

Report of Ajna Light QEEG test

Prepared by John A. Chavez

Recording and Analysis Procedures:

The electroencephalograph (EEG) was digitally recorded (256 Hz sample rate) with a Mitsar 201 amplifier (St. Petersburg, Russia, www.mitsar-medical.com), utilizing an electrocap with 19 sensors (scalp electrodes), using International 10/20 system of electrode placement. Electrode impedances were kept at 5-10 KOhms. Sampling rate was 250 Hz and frequency band analysis consisted 0-40 Hz. The raw EEG was recorded in the awake state with eyes closed during Ajna light stimulation. A 5 minute baseline eyes closed resting condition was first obtained and samples of 5 minute duration were recorded during the 30 minute Ajna lights stimulus presentation at approximately 5,10,15, 25 minutes into the 30 minute session, and at 2-3 minutes post session. Some recordings were started 1-2 seconds following the onset of Ajna lights stimulation. The raw EEG was visually inspected and ocular, muscle and movement artifacts rejected before generating the Neurometric analysis report using WinEEG and Neuroguide software (www.appliedneuroscience.com).

Methods

Ajna lights were tested on a group of volunteers (N=11; 6 females, 5 males; age 26-68) who gave full written consent. None reported complications with light sensitivity, seizure disorders, etc.

All subjects were exposed to the same 30 minute Ajna light session, same minimal ambient light, and the setup was identical for all tests.

Subjects were lying in a comfortable “zero-gravity” recliner seat facing the Ajna lights placed at a distance (18 inches) from head and wore earplugs to suppress ambient noise

Light intensity settings were kept constant throughout:

Theta 50%

Gamma 50%

Event duration 30 to 60 seconds

Flicker power 80 to 100%

Background power 0 to 20%

Frequency spread 100%

Light intensity 20%

Maximum light intensity was 5000 lumens

Ajna Light session flicker frequencies shown in Appendix**Results**

Individual subject's responses to the Ajna light session varied considerably. During flicker stimulation FFT (fast Fourier transform) analysis revealed multiple spectral peaks across Theta-High Beta band (4-30 Hz) suggesting harmonic responses. These peaks were evidenced in different frequency bands (eg. Delta, Theta, Alpha, Beta1, Beta2) for different subjects, indicating the variability in subject's responsiveness to the same light stimulation session. These peaks appear to be the result of significant brainwave entrainment effects. Significant increases in Theta power were recorded and preliminary spectral analysis revealed a robust increase in Gamma (38-40 Hz) power (as high as 350% increase) in some volunteers (shown in topographic maps included here). A post session FFT analysis revealed increased Alpha power (rebound effect, N= 6 subjects). Also, some subjects showed some suppression of Alpha power. Examples of FFT power-frequency plots showing these effects are shown here for subject KA (female, 38yo) and JP (male, 48yo).

Subjective reports

Approximately 10 minutes after conclusion of Ajna session subjects were asked to describe their subjective experience. There was a consistency of reports with the theme of having the sensation of "traveling through space" and seeing what was described as "other planets". Subjects also described a visual pattern that could be described as

recognizing a 'face'. Some volunteers described sensations of drifting in and out of consciousness that was reflected in their qEEG data. 10 volunteers described a distinct sensation of deep relaxation following the Ajna Light stimulation while 1 volunteer described a stimulatory effect.

Challenges

Due to the sensitivity of the qEEG equipment, artifact contamination was difficult to filter in some subjects as the Ajna Light induced eyelid fluttering effects periodically. This fluttering effectively contaminated clean data extraction during the period of stimulation. It's been observed that eyelid fluttering takes place during rapid eye movement (REM) sleep which has been cited to be the most vivid and intense moments of "dream" sleep.¹ There lies the potentiality that Ajna induces mechanisms in the brain that mimic this "dream" state. If so, eyelid fluttering will continue to be a difficult side effect to overcome in future qEEG readings.

Potential Applications

It's been observed in mouse models of Alzheimer's disease that reduced gamma oscillations occur prior to the onset of amyloid beta ($A\beta$) plaque formation and cognitive decline.² Reduced levels of $A\beta$ plaque and $A\beta$ isoforms were realized from gamma oscillations but not other frequencies. Based on preliminary data confirming robust gamma oscillation amplitude (up to 350%) in several Ajna Light stim volunteers, there lies the potentiality that regular usage of Ajna can provide a positive effect on Alzheimer disease progression. Similar abnormalities in gamma oscillation amplitude have been observed in people with autism.³ More follow-up studies are necessary to understand the potential benefits of Ajna Light on neurodegenerative disorders.

Hallucinogenic Overlap:

EEG studies regarding exogenous DMT and Ayahuasca administration have shown consistent and very significant reductions in the Alpha band oscillation. These same studies also measured significant upregulation of gamma band oscillation coinciding with the subjective effects of the psychedelic compounds.^{4,5} This Ajna Light study observed Alpha band suppression in several volunteers and significant increases in gamma oscillations in others as well. However, these changes were not observed

consistently in every volunteer. Nevertheless, based on consistency of subjective reports, all volunteers experienced visual phenomena (hallucinations) other than visual artifacts that could be solely attributed to the light flicker pattern being generated on the eyelids.

Based on the hundreds of testimonials provided by Ajna Light experiencers (prior to this study) comparing their experiential overlap with that of psychedelic compounds, we felt it necessary to compare EEG data of Ajna Light and Ayahuasca, N,N-DMT.^{4,5} Based on the current data it is still inconclusive whether Ajna light stimulates upregulation of specific biochemistry related to endogenously produced hallucinatory compounds (N,N-DMT, 5-MEO/Bufo) on par with that of exogenous administration. However, based on noting varying degrees of overlap including significant gamma oscillation increase and mild Alpha suppression in some subjects in addition to the consistency of subjective reports, we conclude that Ajna is providing a stimulatory effect to induce closed eye hallucinatory phenomena. Future studies to verify specific time-based brain activity coinciding with subjective, time-based experiences are challenging endeavors but should be explored in order to better comprehend if hallucination occurrence coincides with specific changes in oscillation fluctuations.

Follow-up Study Recommendations:

QEEG data provides insights in regards to the changes taking place in brain activity during desired moments of measurement. Understanding how this brain activity coincides with changes in biochemistry is a natural progression of understanding the comprehensive effects of Ajna Light therapy. Meditation, Wim Hof Method, diaphragmatic breathing, hypnosis, and reiki healing have all been observed to induce changes in volunteer biochemical profiles.⁶⁻¹⁰

If we desire to further understand the potential overlap with N,N-DMT and Ayahuasca going forward measuring changes in noradrenaline, dopamine, glutamate, and serotonin would be ideal markers. These biochemicals are upregulated from exogenous ingestion of these substances (N,N-DMT, 5-MEO, Ayahuasca) which potentially correlates with upregulation from Ajna Light therapy.^{11,12} This would provide a periphery biochemical perspective as to the cascade effect taking place during stimulation.

Measuring direct fluctuations in plasma concentrations of endogenous hallucinogenic compounds (N,N-DMT, 5-MEO/Bufo) and monoamine oxidase inhibitors (MAOIs) coinciding with stimulatory exposure would be ideal.^{13,14} However, this is a challenging endeavor based on the necessity to develop ultra-sensitive assays to detect fluctuations without contamination and artifact.

