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Electrical Brain Imaging-Brain Mapping (QEEG)-*LORETA* ***Z-score Neurofeedback in Neuropsychiatric Practice***

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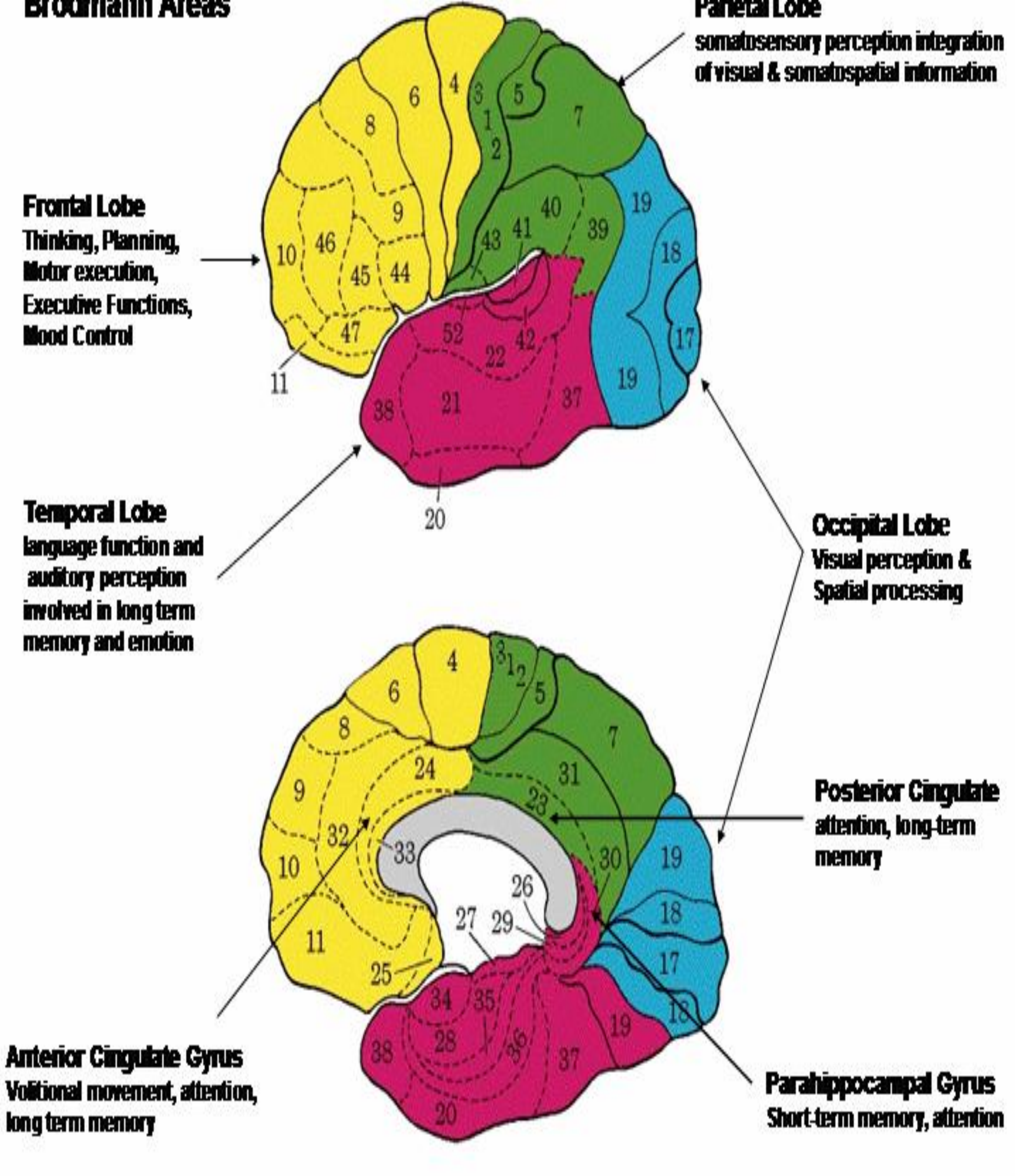
Brodmann cortical areas 1909

Described by Dr. Brodmann approximately 100 years ago but still widely used in research and clinical practice which links specific cortical brain areas to particular functions



Electrical imaging

- Blood electrolytes abnormalities – imbalance-hypo- or hyper-(Na, K, Ca) gives well known clinical *symptoms-Electrolyte abnormalities are detected based on previously determined normative values*.

- Brain electrical imbalance (normative database) gives symptoms based on cortical localization-see Brodmann's Areas

Neuropsychiatric work up

- Detailed history (symptoms and complains)
- Neurobehavioral questionnaire
- Cognitive computerized testing
- Brain MRI, LAB's (B12 deficiency)
- QEEG/LORETA

Materials and Methods

LORETA-is a 3D mathematical transformation of QEEG data enabling relatively precise 7-10 mm localization of cortical dysfunction

Neurotrax Corp. is a computerized cognitive testing where patient is compared to aged and education matched healthy controls where mean=100 with 1 standard deviation=15.

