QEEG Findings in Adults Reporting a History of Sex Addiction

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Introduction

- Identifying and treating individuals who engage in illegal or abnormal sexual behavior has important societal implications.
- Adequate treatment for the rehabilitation of sex offenders has yet to emerge.
- Studies examining EEG patterns and abnormal sexual behavior have yielded mixed results, although there are some common themes.

Previous Research

- Corley, et al. (1994):
  - Found decreased delta power in the left posterior region & decreased delta coherence between left & right posterior temporal regions.
- Flor-Henry and colleagues (1991):
  - Identified increased frontal power in the slower frequency ranges (delta, theta and alpha bands) among pedophiles.

Previous Research, cont.

- Kirenskay-Berus & Tkachenko:
  - Found increased absolute spectral density in delta and theta frequency bands in the frontal, temporal, & central regions.
  - Increased spectral density in all frequency ranges at T5 & T6 locations.

Purpose and Hypothesis

- Purpose of Study:
  - To further explore QEEG patterns among individuals identified as having a sex addiction.
- Hypothesis:
  - It was predicted that QEEG power abnormalities would appear in the posterior temporal regions and in the frontal regions.

Subjects

- Files were from selected from the Sante Center for Healing and from the neurotherapy practice of the second author.
- N = 32
- Age range: 18 to 59 years
- Mean age: 36.8 years
- Handedness: 31 right-handed; 1 left-handed.
- All subjects were identified as having a sexual addiction
- Subjects' medications included a broad range of drugs such as antidepressants, anticonvulsants, and anti-anxiety medications

EEG Recordings

- EEG was recorded in eyes closed and eyes open conditions.
- Electrode placement was made according to the international 10-20 system using linked-ears as a reference.
- Impedance of the electrodes was measured before and after each recording to ensure it remained below 10,000 Ohms.
- At least fifty epochs of each record were chosen via visual inspection for Fast Fourier Transformation.
- The chosen epochs were free of eye movement artifact, though EMG artifact was unavoidably present in some records at T3, T4, FP1, and FP2.

Database Comparisons

- All records were edited in Neuroguide software and comparisons were made to the Neuroguide database (N=625).
- Relative power information was obtained from the Neuroguide database for the eyes closed condition.

Data Analysis

- EEG frequencies were grouped according to the following frequency bands: Delta (1.0-3.5 Hz), Theta (4.0-7.5 Hz), Alpha (8.0-12.0 Hz), and Beta (12.5 to 25.0 Hz).
- Eyes closed relative power for each band at each site for each subject was compared to Thatcher's Lifespan Normative Database (N= 625), producing Z-scores for each of the 32 subjects.
- Derived Z-scores were averaged across all 32 subjects, yielding a mean for each location at each frequency band.

Data Analysis

- Z-scores based on reference database norms were considered significant if greater than +/- 1.96 standard deviations from the mean of zero.

- Prior to analysis, the data were screened for outliers and scores significantly different from the group mean statistic were eliminated.

Data Analysis

- The percentage of subjects who had relative power means greater than 2.0 standard deviations were calculated, as any mean greater than 2.0 is considered significantly different.