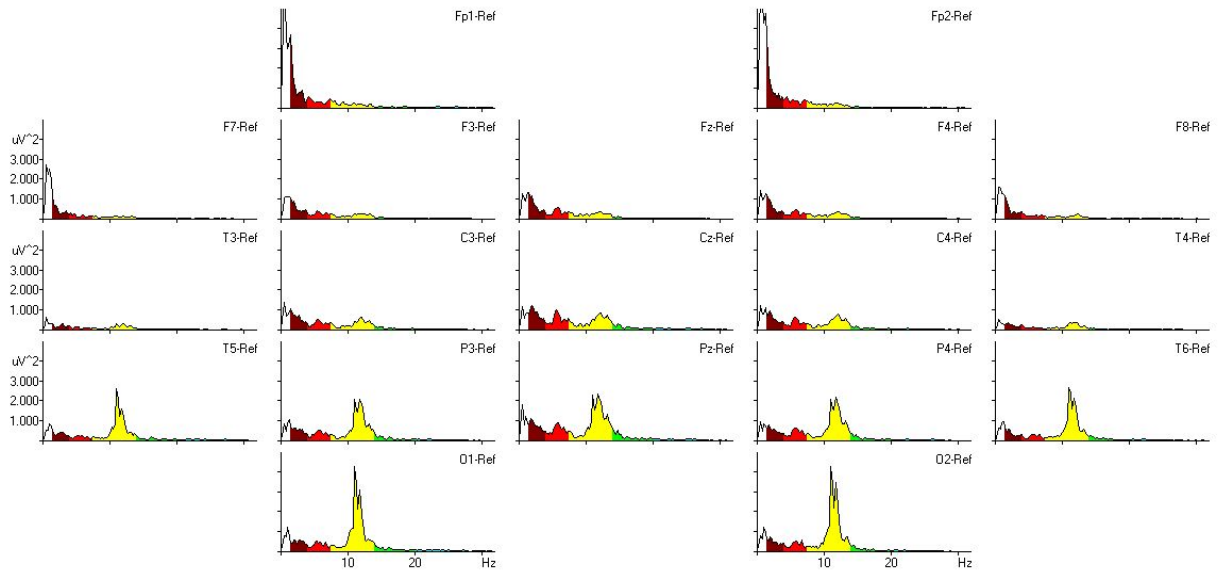
Autonomic nervous system dysfunction has been observed in diseases such as diabetes, arthritis, and cancer.¹⁵⁻¹⁷ Conscious alterations in autonomic nervous system signaling have been noted from meditation, Wim Hof Method, and hypnosis.¹⁸⁻²⁰ Utilizing autonomic nervous system testing methods such as blood pressure, heart rate, body temperature, metabolism, cardiovascular reflexes, HRV measurement, and catecholamine measurements to verify signaling changes from Ajna Light stimulation is necessary.

Studies utilizing functional magnetic resonance imaging (fMRI) have observed the neuroplastic effects of meditation, hypnosis, and Ayahuasca.²¹⁻²³ Based on the analytical *and* subjective data derived from this pilot study in terms of overlap with these states (meditation, hypnosis, Ayahuasca) it would seem pertinent to verify whether Ajna Light therapy provides neuroplastic realization.

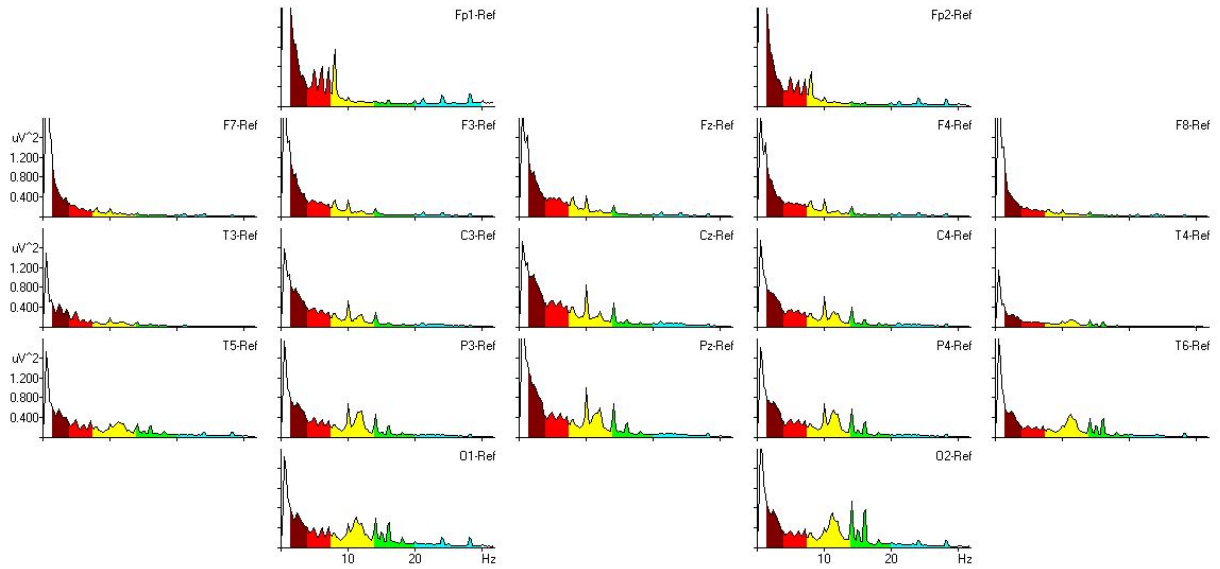
There is the possibility that the changes measured by qEEG coincide synchronously with biochemical upregulation/downregulation, autonomic nervous system signaling, and neuroplastic effects.

Conclusion

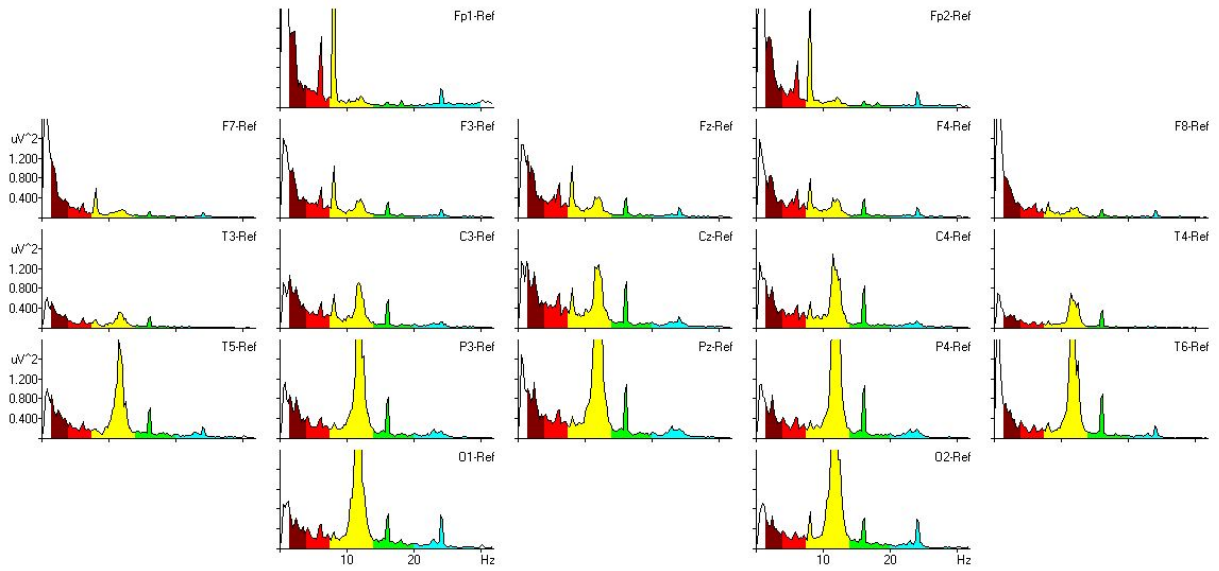
This pilot research demonstrates the effectiveness of the Ajna lights to produce brainstate changes that correlate with alterations in their qEEG and subjective reports. Robust entrainment spectral peaks were observed and further studies are necessary to better understand the implications and potential applications.