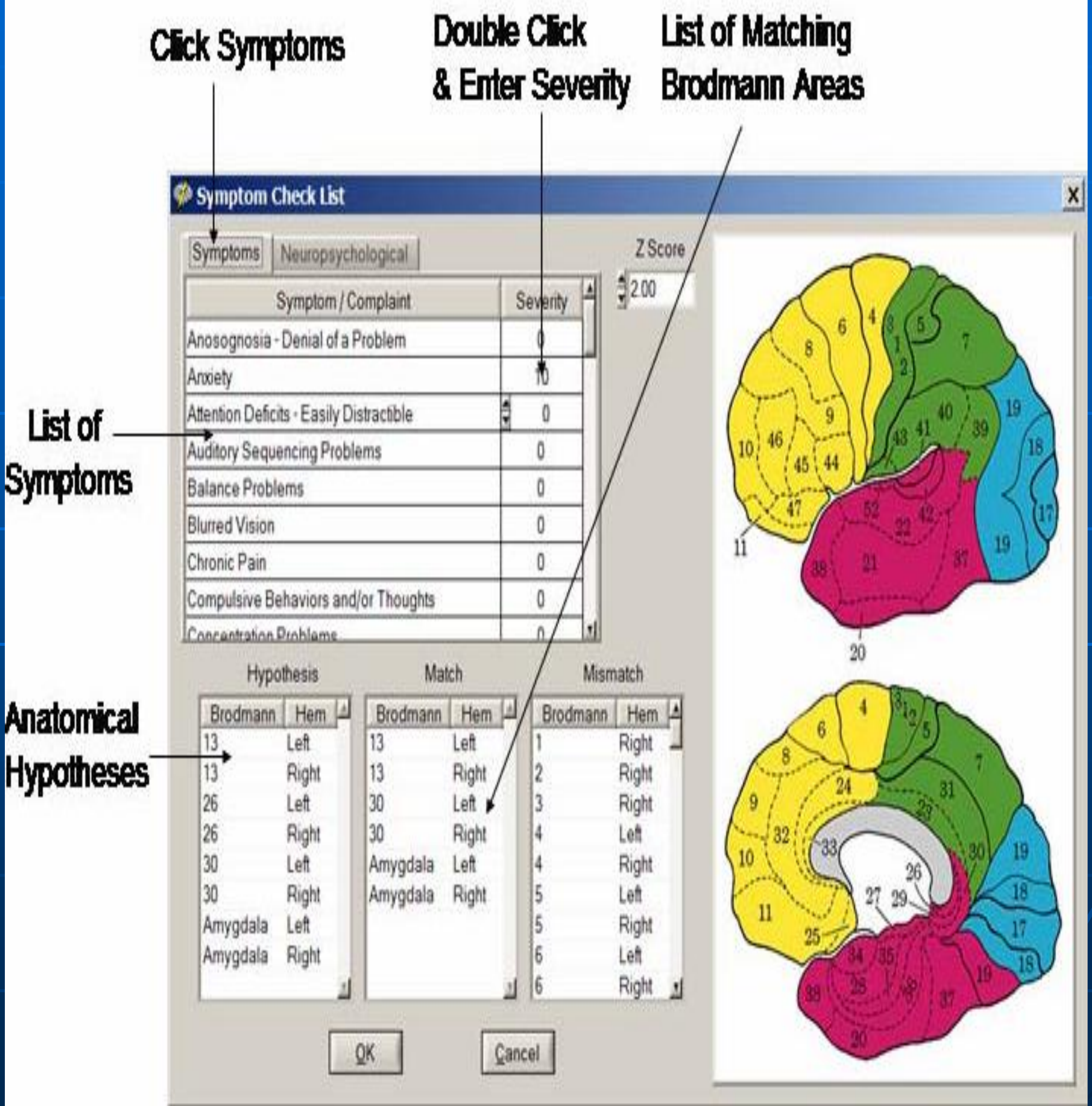
This testing has been previously extensively tested for reliability. To minimize learning across sessions, 3 alternate forms of cognitive tests were developed with identical psychometric properties but different items. Equivalence for all three alternate forms was demonstrated to have an acceptable test-retest reliability

Z score NFB

The clinical use of NFB in neuropsychiatry involves 3 steps:

1. 1. Evaluation of patients symptoms and complaints
2. 2. Linking the patient's symptoms to functional specialization in the brain
3. 3. Real-time Z score neurofeedback of deviant or deregulated brain regions associated with the patient's symptoms.

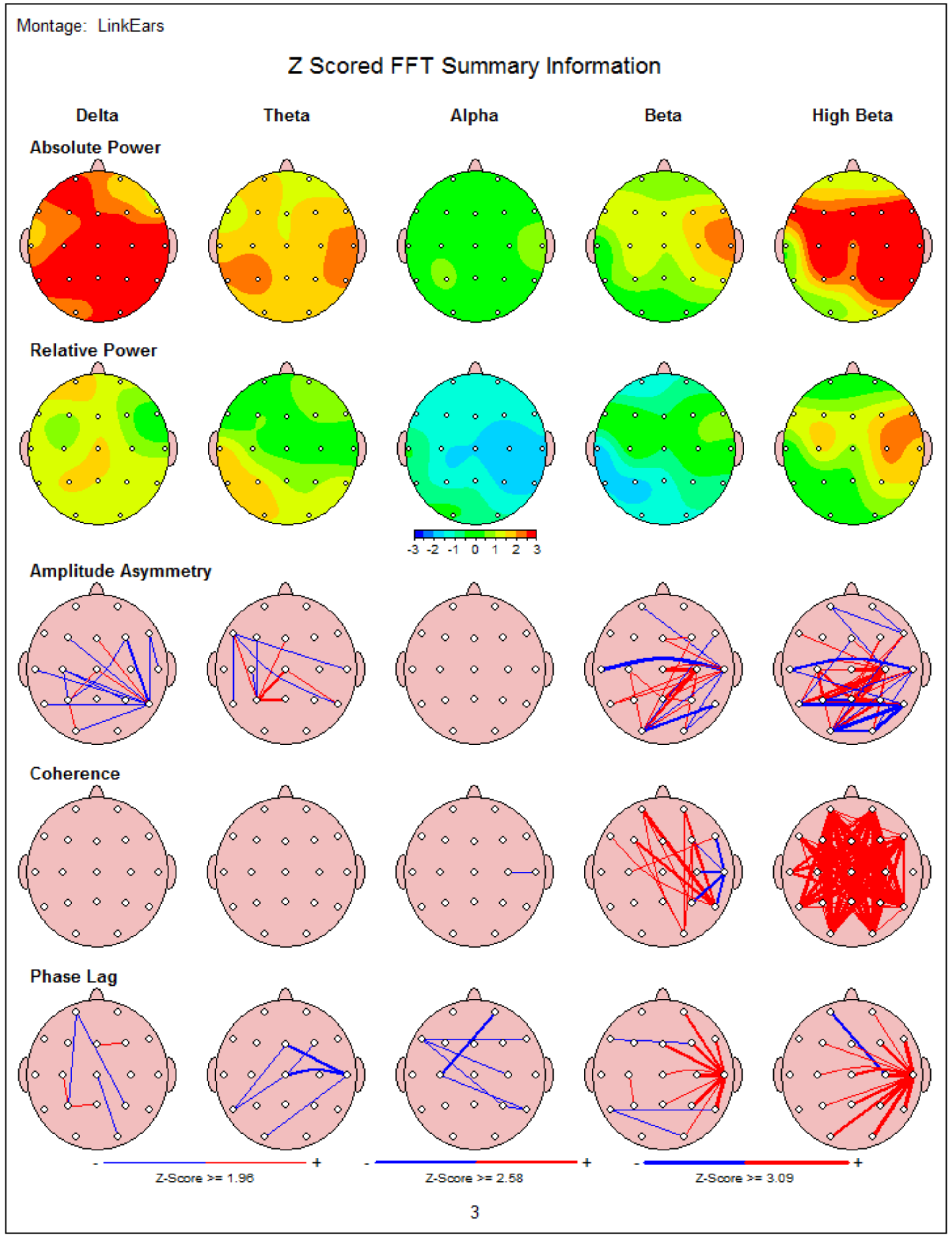
Use of real time to an age matched normative database with Z scores or standard deviations to train patients toward Z=O in brain regions associated with particular disorders.



Z-score surface/LORETA 19 electrodes NFB

58 year old female with long history of chronic migraine and daily HA.

