L. Rybina, I. Serov

Alteration of human cerebral bioelectric activity in the dynamics of the course Resonance Bio-Correction (RBC therapy). Electroencephalography.

I.P. Pavlov Institute of Physiology
of the Russian Academy of Sciences*,
AIRES Research Center**.

The paper presents the dynamics of changes in the rhythm topogram and individual EEG indices of 15 test subjects over time during a course of Resonance Bio-Correction of (RBC therapy). It is demonstrated that regulatory formations of the diencephalic area are activated in the middle of a course of treatment, and in the end of the course the rhythm topogram is partially or fully normalized, as are the analyzed EEG readings, brain's resistance to hypoxia and hypercapnia increase. The above-mentioned changes exceed the changes in the EEG readings of the control group who were given a round of pharmacotherapy for similar complaints and had a similar rhythm topogram.

Resonance Bio-Correction (RBC) is a branch of the so-called alternative medicine. When describing adherents of alternative methods of treatment, representatives of the scientific (academic, orthodox) medicine argue that the former "are disinclined to subject their methods to research by scientific medicine, take no part in the work of professional scientific communities, do not publish their papers in specialized journals" (1). To avoid such accusations against RBC, members of the AIRES Research Foundation deemed it expedient to conduct a full clinical and physiological examination of their patients. This paper will set forth the results of the pilot study of alterations in the bioelectrical activity of the brain over time during a course of RBC therapy. Starting with the first series of clinical and physiological research of the results of RBC therapy, we intended to answer only the following two questions:

1. whether there were changes in EEG in the aftereffect of a course of RBC therapy,
2. what the direction of those changes was.

Description of Patients and Research Procedure

The current u1084 paper will not dwell upon the procedure of RBC therapy. Materials on this issue are detailed by one of the authors (2, 3).

Fifteen people aged between 27 and 45 took part in the study taking a course of RBC therapy in April–October, 1998. The EEG study was conducted at the Department of Functional Diagnostics of Local Medical Association 20, Saint Petersburg.

11 test subjects demonstrated inflated self-worth. All of the 15 people showed a high level of alexithymia (76 points and higher on the alexithymia scale). Premorbid personality traits, in combination with an acute intrafamilial conflict or longstanding psychoemotional tension identified in anamnesis, engendered not only the astheno-neurotic syndrome, but also, in 6 patients, a psychosomatic disease – hypertonia, asthma, neuroendocrine and hormonal disorders.

Inefficiency of previous conventional, mostly pharmacological, treatment was the reason to turn to RBC.

The control group consisted of 15 people of relevant gender and age, with a similar psychosomatic status and an identical rhythm topogram, who were undergoing a course of treatment by a neurologist or a general physician in their local institutions.

EEGs were taken and analyzed with "Encephalan-131-01" version 4.2 ("Medikom Ltd", Taganrog) – the analyzer of electrical activity of the brain with a topographic mapping feature. Electrodes were placed according to the "10-20" international system (4). The study was performed using the procedure established in electroencephalography. The study process included taking the baseline EEG (EEG at rest) and taking an EEG with functional loads: opening and closing the eyes, rhythmic photostimulation ranging from 3 Hz to 25 Hz, hyperventilating for two minutes. As a rule, readings were taken before the beginning of the course of RBC therapy, in the middle of the course, and 1–3 days after its end. The control group patients were examined twice: during the routine diagnostic u1086 examination (before prescription of remedial measures) and after the end of the course of treatment procedures and pharmacotherapy, which was normally prescribed for 30-45 days. BBA is analyzed using the spectral analysis of EEG on the Pz-lead. The following values of total power of rhythms grouped into frequency ranges were analyzed: theta, alpha and beta, and the value of power of the dominant frequencies in three five-second sectors of the baseline EEG. Moreover, the features of the rhythm topogram in all leads, EEG changes with functional loads and identity of the baseline EEG pattern in aftereffect of hyperventilation were taken into account.

Statistical processing of the results was performed using nonparametric tests of statistics: the sign test and the Wilcoxon test (5). Only statistically valid results are discussed.