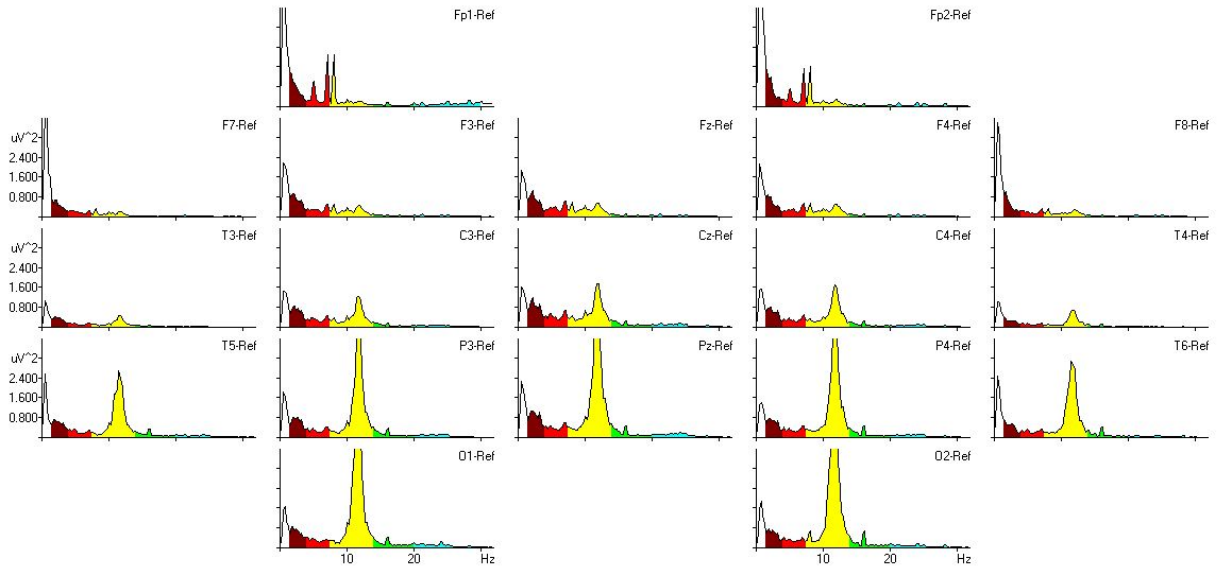
KA76EC baseline



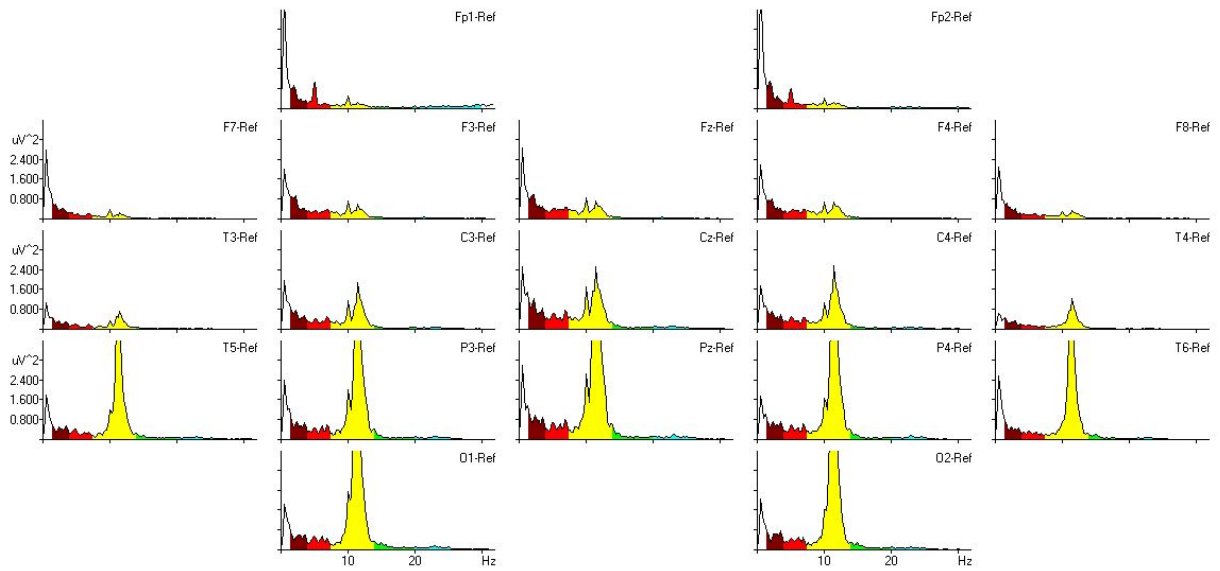
KA76Ajna2min at 2 min. Note multiple peaks evidenced in Theta and Beta bands.



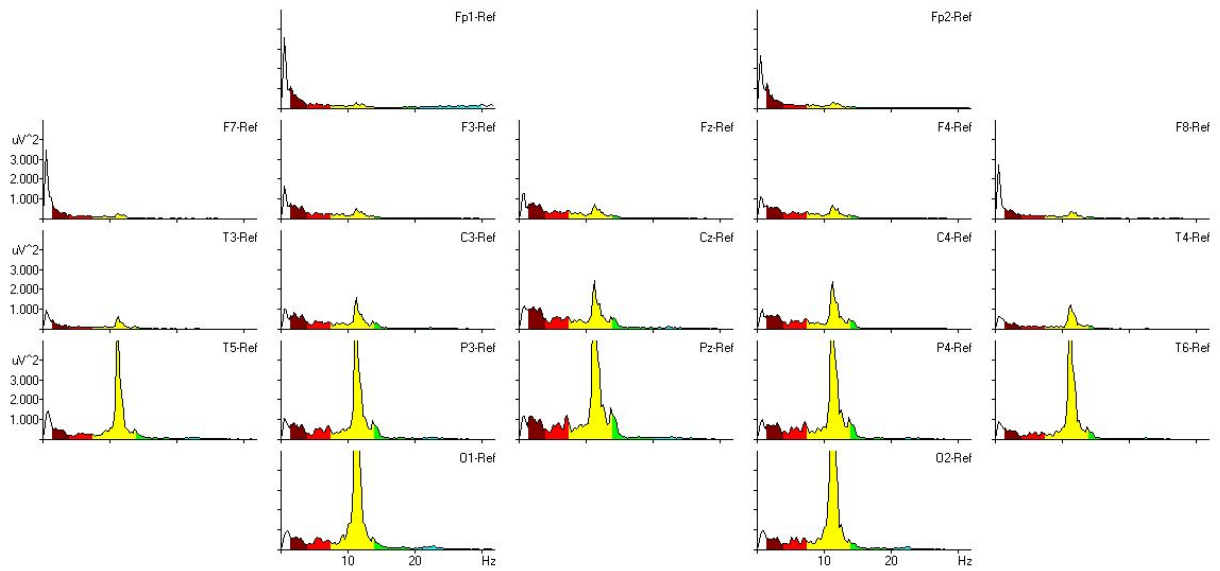
KA76Ajna8 at 8 min. A different set of spectral peaks now evident.



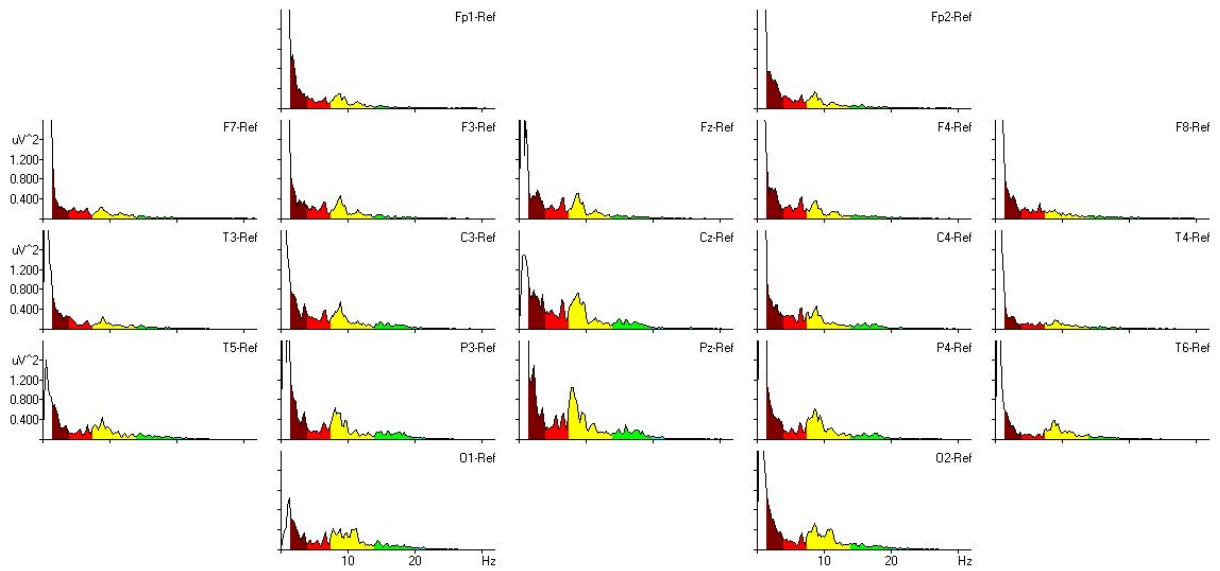
KA76Ajna16 at 16 min. Alpha power increased posterior sites.