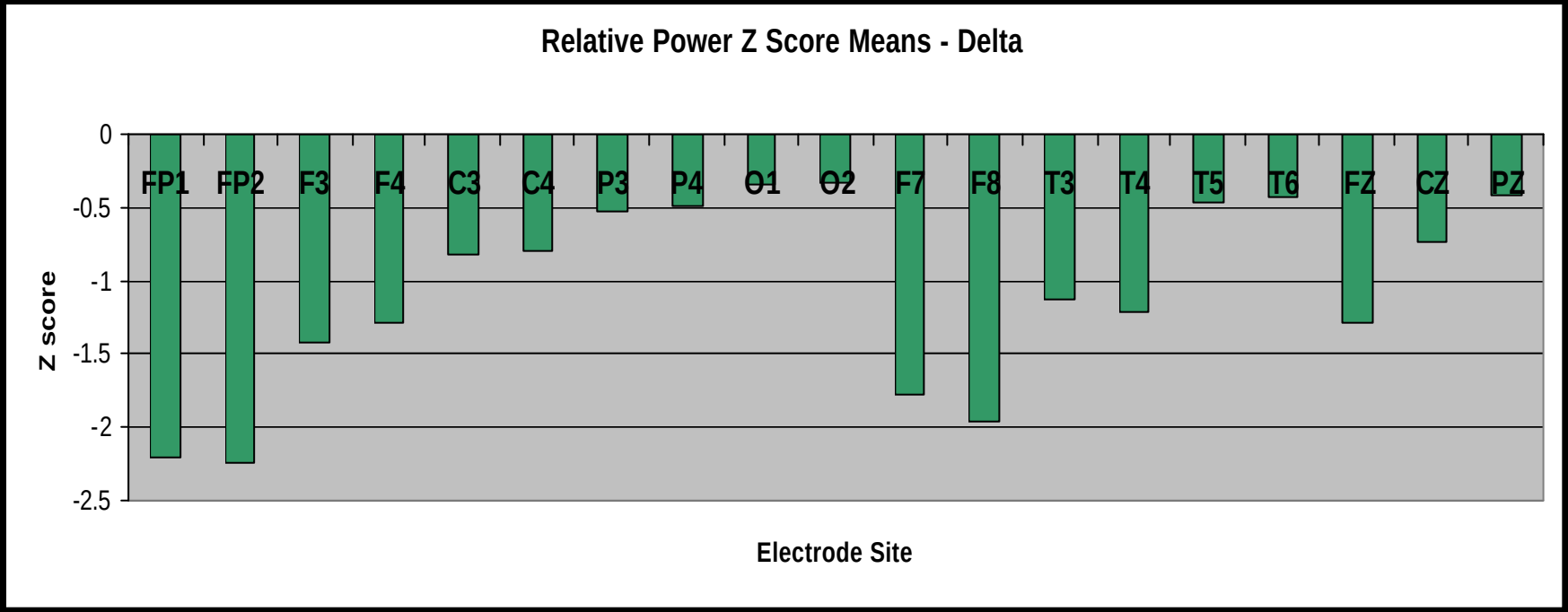
Results

- Results showed decreased relative power in the slower frequency bands (delta and theta), as well as in the beta range.
- Greatest decreases seen in frontal delta:
  - At FP1 (M = -2.20 , SD =1.27), at FP2 (M = -2.24, SD = 1.18), and at F8 (M = -1.95, SD =.951), with 58% of all subjects showing decreased frontal delta at least two standard deviations less compared to the database.

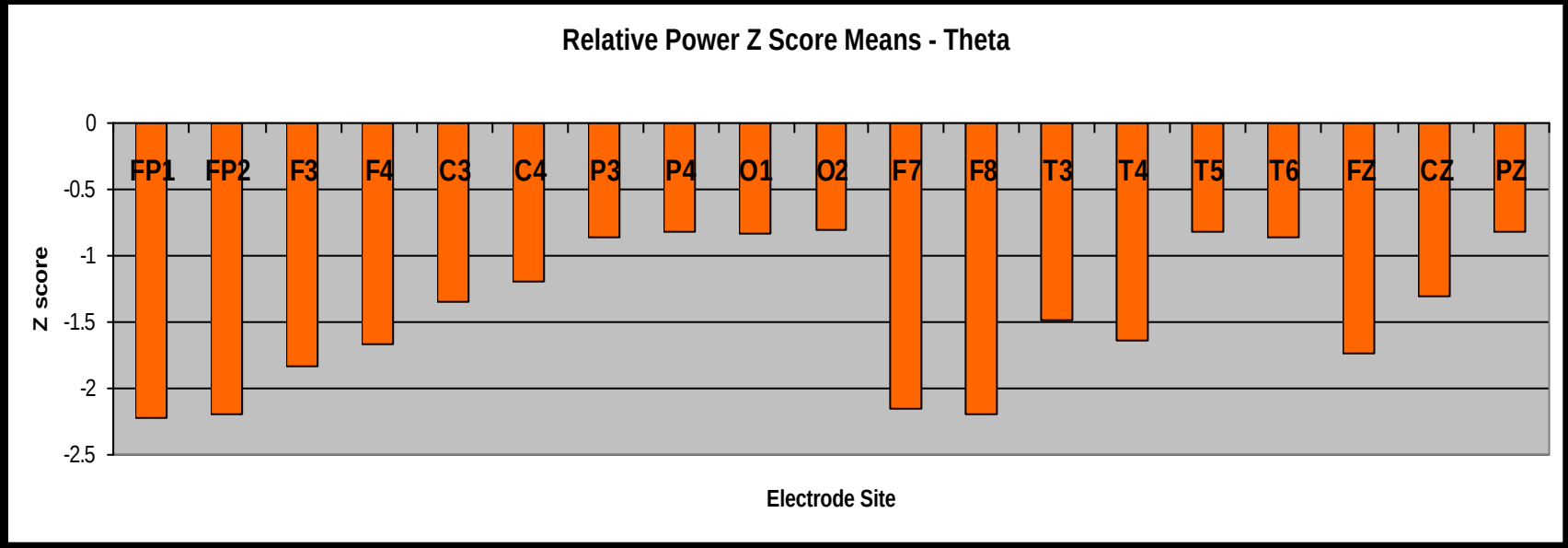
Results

- Theta
  - Showed decreased power frontally at FP1 (M =-2.22, SD =2.23), FP2 (M =-2.20, SD =2.22) F7 (M =-2.15, SD=2.17) and F8 (M =-2.19 , SD =2.19) with 58% of subjects showing decreased theta in these frontal sites.
- Beta
  - Showed decreased relative power in the right frontal region at F8 (M = -2.22, SD = 2.01) with 59% of subjects showing decreased beta at F8.

Delta Z Score Means



Theta Z Score Means



Conclusions

- Analysis of the data reveals several patterns:
  - Decreased relative power in delta and theta in the frontal sites (FP1, FP2, F7, and F8).
  - Decreased beta in the right frontal region (F8).
  - 96% of all subjects (31 of 32) showed decreased delta in the prefrontal region (FP1, FP2, F7 & F8) with at least 58% of subjects showing decreased delta two standard deviations below the database mean.

Conclusions, cont.

- Corley et al. (1994) also found decreased delta power; but decreased delta was observed in the left posterior region.
- Results not consistent with other research showing increased frontal power in the slower bands (e.g., Flor-Henry, et al., 1991).
- Current study further supports the notion that anterior EEG abnormalities may be related to sexually deviant behavior.

Limitations

- Subjects were not free of medications during QEEG – some observed differences could be due to medication effects (though unlikely all were).
- Narrow criteria used to determine scores significantly different from normal (e.g. only relative power).

Limitations, cont.

- Scores that deviate significantly from the database do not necessarily indicate abnormal brain functioning.
- Superior functioning would also deviate from the database (may subjects were professionals with advanced degrees).

Future Research

- Future studies should:
  - Address effects of the subjects' medications.
  - Use additional measures to identify EEG patterns such as coherence, absolute power, and peak frequency.

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