Results and Their Treatment

Out of the 15 test subjects, local changes were identified in one female. That participant's EEG, with no cerebral changes, showed abnormalities of rhythmic activity in the frontal region, where there was an increase of the low-frequency alpha rhythm changing over to a theta-rhythm with an extended (compared to neighboring leads) amplitude. It is notable that a repeat examination (in the middle of the RBC therapy regimen) showed a reduction of local changes accompanied by an improvement of the patient's health and indices of lab tests.

The other 14 test subjects did not demonstrate such pronounced local changes.

A hypersynchronous alpha rhythm of paroxysmal nature was registered in two female subjects, whose echoencephaloscopy showed an increase of intracranial pressure. After taking a course of RBC therapy, the width of the M-Echo equal to 8.3 and 9.0 mm decreased to 6.0 and 7.0, accordingly. At the same time, a decrease in the total power in the alpha band was registered, as well as partial restoration of the occipital-frontal decrement of the amplitude of alpha waves, which had been disturbed in the first examination (Fig. '31).

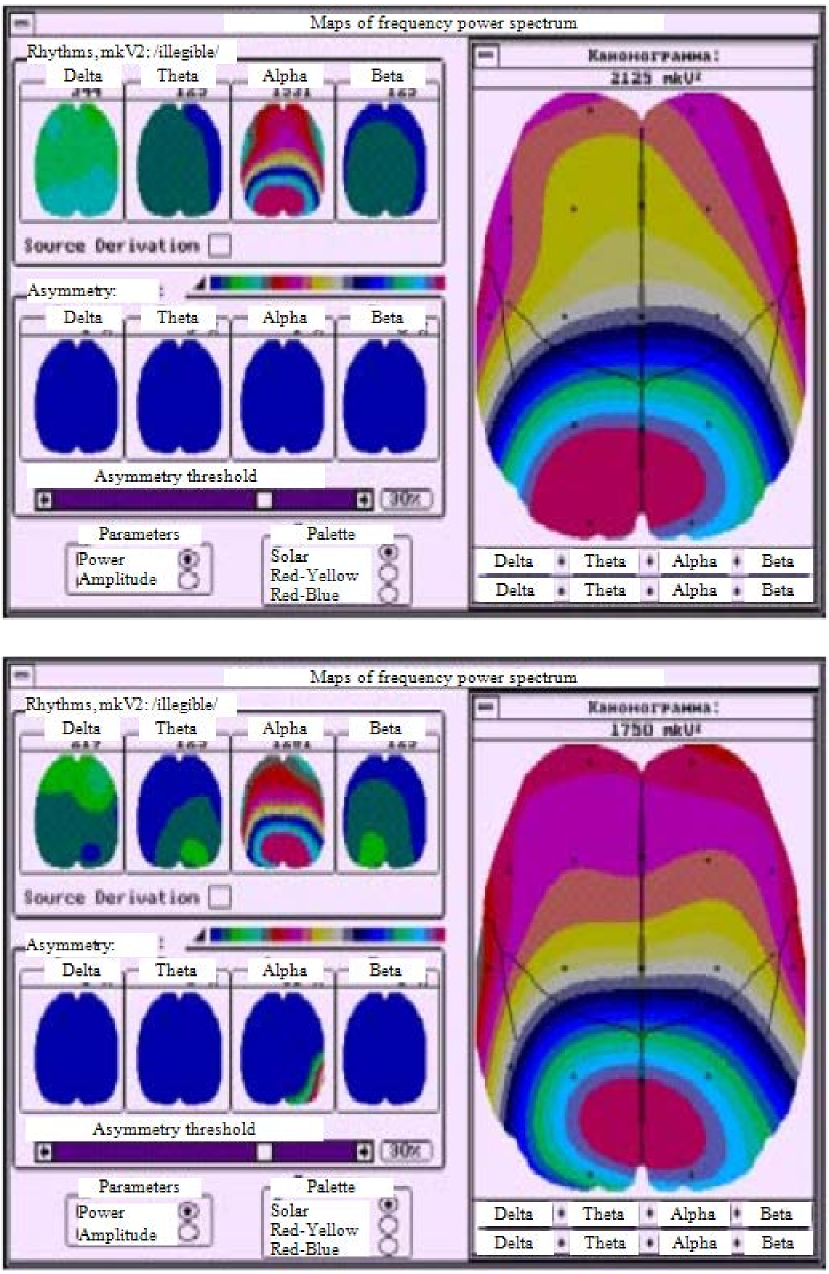


Fig. 1 The map of patient B.'s total power spectrum before and after the course of RBC therapy.