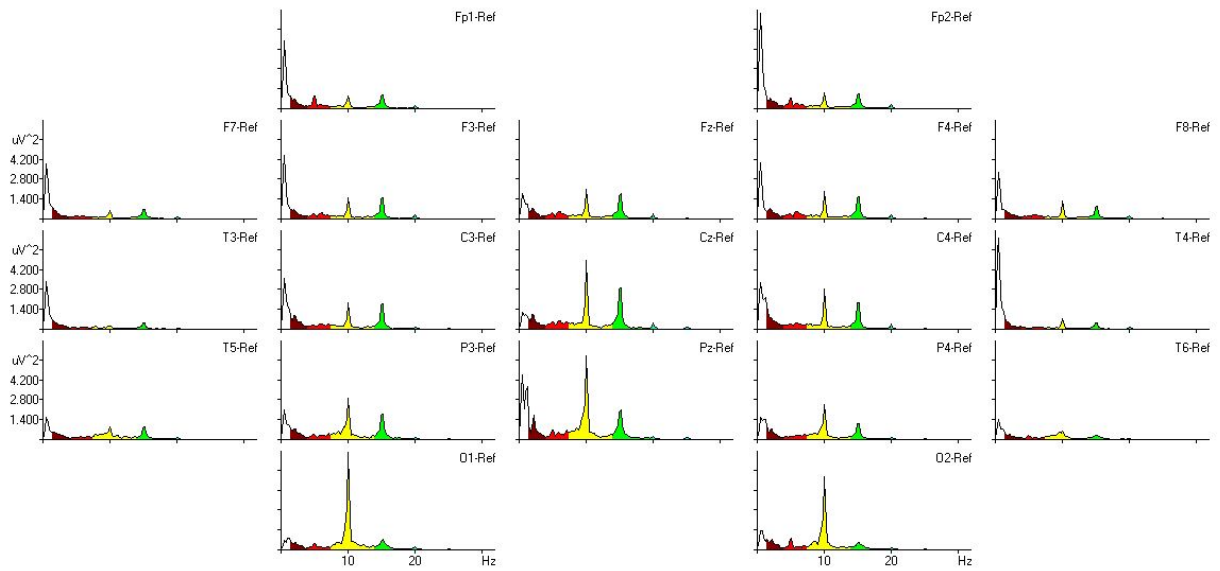
KA76Ajna25 at 25 min. Alpha power increased.



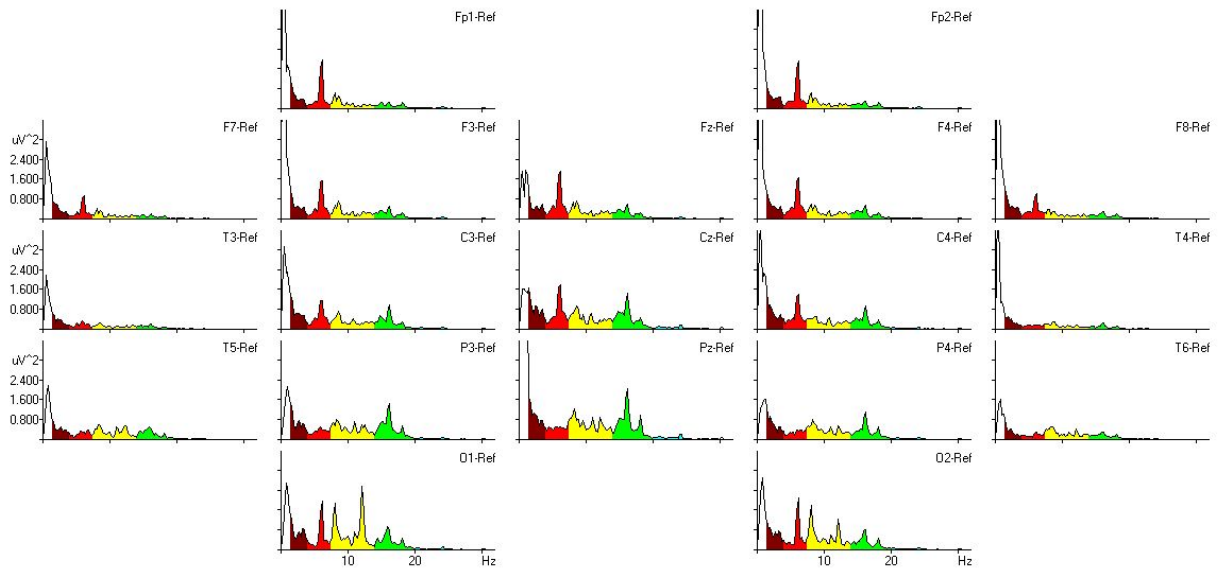
KA76postAjna2min at 2 min. Alpha power increased.