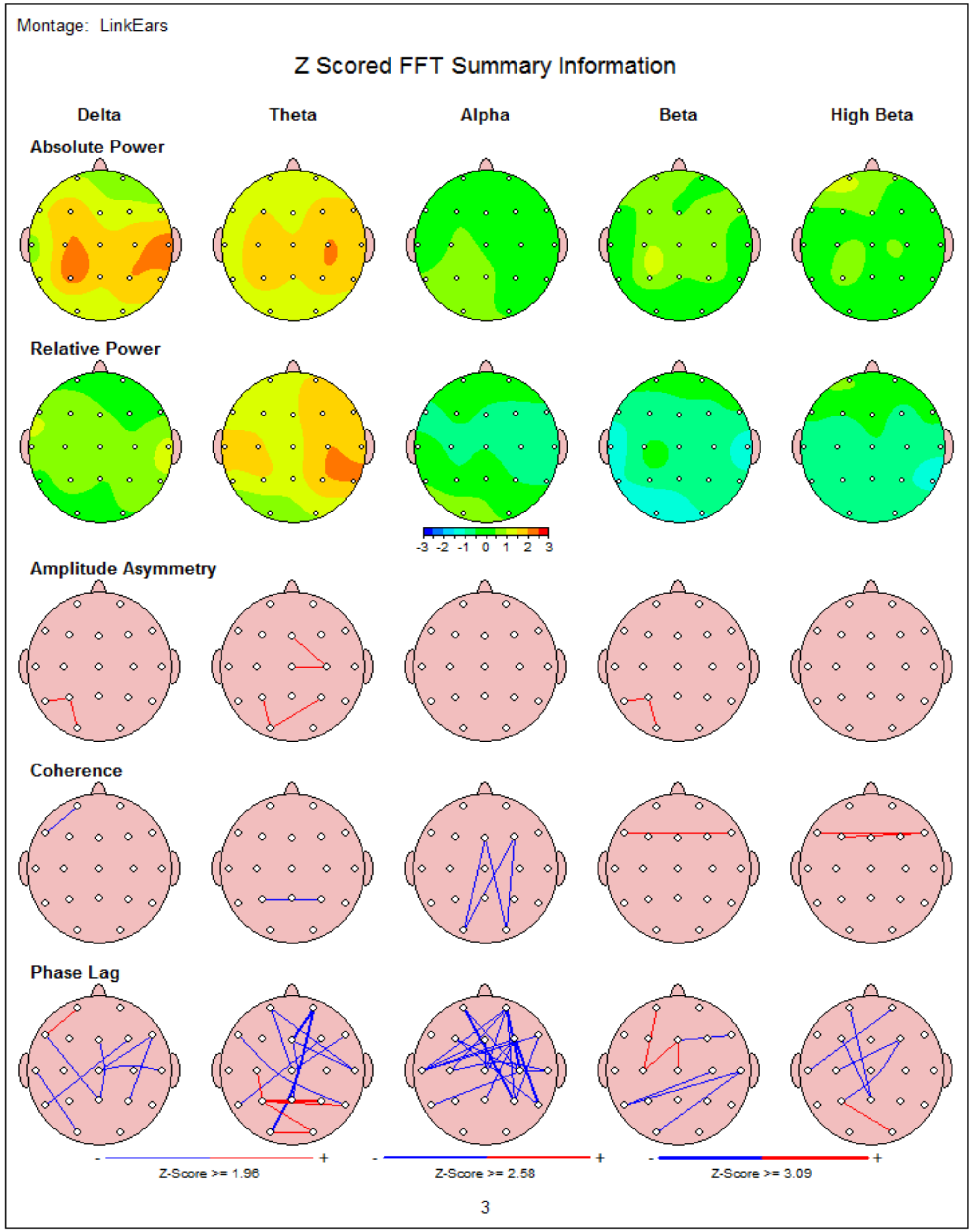
Pre-NFB QEEG (brain maps) showed marked increase in frontal and central beta power as well as increased delta and theta powers.



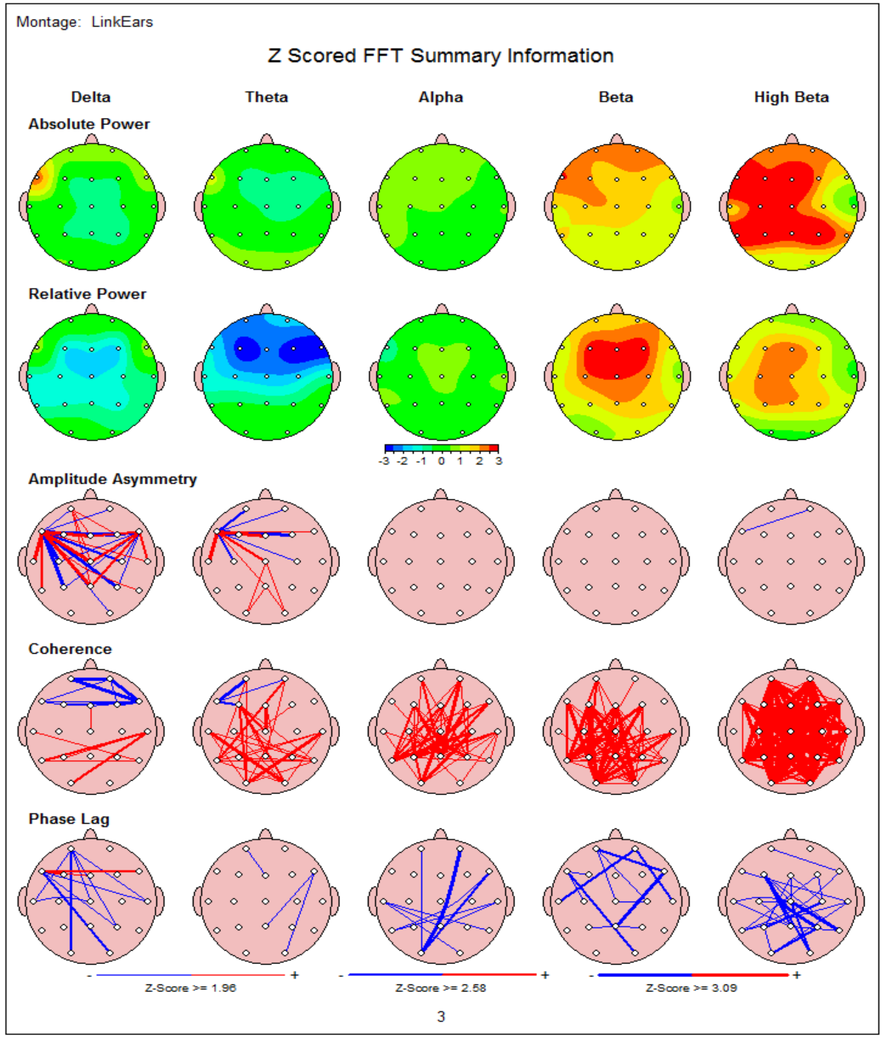
Z-scored surface and LORETA 19-electrodes NFB-continuation