Comparison of the EEG readings of RBC therapy in these subjects with the dynamics of EEG indices of their correspondent "control pairs", who had been given dehydrational and vascular treatment, revealed their sameness.

12 subjects showed a decrease in the power of EEG rhythms in all bands. Similarity of the overall EEG readings let them be grouped together in spite of diversity of complaints of somatic nature. In the first examination, the total power of theta, alpha and beta rhythms ranged from 180 mcV^2 to 1700 mcV^2 (the average for the group was 1151 ˜167.3 mcV^2). The most pronounced inhibition of amplitude was registered in the alpha band.

There were so-called "straight line" EEGs (3 persons): low-amplitude polymorph, polyrhythmic activity registered in all leads with a slight predominance of high-frequency rhythms. The rest (9 subjects) registered an alpha rhythm that was instable in frequency, weakly modulated in amplitude, had sharpened apexes due to high-frequency activity and leveled differences. There was a spontaneous change of the described EEG pattern – a longterm reduction of alpha activity. The period of depression of the amplitude of alpha waves in response to opening of the eyes lengthened up to 20–30 seconds. The range of processing of photostimulation rhythms extended. There was a clear processing of rhythm in the range from 3 Hz to 25 Hz, often with harmonics. The described EEG features of that group in the first examination show a shift of the activation-deactivation balance towards excess of activation due to strengthening of mesencephalic activating factors (6, 7).

A distinguishing feature of the EEG picture in the repeat examination in the middle of the course of RBC therapy is the occurrence of a low-frequency beta-rhythm with a frequency of 15–18 oscillations per second registered as spindle-shaped bursts, mostly in the front (frontal-central) leads. The amplitude of beta bursts in some records reached 40 mcV^2, and in the "straight line" cases exceeded the u1072 amplitude of alpha waves. At this stage of the study, the subjects with the "straight line" EEG showed a slight increase in the power of alpha rhythms (up to 250–300 mcV^2), and the participants whose records contained alpha activity (7 subjects) showed a decrease in the power spectrum of alpha activity from 938.7 ˜ 41.4 mcV^2 to 732 ˜ 20.1 mcV^2 (as the predominant frequency rises from 10.06 ˜ 0.7 to 10.80 ˜ 0.4 oscillations per second). Polyrhythmy in the alpha band remained, and alpha waves' spindle-shaped modulation in amplitude improved.
The total power spectrum of the analyzed rhythms stayed virtually the same and in the second examination was 1238 ˜ 54.1 mcV^2 because of the increase in the power of theta and, mostly, beta activity. In the aftereffect of the test of opening and closing of eyes, a paroxysmal burst of alpha activity was registered. The range of processing of the photostimulation rhythm was limited to 12–20 Hz. Hyperventilation caused a steeper increase of spindles in the alpha and beta bands both. All of the above regarding EEG features in the middle of a course of RBC therapy affords ground to speak about weakening (as compared to the first records) of activating reticular factors at the mesencephalic level with simultaneous strengthening of influences of diencephalic-limbic formations belonging to "regulatory" structures in the terms of Ye.A. Zhirmuskaya (8). All participants at that stage of the study noticed improvement of health, better mood and higher mental alertness.

2–3 days after the end of the course of RBC therapy, the EEG was partially (in 5 subjects) or fully normalized.