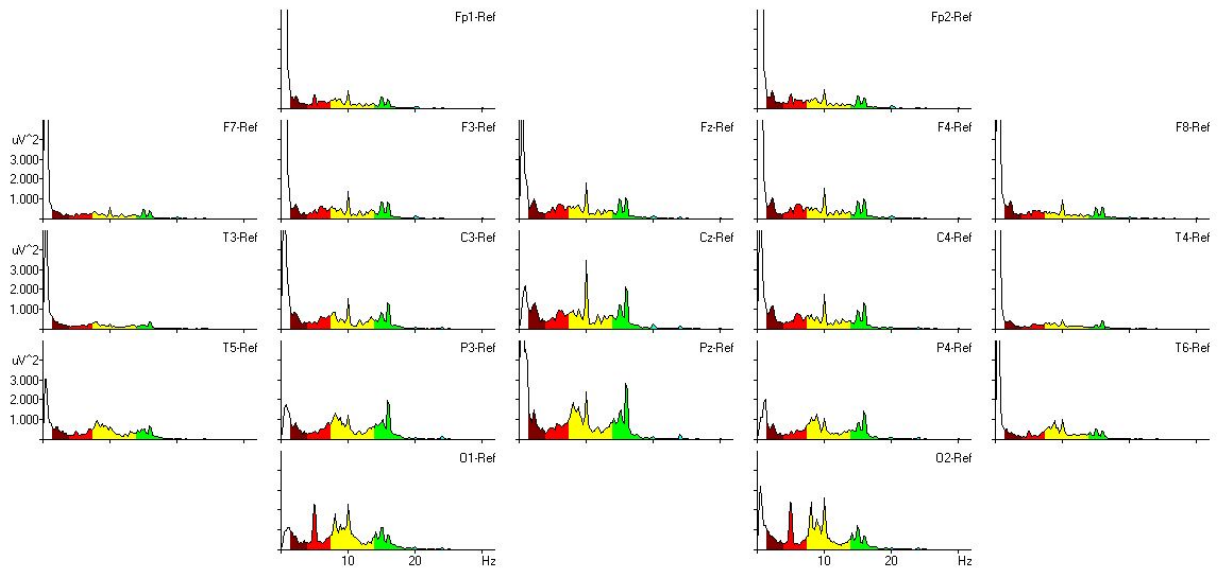
JP77EC baseline



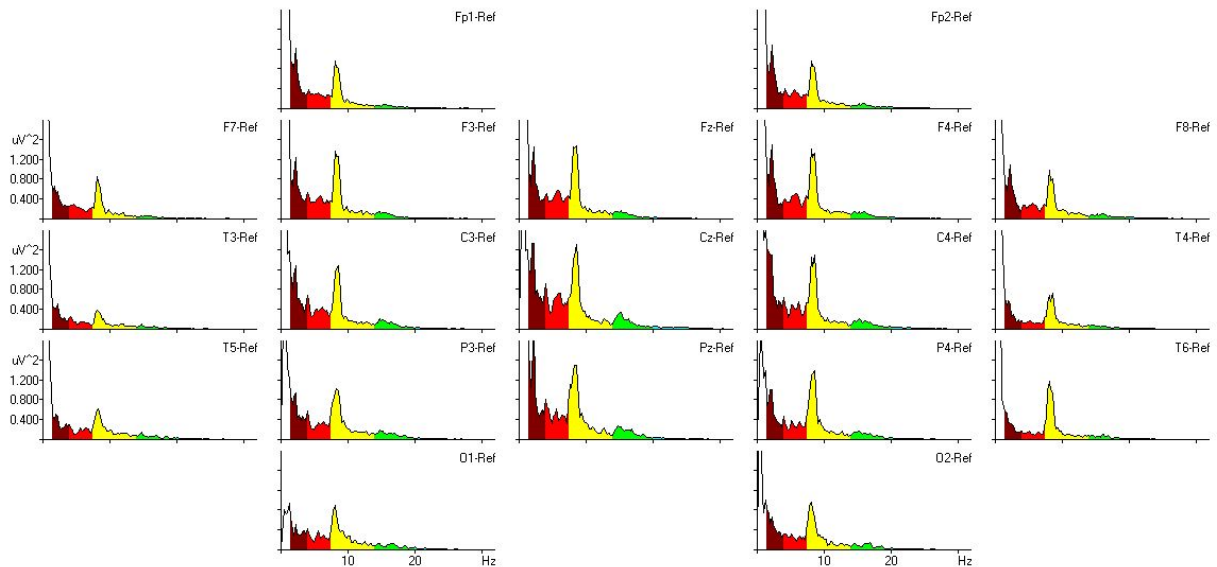
JP77Ajna immed. (first 5 min.) shows spectral peaks in Beta band.



JP77Ajna12 at 12 min. Note peaks evidenced in Theta, Alpha and low Beta bands.

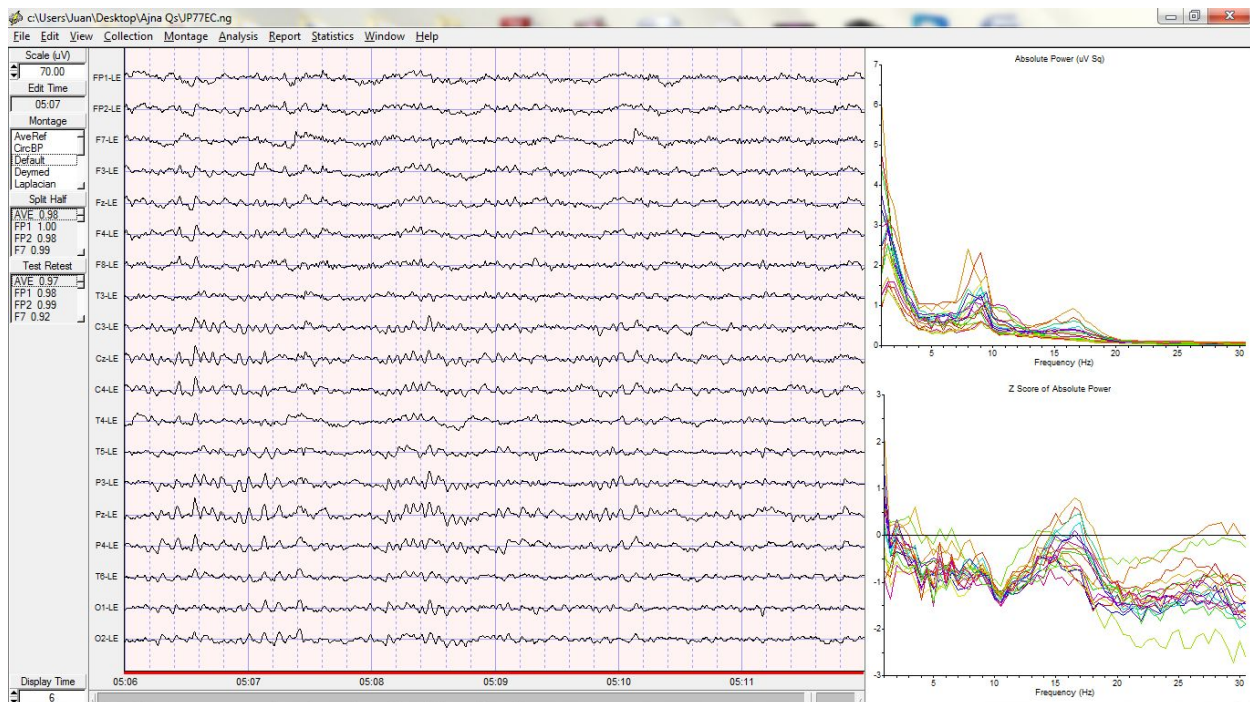


JP77Ajna20 at 20 min.

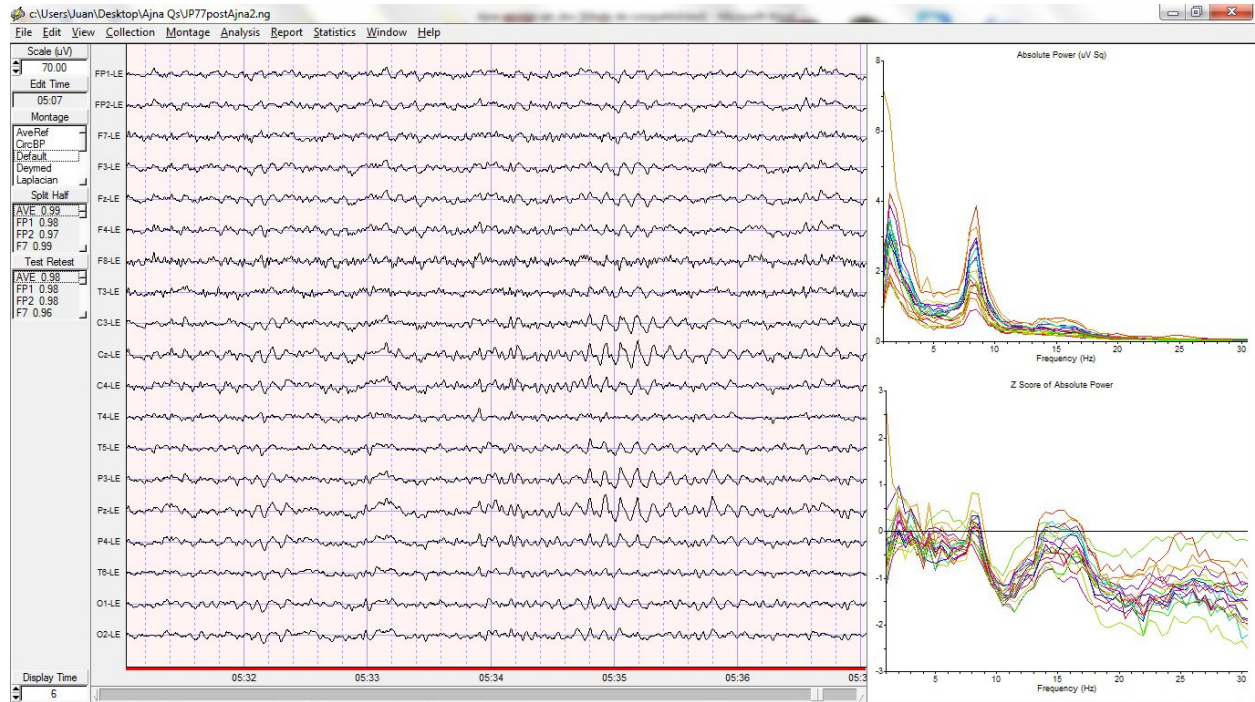


JP77postAjna2 post stim. at 2 min. Global Alpha increase.