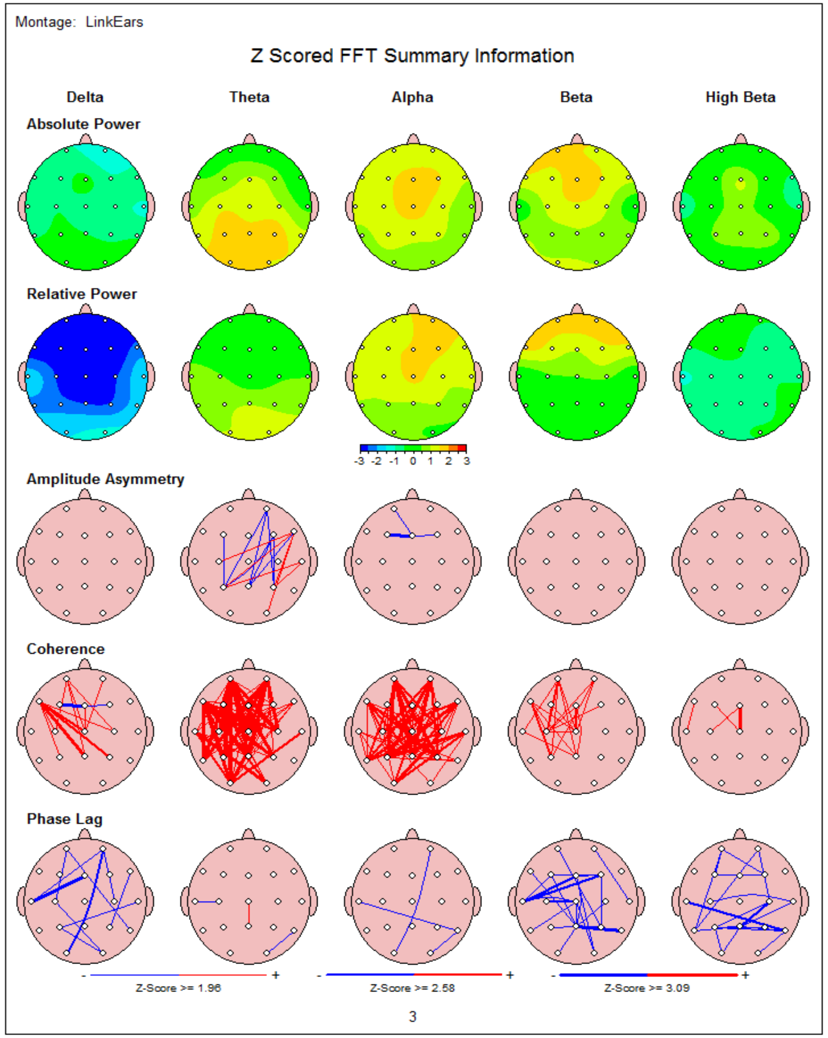
After initiation of NFB and completion of 10 sessions of therapy patient's HAs practically resolved and were in remission for 2-3 months.

F/U QEEG showed the resolution of frontal and central excess of beta activity (power).

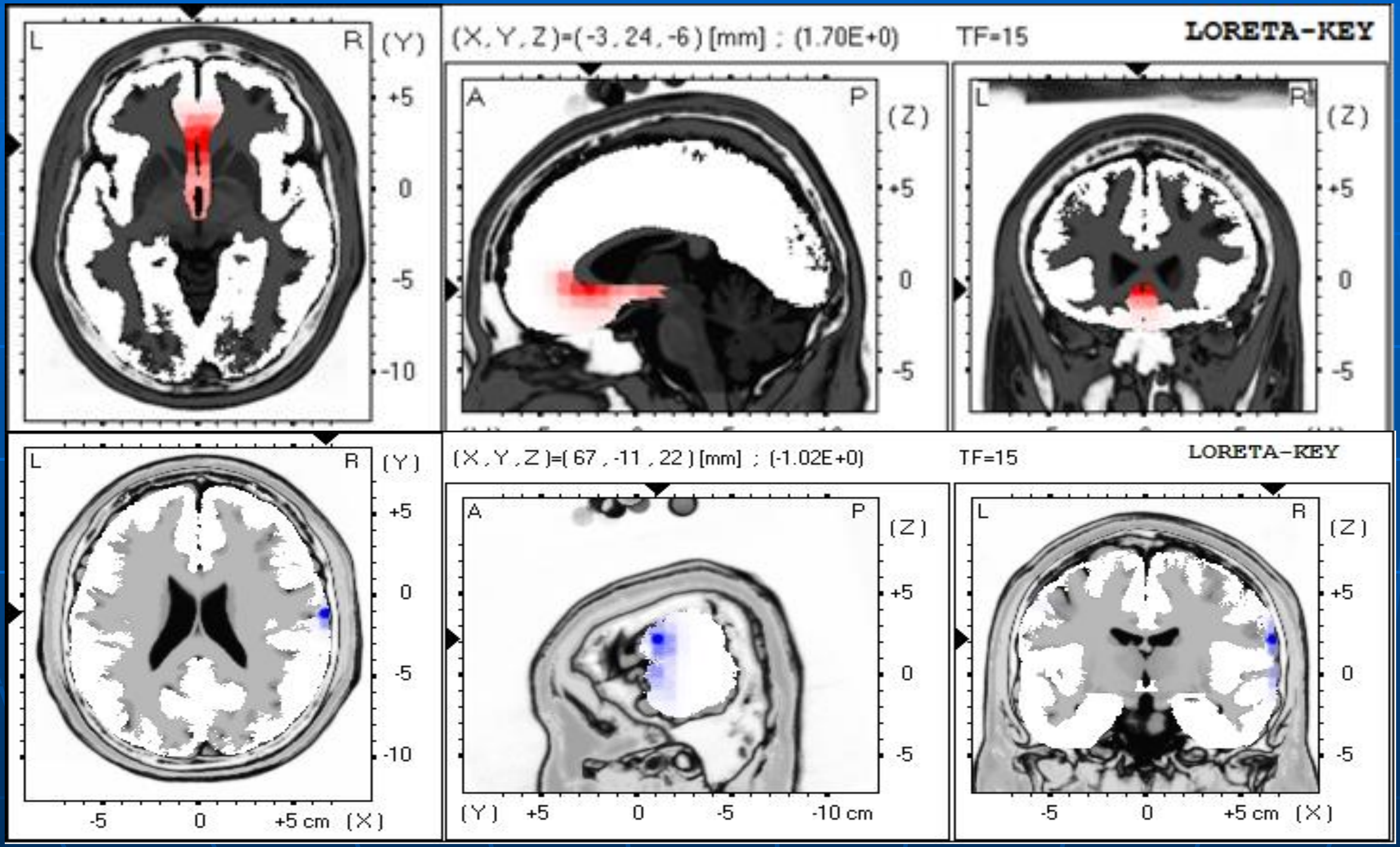


15 year old female competitive horse rider who was complaining of major anxiety before competitions and poor performance. Brain Mapping (QEEG) was completed before Neurofeedback (NFB) and after 15 sessions of NFB. See major reduction of beta activity (red color indicates increased beta activity-responsible for the anxiety) in after NFB maps. After NFB marked improvement of anxiety and performance during the competitions was noted





15 F with anxiety-LORETA-before and after 15 NFB sessions: BA 25



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Clinical Advantages of Quantitative Electroencephalogram (QEEG)–Electrical Neuroimaging Application in General Neurology Practice