Among persons with partial normalization of electrographic readings, three had displayed a "straight line" EEG in the first examination. Those subjects had no pronounced changes in the alpha band. The drop of power spectrum in the beta band and its increase in the theta band can be denoted as a trend. The responses to opening and closing of the eyes and rhythmic photostimulation were similar to responses to functional loads in the previous examination. Nevertheless, greater resistance of the u1084 brain to hypoxia and hypercapnia can be noticed. Whereas in the aftereffect of hyperventilation in the second examination there was an intensification of bursts of spindle-shaped low-frequency beta!!! or sharp alpha waves, the EEG in the aftereffect of hyperventilation in the third examination remained unchanged both in individual figures and in the rhythm topogram. And only in terms of resistance of the EEG pattern to hyperventilation did those test subjects differ in the last examination from their counter-pairs in the control group, who, in the aftereffect of hyperventilation, registered an increase of bursts of low-frequency beta and a total increase of power in the beta band, along with increased power in the theta band.

That difference in the aftereffect of RBC therapy and pharmacotherapy was also observed in the other 7 test subjects. That sub-group showed an increase in total power in the analyzed bands from 1825.3 ˜ 138.4 mcV^2 to 2725.8 ˜ 141.2 mcV^2, mainly due to an increase of power in the alpha band from 1231.7 ˜ 84.0 mcV^2 to 2034.7 ˜ 112.4 mcV^2, reduction of power in the beta band from 154.1 ˜ 32.0 mcV^2 to 87.3 ˜ 37.4 mcV^2 and low-frequency beta bursts, as well as a decrease of the predominant frequency in the alpha band from 10.7 ˜ 0.2 to 10.1 ˜ 0.1 oscillations per second (Figs. 2, 3). Processing of the photostimulation rhythm was observed within the range of 10–15 Hz (Figs. 2, 3). In the control group, full EEG normalization was observed in two subjects.

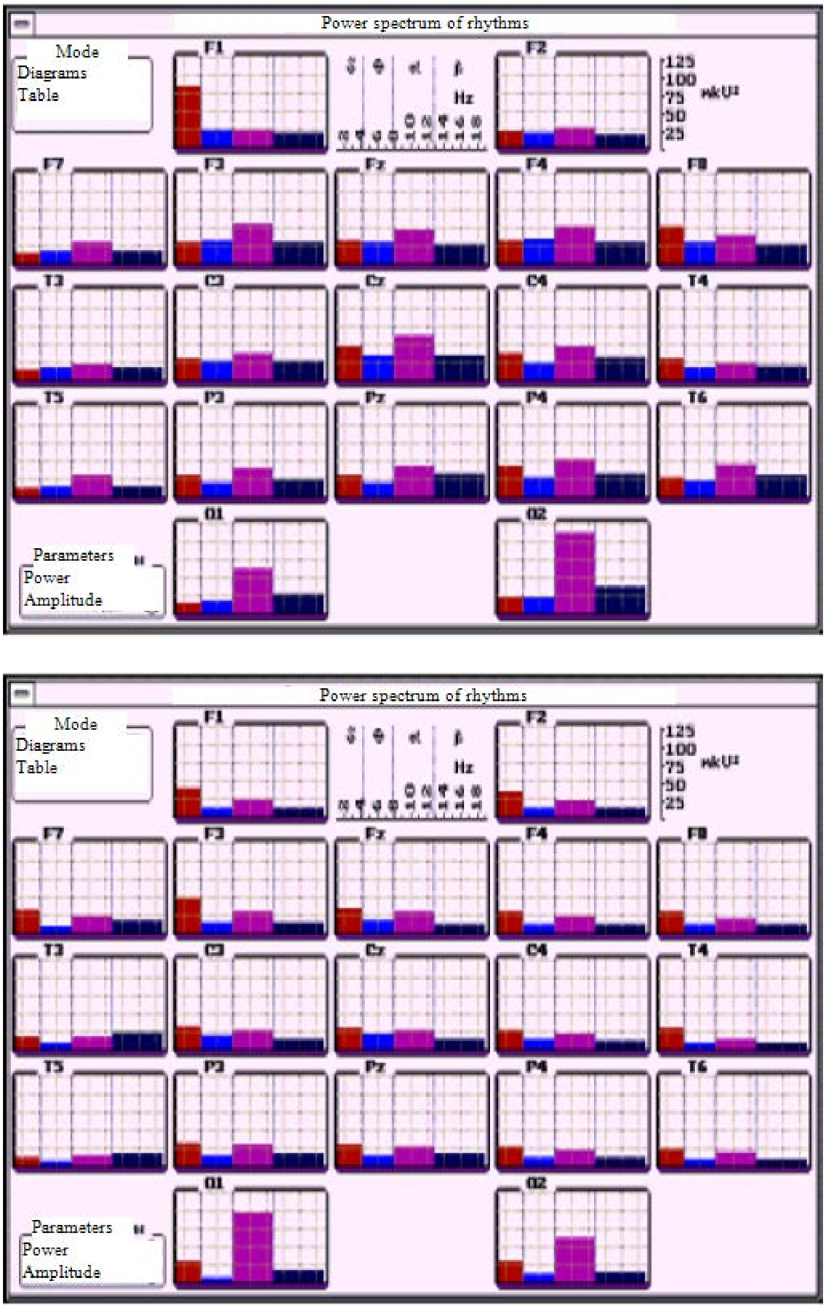
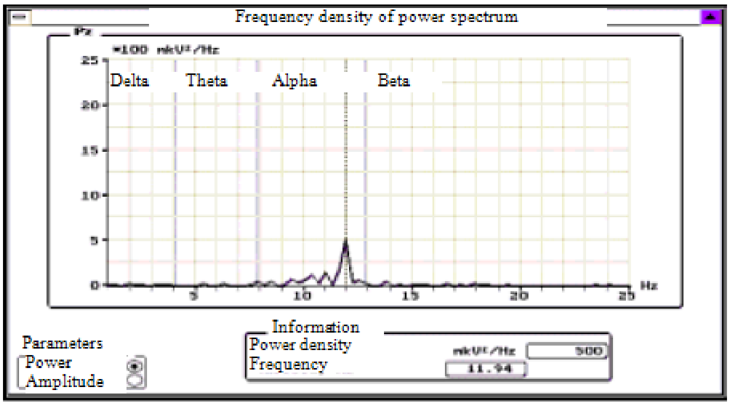


