

QEEG Subtypes of Autistic Spectrum Disorder

Michael Linden, Ph.D.
Director – Attention Learning Centers
949-489-3233

Quantitative electroencephalographic (QEEG) evaluation or mapping is an assessment instrument designed to pinpoint anomalies in brain function (Hammond, 2005). QEEG Maps, collected using 19 electrodes based on the International 10-20 system (Jasper, 1958), are quantitative analyses of EEG characteristics of frequency, amplitude and coherence during various conditions or tasks. These data can be statistically compared to an age-matched normative database to reveal a profile of abnormalities. Such regions and aspects of dysfunctional neurophysiology may then be targeted specifically through individualized Neurofeedback protocols. QEEG analyses measure abnormalities, instabilities, or lack of proper communications pathways (connectivity) necessary for optimal brain functioning.

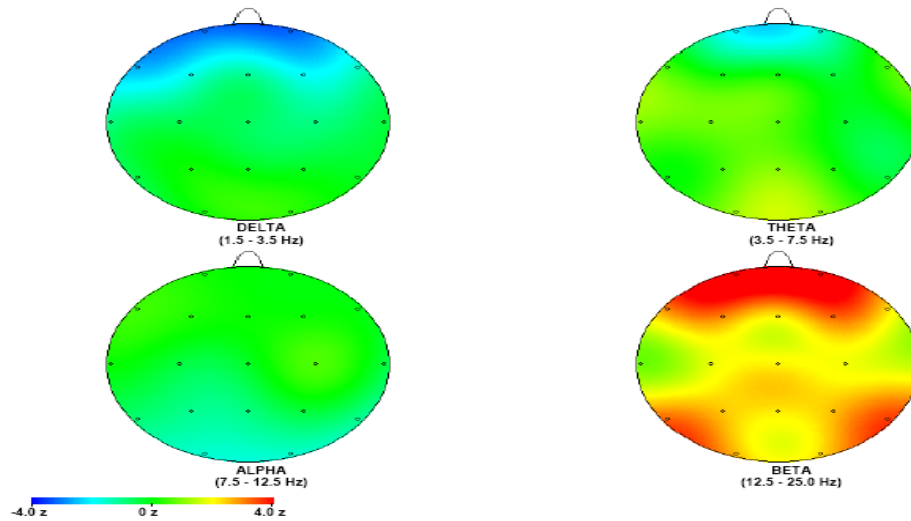
QEEG analyses are conducted to assess underlying neurophysiological patterns related to the symptoms and challenges of children with ASD. In addition, assessment of the raw EEG can be used to evaluate neurological abnormalities such as seizure disorders, which are common in children with autism. QEEG data are important for developing the most individualized, specific and successful Neurofeedback protocols for patients with ASD (Coben & Linden, 2009; Coben & Padolsky, 2007; Linden, 2004).

Dr. Linden (2004, 2008) of Attention Learning Centers identified six QEEG patterns of Autism and two of Aspergers based on 19 channel EEG recordings and analysis of raw EEG, absolute power, relative power and multivariate connectivity. The six Autism QEEG subtype patterns are: 1) High Beta activity which corresponds to obsessing, overfocusing and anxiety, 2) High Delta/Theta activity which corresponds to cortical slowing and inattention, impulsivity and hyperactivity, 3) Abnormal EEG/Seizure activity, and 4) Metabolic/Toxic pattern of lower overall EEG activity (voltage), 5) Mu activity which corresponds to social skills, and 6) Coherence Abnormalities. The High Beta and coherence subtypes were the most common subtypes, occurring in approximately 50-60 percent of the students with ASD. The Delta/Theta subtype occurred in 30-40 percent, the Abnormal EEG subtype in 33 percent and the Metabolic/Toxic subtype in 10 percent.

The QEEG patterns with students with Asperger's primarily occurred in the right temporal and parietal regions, sites involved in social and emotional recognition mechanisms. The QEEG patterns of those with Aspergers' are: 1) High Theta/Alpha slowing in the right temporal/parietal areas and 2) Low coherence between right temporal/parietal brain regions and other regions. More than one QEEG subtype pattern was frequently present in the students with ASD.

Autism Child 9 y/o High Beta

FIGURE 7B: RELATIVE POWER Z-SCORE TOPOGRAPHS

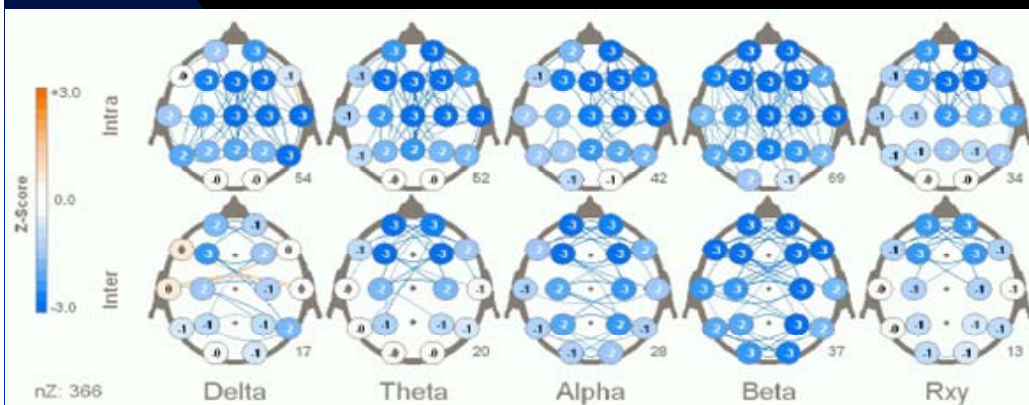


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Case Studies QEEG Maps & NF
with ASD

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Aspergers 8 y/o child Right Frontal Hypoconnectivity



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