J. Lucas Koberda[1], Andrew Moses[1,2], Paula Koberda[1,2] and Laura Koberda[1,2]

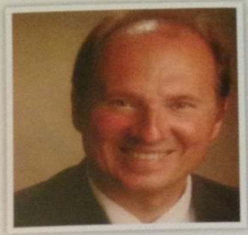
Abstract

QEEG-electrical neuroimaging has been underutilized in general neurology practice for uncertain reasons. Recent advances in computer technology have made this electrophysiological testing relatively inexpensive. Therefore, this study was conducted to evaluate the clinical usefulness of QEEG/electrical neuroimaging in neurological practice. Over the period of approximately 6 months, 100 consecutive QEEG recordings were analyzed for potential clinical benefits. The patients who completed QEEG

Invited publication 2012

AUTISTIC SPECTRUM DISORDER AS A POTENTIAL TARGET OF Z-SCORE LORETA NEUROFEEDBACK

J. Lucas Koberda, MD, PhD



Autism is a neurodevelopmental disorder characterized by impaired social interaction and communication, and by restricted and repetitive behavior. It is one of three recognized disorders in the autism spectrum disorders (ASDs), the other two being Asperger Syndrome (AS), which lacks delays in cognitive development and language, and Pervasive Developmental Disorder, not otherwise specified (PDD-NOS), which is diagnosed when the full set of criteria for autism or Asperger syndrome are not met.

The prevalence of autism is about 1–2 per 1,000 people worldwide, and the Centers for Disease Control and Prevention (CDC) report 11 per 1,000 children in the United States are diagnosed with ASD as of 2008. Parents usually notice signs in the first two years of their child's life. Early behavioral or cognitive intervention can help autistic children gain self-care, social, and communication skills.

Asperger Syndrome (AS), frequently considered as mild form of ASD is characterized by significant difficulties in social interaction, alongside restricted and repetitive patterns of behavior and interests. It differs from other autism spectrum disorders by its relative preservation of linguistic and cognitive development. Although not required for diagnosis, physical clumsiness and atypical use of language are frequently reported. The syndrome was named after the Austrian pediatrician Hans Asperger who, in 1944, studied and described children in his practice who lacked nonverbal communication skills, demonstrated limited empathy with their peers, and were physically clumsy. There is doubt about whether it is distinct from High-Functioning Autism (HFA) partly because of this; its prevalence is not firmly established. Although research suggests the likelihood of a genetic basis, there is no known definite genetic etiology. The lack of demonstrated empathy is possibly the most dysfunctional aspect of Asperger syndrome. Individuals with AS experience difficulties in basic elements of social interaction, which may include a failure to develop friendships or to seek shared enjoyments or achievements with others. Stereotyped and repetitive motor behaviors are a core part of the diagnosis of AS and other ASDs. They include hand movements such as flapping or twisting, and complex whole-body movements. Although individuals with Asperger syndrome acquire language skills without significant general delay and their speech typically lacks significant abnormalities, language acquisition and use is often atypical. Abnormalities include verbosity, abrupt transitions, literal interpretations and miscomprehension of nuance, use of metaphor meaningful only to the speaker, auditory perception deficits (unusually pedantic), formal or idiosyncratic speech, and oddities in loudness, pitch, intonation, prosody, and rhythm. Echolalia has also been observed in individuals with AS. There is no single treatment, and the effectiveness of particular interventions is supported by only limited data. Intervention is aimed at improving symptoms and function. The mainstay of management is behavioral therapy, focusing on specific deficits to address poor communication skills, obsessive or repetitive routines, and physical clumsiness. Most children improve as they mature to adulthood, but social and communication difficulties may persist. More recently, neurofeedback (NFB) has been reported as a potential treatment modality which could benefit ASD individuals. Therefore, the following case of Z-score Low Resolution Electro-magnetic Tomography Analysis (LORETA) NFB treatment, which is one of the newest forms of neurotherapy, is presented as an example of successful outcome.

A CASE STUDY

Victor is an 18-year-old male student who presented for an initial evaluation with his mother. The mother reported that he had problems with focusing, concentration, and speech expressive functions. In addition, social interaction problems were reported including a difficulty in making friends and generalized clumsiness. Victor was not taking any medications. He was a freshman at a local university with very good performance in mathematics and physics (A) however poorer performance in English and philosophy (B, C). His examination showed monotone type of speech with decreased speech output and reduced facial expression. Some reduction of fine motor movements was also noted during the exam.

Initial workup was unremarkable except for the quantitative electroencephalogram (qEEG) (Neuroguide, Inc. St. Petersburg, FL) which showed increased theta activity in the fronto-temporal (see Fig. 1) region.

Victor and his mother were not interested in medication therapy.

Victor was diagnosed with possible Asperger syndrome and was initially treated with 1-electrode basic type of NFB guided

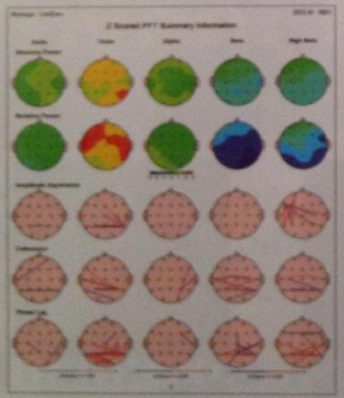


Figure 1
qEEG of 18-year-old student with probable AS with noticeable increase in frontal and temporal theta power

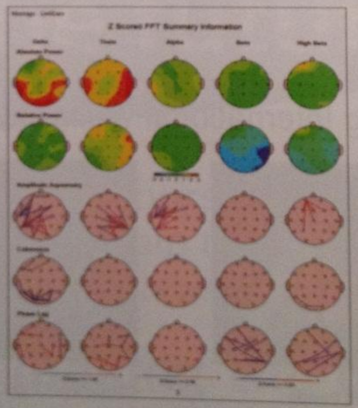


Figure 2
Follow up qEEG after 30 sessions of 1-electrode NFB. Notice elevated frontal and temporal delta and theta power.

Journal of Neurotherapy, 17:179–190, 2013

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DOI: 10.1080/10874208.2013.813204

PAIN MANAGEMENT USING 19-ELECTRODE *Z*-SCORE LORETA NEUROFEEDBACK

J. Lucas Koberda, Paula Koberda, Andrew A. Bienkiewicz, Andrew Moses, Laura Koberda

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***Z*-score LORETA neurofeedback (NFB) has been found in case reports to be an effective and promising form of neuromodulation, relieving many neuropsychiatric symptoms. LORETA imaging that identifies dysregulation in the structures of the brain that are involved in pain regulation has made it possible to design a targeted NFB therapy. This article describes the effective delivery of targeted LORETA NFB to treat chronic pain in four selected patients.**

INTRODUCTION

Previous reports from our clinic have described LORETA *Z*-score NFB as highly effective in the

Stern, Jeanmonod, & Sarnthein, 2006; Walker, 2011).