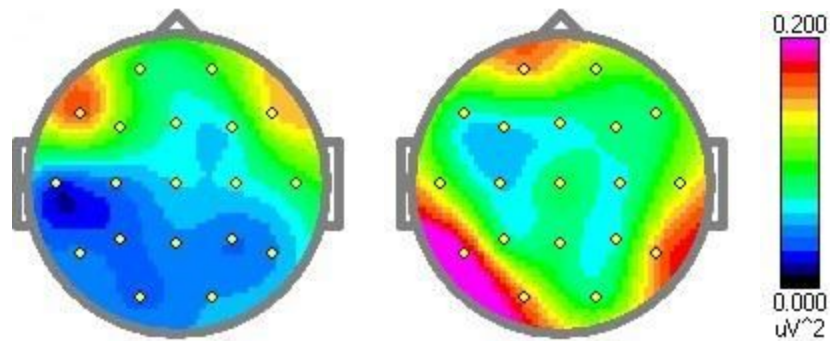
FFT spectra analysis with Neuroguide software:



JP77EC FFT spectra baseline, peak Alpha ca. 9 Hz (upper right).



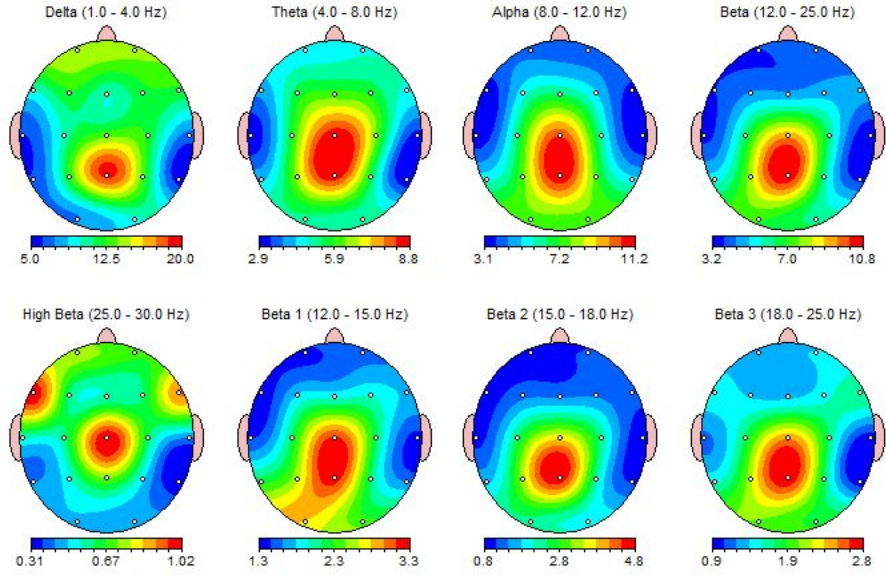
JP77postAjna2 at 2 min. post session Alpha power increased.



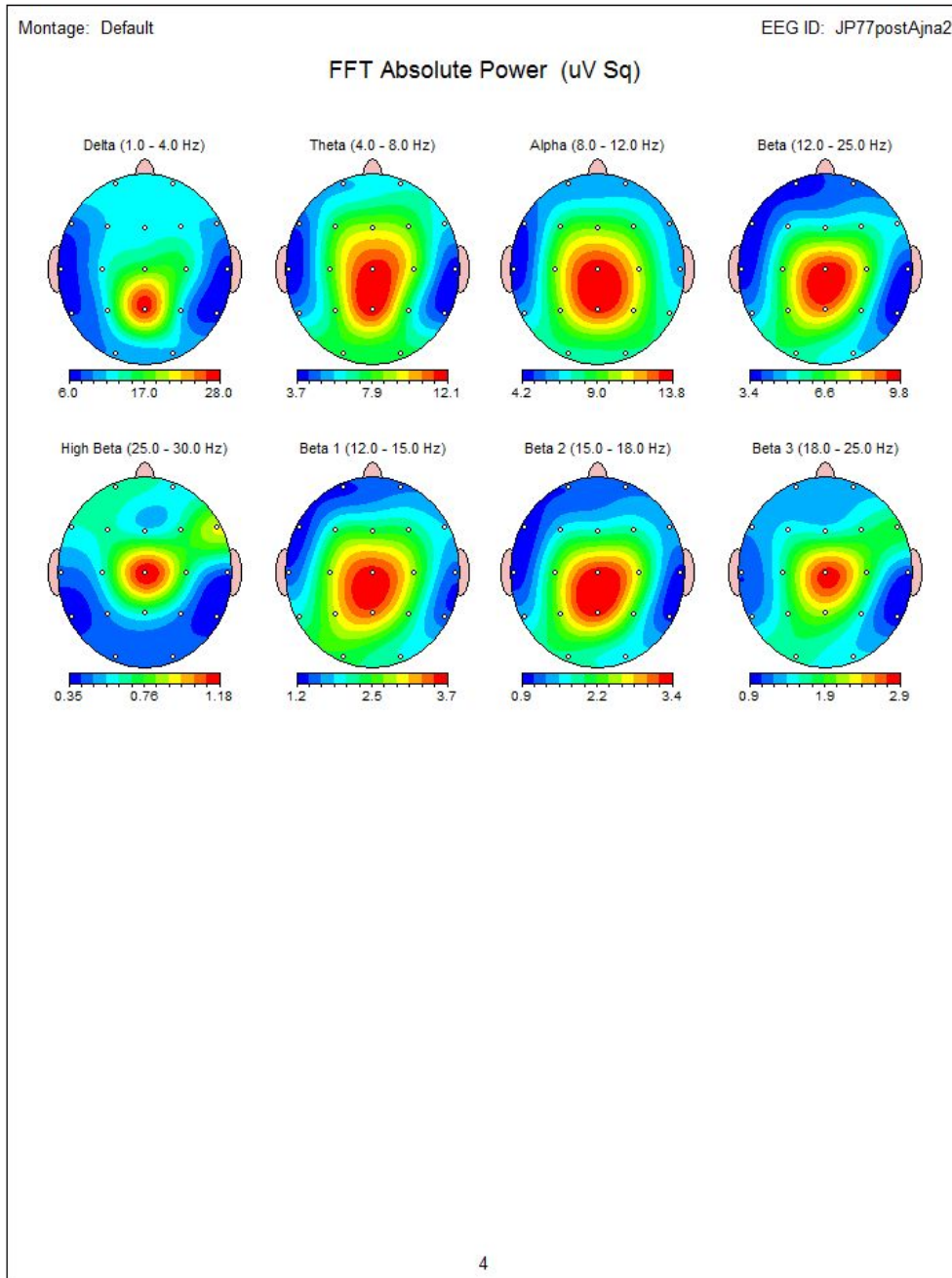
Topographic brainmaps show robust Gamma (38-40 Hz) power increase during Ajna session.

Baseline (left), at 17 min. into Ajna session (right).