Fig. 2 Maps of patient Sh.'s frequency power spectrum in the middle (top) and in the aftereffect (bottom) of the course of RBC therapy.



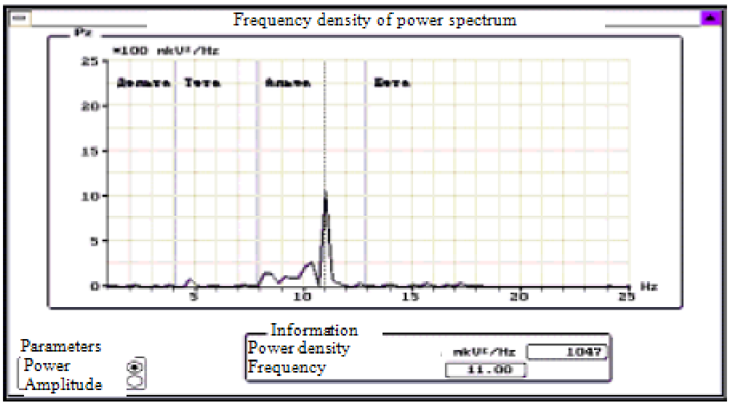


Fig. 3 Maps of patient Sh.'s frequency density in the middle (top) and in the aftereffect (bottom) of the course of RBC therapy.

An impression is made that, as of the last examination, the processes in the control group that restore normal neurodynamic interrelations between the structures of the central nervous system (CNS) are not stabilized, and, because disease recurrence is possible, the patients need maintenance therapy.