Neurofeedback (NFB) is becoming an

Journal of Neurotherapy, 16:224–230, 2012

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COGNITIVE ENHANCEMENT USING 19-ELECTRODE *Z*-SCORE NEUROFEEDBACK

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Tallahassee NeuroBalance Center, Tallahassee, Florida, USA

A 23-year-old man presented for a neurological evaluation due to cognitive problems restricting him from college education. He graduated successfully from high school but had problems in college, which caused his subsequent withdrawal. He was interested in trying neurofeedback (NFB) for possible cognitive enhancement. His initial computerized neurocognitive testing showed global cognitive standard score (GCS) of 93.1. The information processing speed standard score was 64.5 and was the lowest of scored domains. Quantitative electroencephalography revealed right frontal and temporal increase in delta power and left frontal and temporal beta power excess. Fifteen sessions of 19-electrode *Z*-score NFB lead to marked improvement of the patient's subjective cognitive perception as well as

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Figure 2b

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Journal of Neurology & Stroke

Z-score LORETA Neurofeedback as a Potential Rehabilitation Modality in Patients with CVA

Abstract

This is multi-case presentation describing promising rehabilitation results of Z-score LORETA neurofeedback therapy of patients suffering from prior stroke. Potential benefits include improved cognitive function and motor performance.

Keywords

CVA; LORETA; Neurofeedback; Rehabilitation; Z-score, Imaging

Abbreviations

NFB: Neurofeedback; LORETA: Low Resolution Electromagnetic Tomography Analysis; CVA: Cerebrovascular

Case Report

Volume 1 Issue 5 - 2014

J. Lucas Koberda[1]* and Urszula Stodolska-Koberda[2]

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Journal of Psychology & Clinical Psychiatry

Z-Score LORETA Neurofeedback as a Potential Therapy in Cognitive Dysfunction and Dementia

Abstract

Introduction of QEEG/LORETA electrical brain imaging has improved our diagnostic ability in neuropsychiatric practice by enhancing identification of dysregulated cortical areas implicated in patient symptoms. Additional use of LORETA Z-score neuro feedback (NFB) enables us to directly target these areas of dysregulation in order to improve associated symptoms. Based on the review of 250 patients treated in our clinic suffering from neuropsychiatric illness and treated with Z-score LORETA NFB, analysis of cases of cognitive dysfunction and dementia are presented. Specific areas of dysregulation attributed to particular conditions identified by LORETA are discussed. Follow up findings of QEEG/LORETA electrical imaging after NFB therapy (including computerized cognitive testing results) are shown. This paper summarizes my experience with LORETA Z-score NFB as a tool for therapy of cognitive dysfunction. In addition, this form of NFB is able to improve cognitive functions of individuals suffering from memory, information processing and other cognitive dysfunctions. Extensive presentations of selected cases are used for demonstration of results from

Research Article

Volume 1 Issue 6 - 2014

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Tallahassee Neuro-Balance Center, USA

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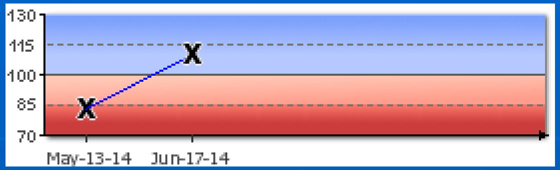
16 M after mTBI-Computerized cognitive testing after 10 sessions of NFB



Global CS:	82.3	110.7
Memory:	85.9	105.6
Executive Function:	65.7	108.4
Attention:	49.2	108.1
Info Proc. Speed	82.7	113.1
Visual Spatial:	107.3	113.9
Verbal Function:	85.3	114.2
Motor Skills:	100.1	111.6

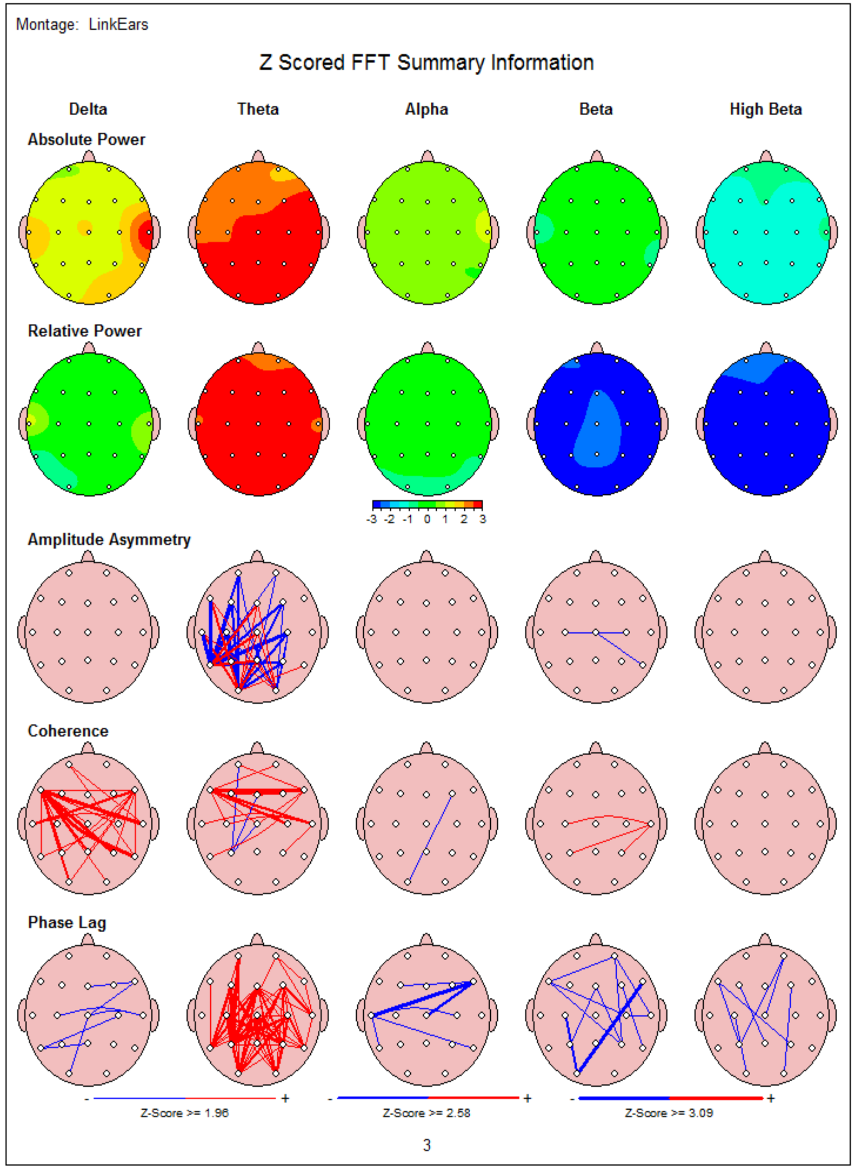
32 M-with mTBI-after he was assaulted in psychiatric hospital-computerized cognitive testing before and after NFB