FFT Absolute Power (uV Sq)



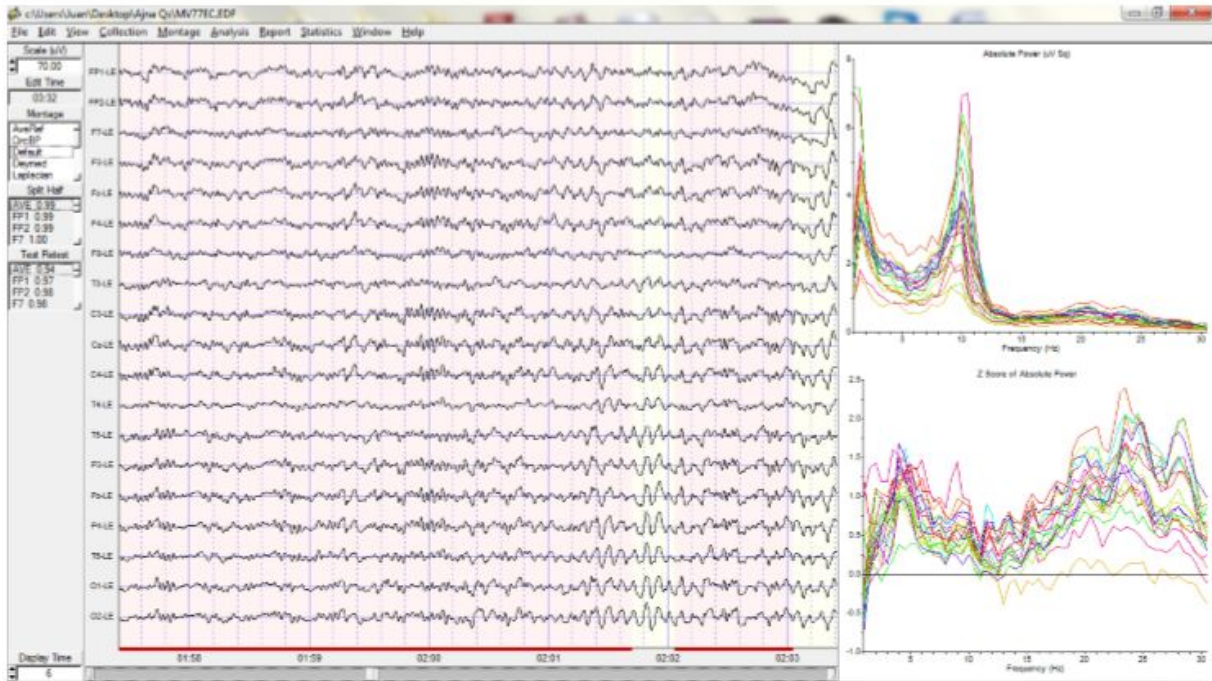
JP77EC Baseline topo maps showing absolute power for all frequency bands.



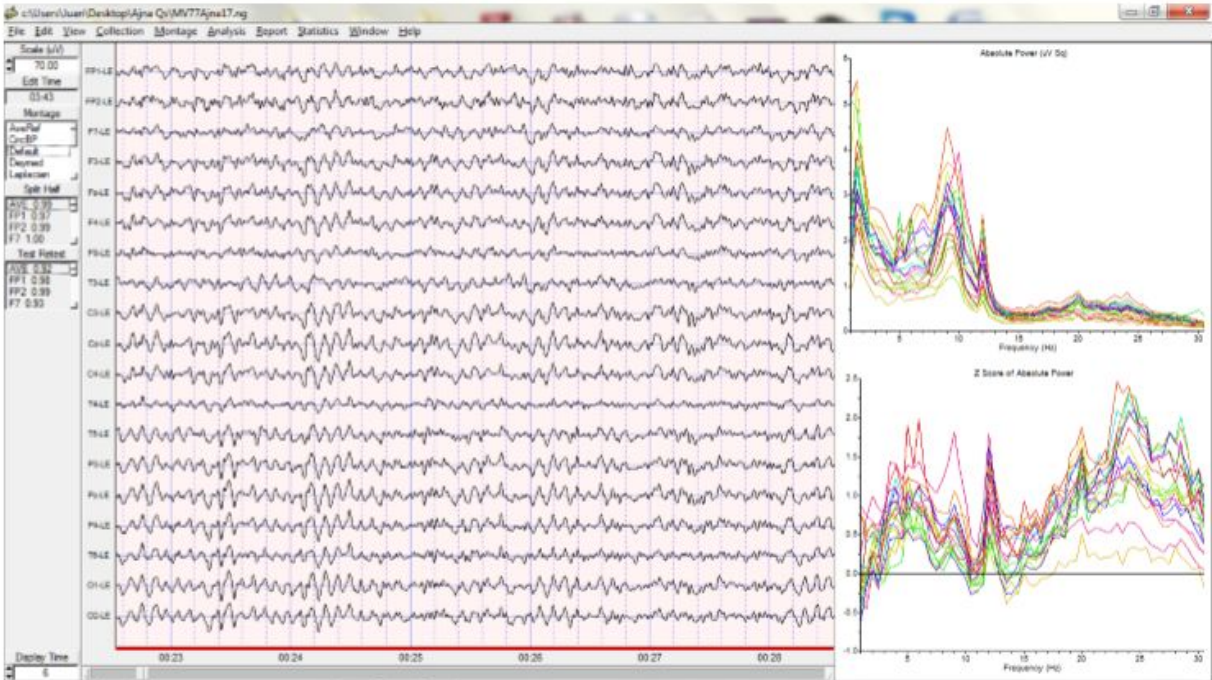
JP77postAjna2 at 2 min. post session: Delta and Beta 2 power decreased, Theta and Alpha power increased.



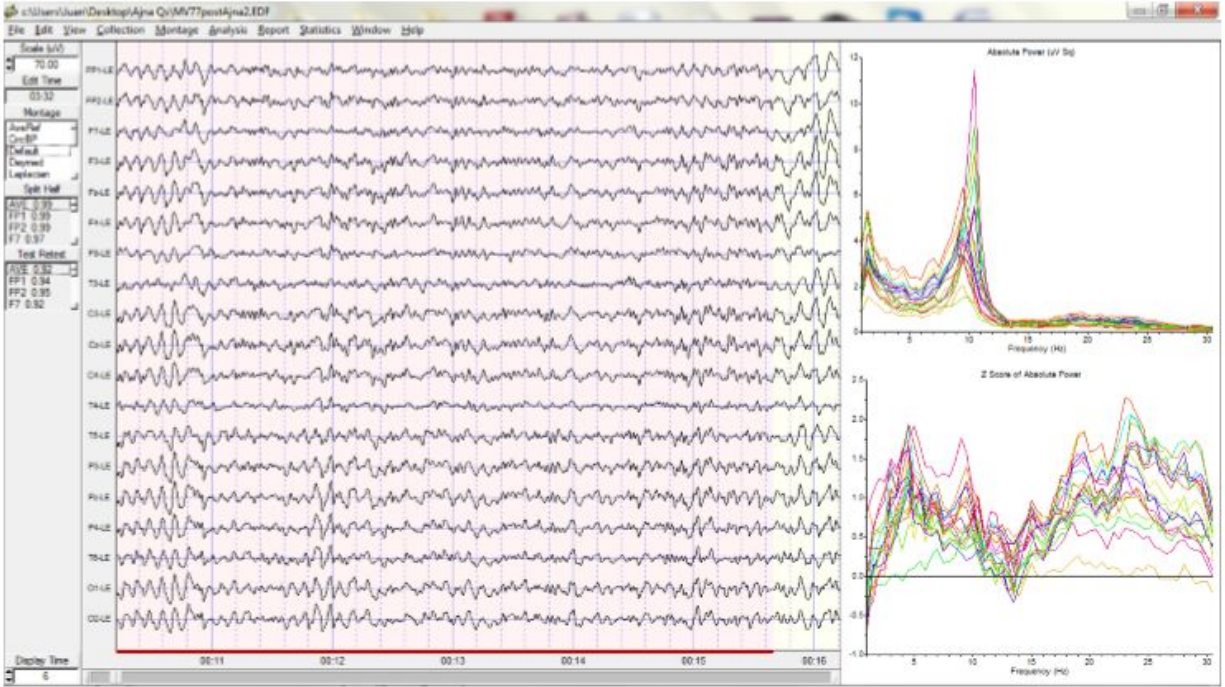
7/27/2017 Ajna tests Neuroguide Coherence analysis.



