date the state of art in qEEG database derivation, standardization, and applications to neurotherapy. In the light of that special issue, it is difficult to make any case that the contributions of neurotherapists are not essential to the current state of qEEG database science, particularly in those areas of interest specific to the field of neurotherapy.

Still we are left with unanswered questions regarding qEEG-derived neurotherapy. The current position paper is careful to point out that, " . . . *a full QEEG assessment is not required for successful treatment with neurofeedback. It is not the intent of this paper or committee to suggest that neurofeedback clinicians need to be doing quantitative EEGs.*" There is only partial and oftentimes anecdotal evidence that qEEG-guided neurotherapy is indeed more efficacious than clinically derived "one size fits all" or symptom-guided individualized neurotherapy. To date I am unaware of any published clinical trials that go head-to-head with qEEG-guided vs. protocol-guided therapy, although there have been papers published on successful outcomes from qEEG-guided neurofeedback (e.g., Thornton 2000, 2002; Tinius & Tinius, 2000; Walker et al., 2002). An interesting recent paper by Fernandez et al. (2003) reports on a placebo-controlled study of qEEG-guided training. Even though they did successful neurofeedback training with learning disabled

children at the site of the most abnormal theta/alpha ratio, they found no differences in the EEG immediately upon completion of neurofeedback training. However, differences were evident two months later, although the greatest changes were not always found at the site of training.

In my opinion we need much more information on the effects of neurotherapy interventions intended to normalize qEEG deviations from norms. While it is common to assume that there is a linear relationship between an intervention and brain electrophysiology, there is also reason to believe that what we are measuring as surface EEG is in large part an epiphenomenon of a dynamic and non-linear process. While models abound (linear and non-linear) to describe relationships between interventions and effect on qEEG, there is precious little demonstration beyond case reports. A priori arguments as to why it makes sense to train to suppress or increase the amplitude of a bandwidth at one or several international 10-20 sites, or to train the dominant frequency up or down, or to train the brain out of dysfunctional patterns (etceteras) may provide hypotheses. To say that either entrainment of EEG, recruitment of EEG, or normalization of qEEG deviation takes place needs to be demonstrated. It remains possible that what occurs with EEG biofeedback or audio-visual stimulation or hemoencephalographic biofeedback may produce EEG changes in unexpected and surprising directions. We also need much more information about the specifics of qEEG deviations with brain dysfunction, and the correlation between qEEG remediation and functional remediation.

As the field moves forward with studies of qEEG-guided therapy, the effects of interventions on qEEG deviations, and the relationships between qEEG deviations and function, answers to the above questions will become more apparent. The position paper on Standards for the Use of QEEG in Neurofeedback gives neurotherapists important guidelines to continue their pursuits in the advancement of qEEG in clinical application and research in neurotherapy.

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Editor

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