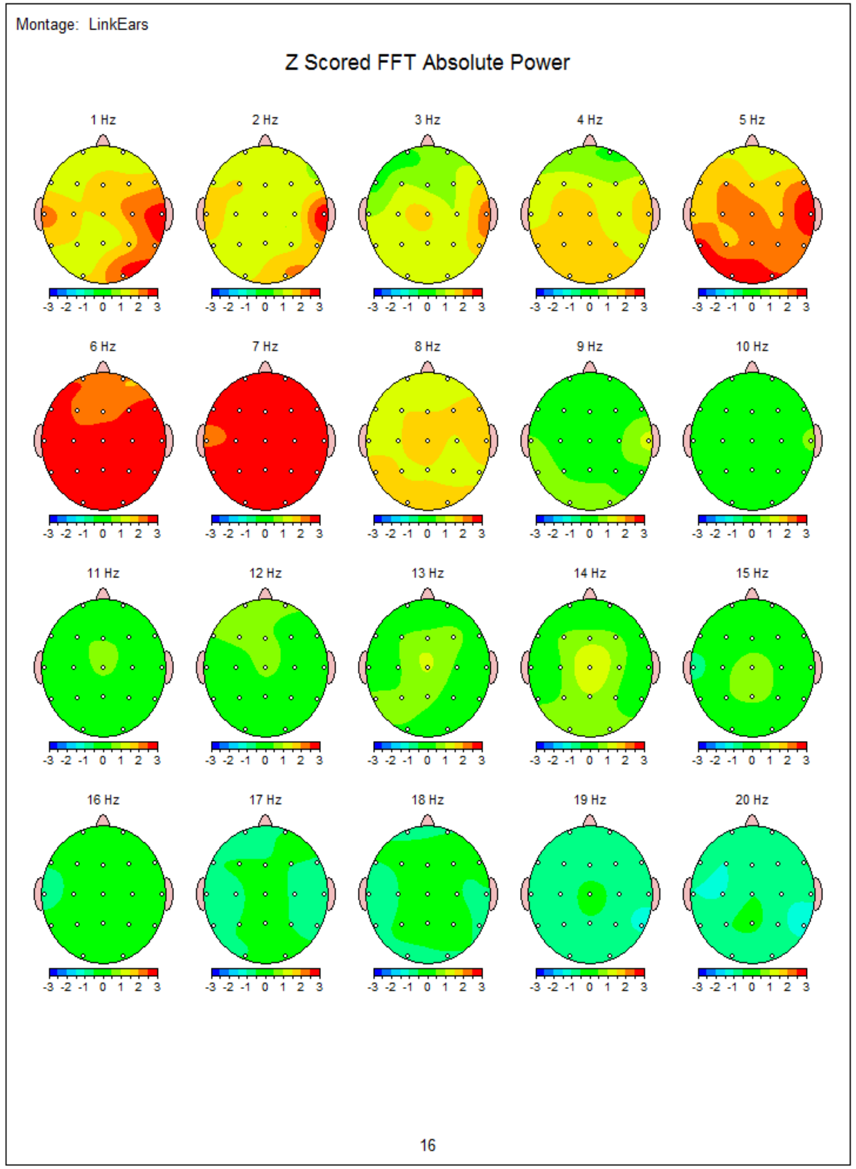
Global CS:	91.5	95.6	101	104
Memory	90.5	99.6	101.3	107.8
Info Processing Speed:	64.2	74	89.9	90.3

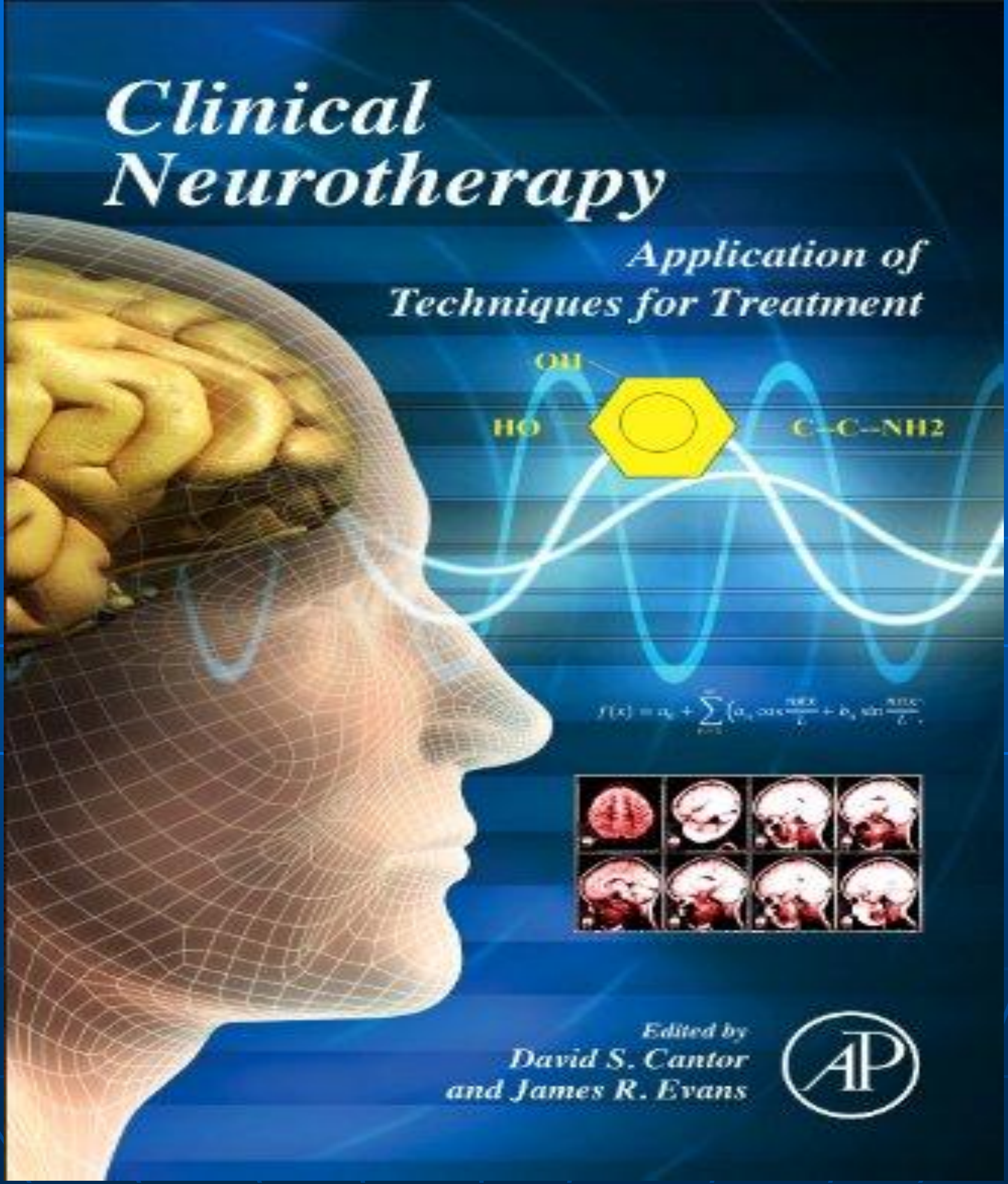
32 M-with mTBI-after he was assaulted in psychiatric hospital-computerized cognitive testing before and after NFB