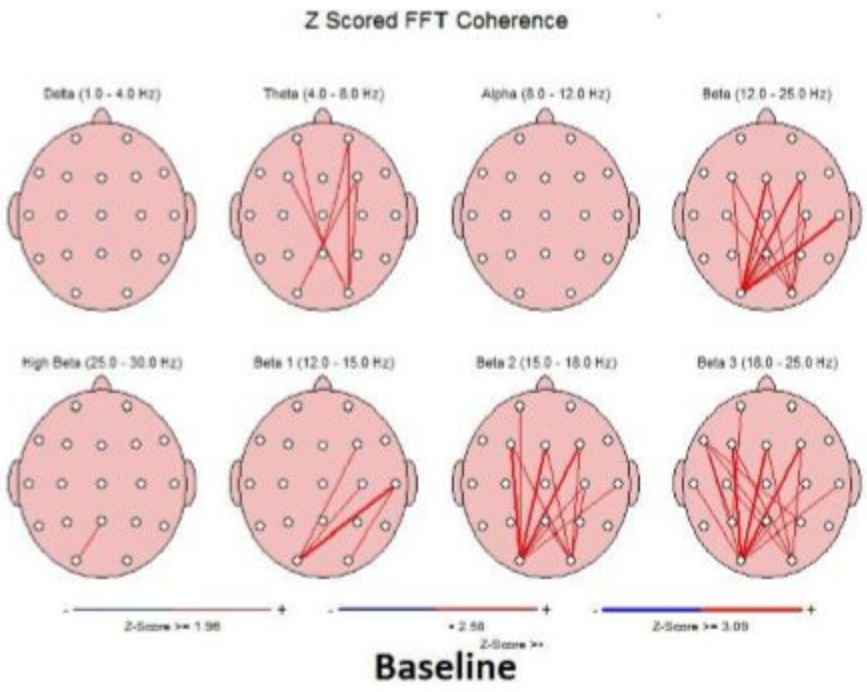
MV77EC FFT spectra baseline



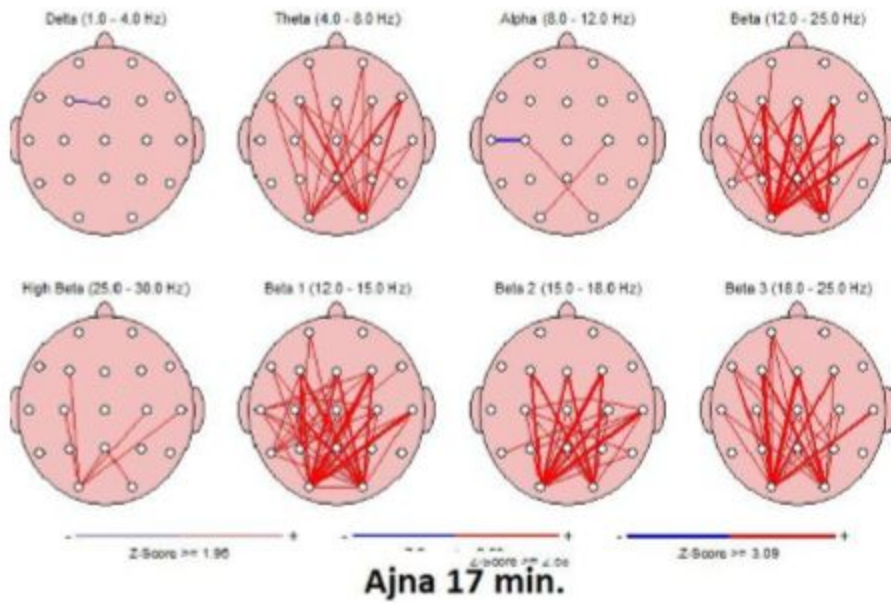
MV77Ajna17 at 17 min.



Post Ajna session at 2 min. Alpha power increase (Alpha rebound)



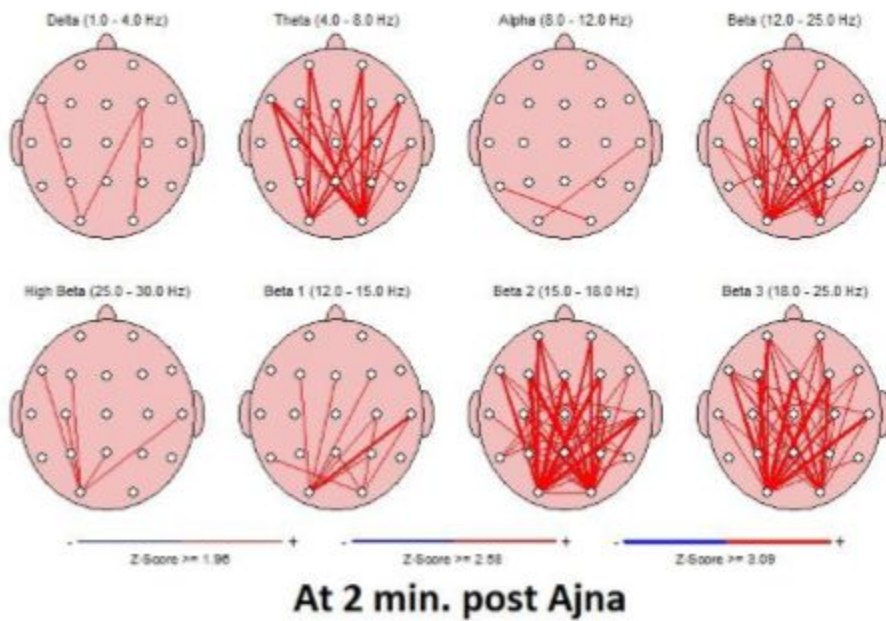
Z Scored FFT Coherence



Montage: Default

EEG ID: MV77postAjna2

Z Scored FFT Coherence



Appendix

The Ajna stimulation session employed the following settings:

Time - frequency stimulation

0:00 to 38 seconds - 33 Hz Gamma

0:38 to 1:18 - 49 Hz Gamma

1:18 to 2:15 - 5 Hz Theta

2:15 to 3:07 - 6 Hz Theta

3:07 to 3:49 - 8 Hz Theta

3:49 to 4:46 - 7 Hz Theta

4:46 to 5:35 - 8 Hz Theta

5:35 to 6:11 - 7 Hz Theta

6:11 to 7:00 - 8 Hz Theta

7:00 to 7:36 - 7 Hz Theta

7:36 to 8:25 - 49 Hz Gamma

8:25 to 9:05 - 30 Hz High Beta

9:05 to 9:54 - 49 Hz Gamma

9:54 to 10:34 - 30 Hz High Beta

10:34 to 11:09 - 5 Hz Theta

11:09 to 12:08 - 5 Hz Theta

12:08 to 13:02 - 7 Hz Theta

13:02 to 13:35 - 8 Hz Theta

13:35 to 14:11 - 5 Hz Theta

14:11 to 14:53 - 6 Hz Theta

14:53 to 15:30 - 6 Hz Theta

15:30 to 16:09 - 6 Hz Theta

16:09 to 16:44 - 33 Hz Gamma

16:44 to 17:42 - 33 Hz Gamma

17:42 to 18:15 - 47 Hz Gamma

18:15 to 18:46 - 5 Hz Theta

18:46 to 19:33 - 8 Hz Theta

19:33 to 20:18 - 46 Hz Gamma

20:18 to 21:07 - 8 Hz Theta

21:07 to 21:43 - 7 Hz Theta

21:43 to 22:32 - 8 Hz Theta

22:32 to 23:08 - 7 Hz Theta

23:08 to 23:53 - 6 Hz Theta
23:53 to 24:49 - 8 Hz Theta
24:49 to 25:40 - 36 Hz Gamma
25:40 to 26:29 - 42 Hz Gamma
26:29 to 27:03 - 43 Hz Gamma
27:03 to 27:38 - 49 Hz Gamma
27:38 to 28:17 - 49 Hz Gamma
28:17 to 29:15 - 6 Hz Theta
29:15 to 29:52 - 7Hz Theta
29:52 to 30:00 - 8Hz Theta

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