QEEG OVERVIEW:

Quantitative EEG is a direct measure of the electrical energies of the brain and the network dynamics.

- QEEG does not reveal the structure of the brain but rather how the brain is functioning.
- QEEG allows measures of neural activity as well as the temporal synchronization or “orchestration” of various brain networks.
- Like medical blood tests, QEEG data is compared to normative data bases.
- QEEG data displays few deviant values in healthy, normally functioning individuals.
- In subjects with neurological and psychiatric disorders, high proportions of abnormal findings have been reported with good concordance and high specificity and sensitivity across numerous studies.

The results can contribute important information to the process of differential diagnosis.

For a more detailed description, click here.

For the standards for usage of QEEG, click here.

QEEG DEFINED:

Quantitative EEG is a technique that employs methods that have long been developed for signal analyses and mathematics to understand dynamic properties of electrical signals that serve to define a functional status. Currently (2022), there are over 7,000 publications using the term or "quantitative EEG" or "QEEG" that are listed in the National Library of Medicine at: https://www.ncbi.nlm.nih.gov/sites/entrez?db=pubmed, however in as much as EEG studies have utilized computerized digital recordings and digital analyses of EEG in general for decades, there are well over 100,000 publications.

QEEG in clinical practice typically references a set of derived metrics to age matched normal or neurotypical populations that have met the statistical standards of validity and reliability and use parametric statistical calculations to determine probabilistic deviations from normal. These statistically based deviations are often illustrated in 2-dimensional or 3-dimensional often referred to as "brain maps" to illustrate regions of the brain that are indicated to be deviant in function. Depending on the regions indicated and sometimes, when appropriate, using statistical algorithms that have been published for certain clinical populations, correlations to specific behavior or functional abilities can be indicated. The brain-function inter-relationships indicated by qEEG analyses are highly consistent with other clinical indications from psychological and neuropsychological testing and findings from other forms of both structural or functional neuroimaging techniques and have been used to establish convergent validity of findings.

It is important to emphasize that QEEG does not assess structural integrity of the brain but rather how the brain is functioning. The methods regarding the acquisition of the EEG from a patient, methods of ensuring adequate artifact-free portions from a raw EEG record that are submitted for quantitative analyses, and the types of metrics shown to have clinical value are standardized and is a part of the mission of the International QEEG Certification Board. Clinicians using qEEG methodology are recommended to achieve certification to demonstrate their knowledge in the proper methods to conduct qEEG analyses and the interpretation of the results using this methodology.

For a brief description, click here.

For the standards for usage of QEEG, click here.

STANDARDS FOR USAGE OF QEEG

QEEG is a functional neuroimaging technology used to link symptoms and/or diagnostic history to observed patterns of dysregulation in brain electrical activity mapping, relying on a referral question established by other diagnostic testing and instruments, clinical interviews, and diagnostic imaging data.

- QEEG may not be used to render a diagnosis(es) but may be used to confirm an existing diagnosis(es) and to provide amplifying or clarifying information.
- QEEG may be used to "locate" the source(s) of dysregulation in the brain's electrical activity by various spectral analyses, forward and inverse solutions, and statistical measures to include reference normative databases.
- QEEG analyses cannot be performed in the absence of an existing diagnosis(es) OR diagnostic history provided by an appropriately credentialed and licensed healthcare professional acting within the scope of their licensure.
- QEEG post hoc testing, including discriminant analyses, must meet the assumptions of the respective tests – violations of the assumptions of the test(s) render any results invalid.
- QEEG results do not "trump" or otherwise overrule diagnostic imaging or diagnostic tests or clinical interviews.
- QEEG imaging data provides functional insights into structural studies, such as MRI, CT/CAT, and conventional X-Ray technologies, particularly in mTBI and certain clinical conditions where structural imaging results are commonly negative (FASD, ASD, ADHD, MDD, PTSD, among others).
- QEEG should only be used in medico-legal settings in concert with other imaging technologies for the purposes of convergent validity.

QEEG relies on reliable and consistent processes in selecting and analyzing EEG data.

- Selection bias should be avoided by using test retest and split-half reliability coefficients above .90 and edit lengths of no fewer than 59 seconds and not longer than 180 seconds to avoid the problems associated with over and under sampling (this is dependent upon the reference normative database employed in the analyses).
- All analyses performed to include the edit selections used in those analyses should be preserved so that those tests can be repeated by opposing experts.

QEEG relies on high quality, artifact-free EEG data – to the extent possible using a combination of "eye ball" and computer assisted artifact rejection routines – before analyzing the EEG data.

For a brief description, click here.

For are more detailed description, click here.