Global CS:	91.5	95.6	101	104
Memory	90.5	99.6	101.3	107.8
Info Processing Speed:	64.2	74	89.9	90.3

68 y.o. female with 1-2 years of progressive forgetfulness due to mild AD (second opinion after visit with another neurologist/neuropsychologist-recommended Aricept)



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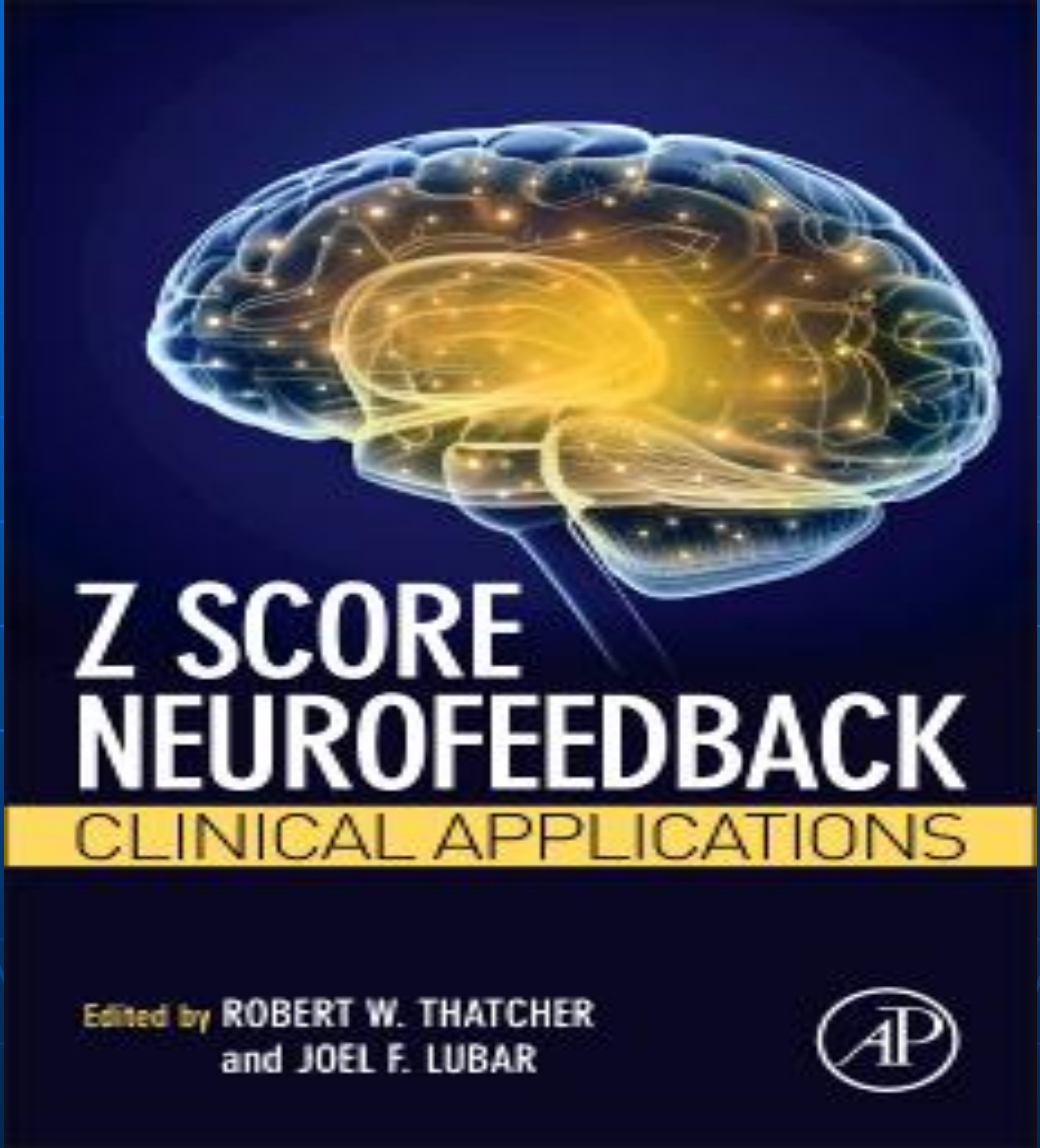
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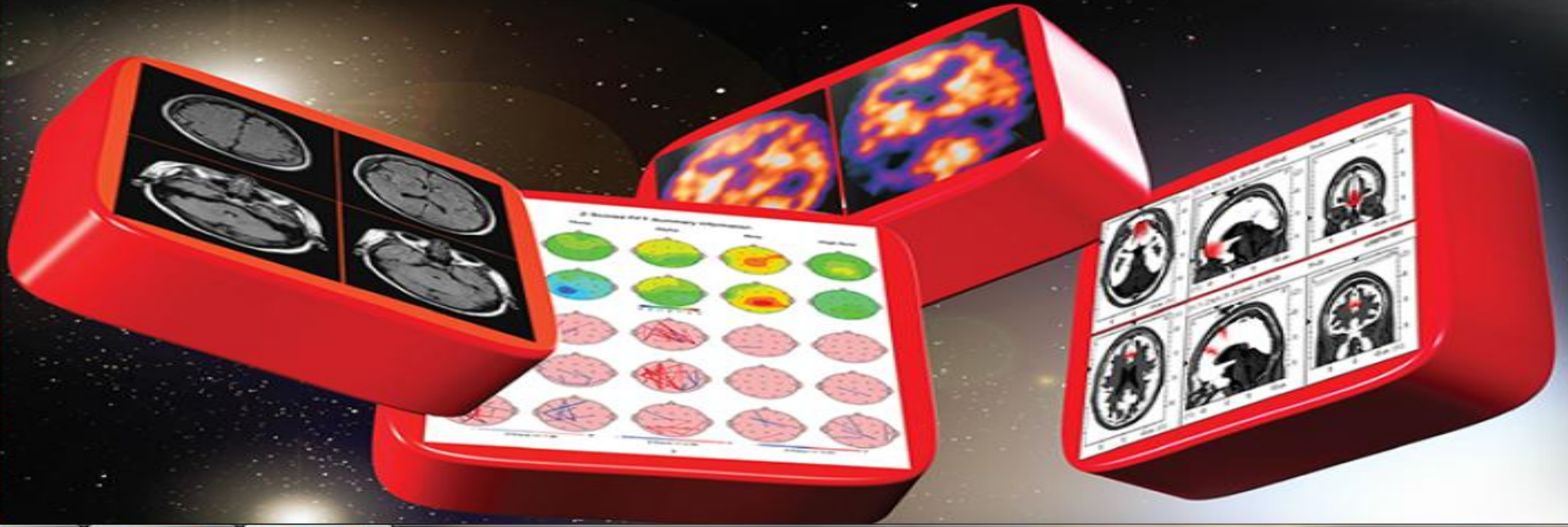

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