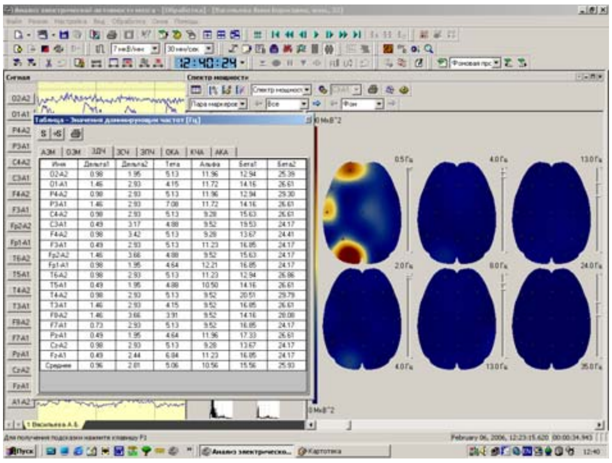
RBC therapy restored the activation-deactivation balance characteristic of the norm, the brain became more resistant to decompensating influences of u1057. From the neurophysiological point of view, change in the EEG readings taken in the second examination can be treated as an evidence of mobilization of compensatory abilities triggered by the structures of the limbic-reticular complex; the electrographic changes in the third examination indicate stable normalization of the functional state of the brain, and, consequently, regression of not only subjective complaints, but also objective clinical indices in psychosomatic diseases (9, 10).

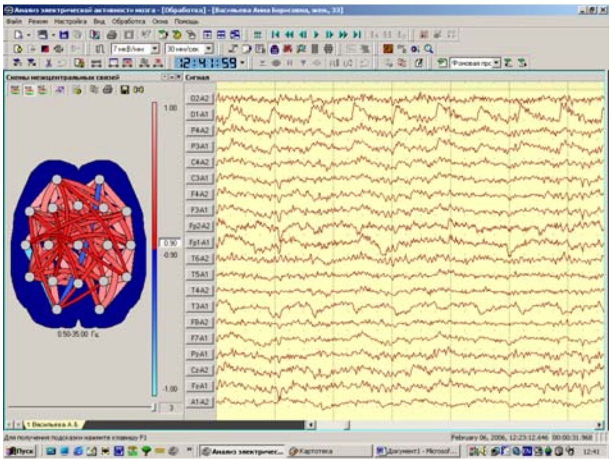
In this paper we have not touched upon a detailed analysis of the rhythm topogram and distribution asymmetry of the power spectrum of rhythms over time during RBC therapy, those data will be the subject of our further publications.

Stage monitoring electroencephalograms before and RBC-after therapy

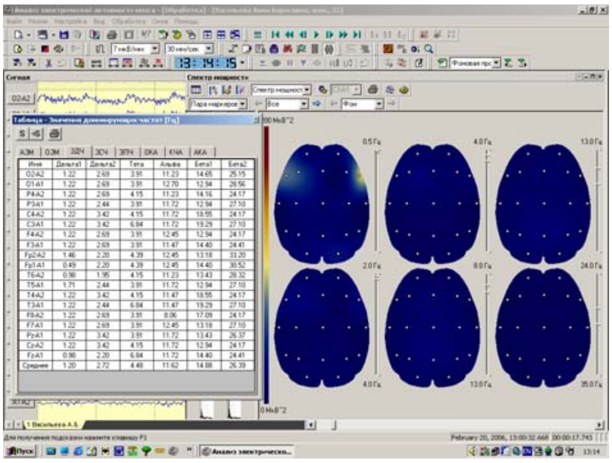
1. Patient A. V.

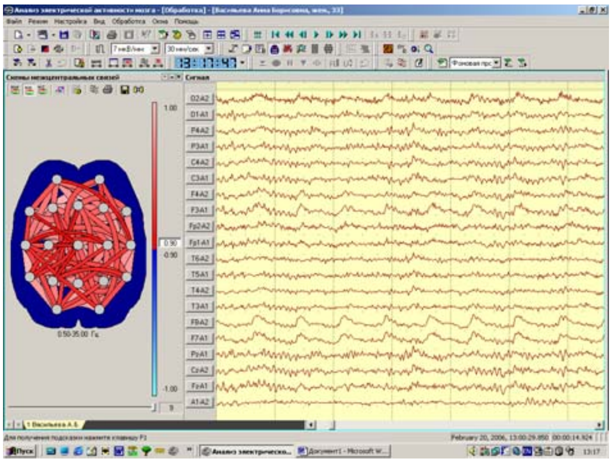
06.02.06. before RBC-therapy





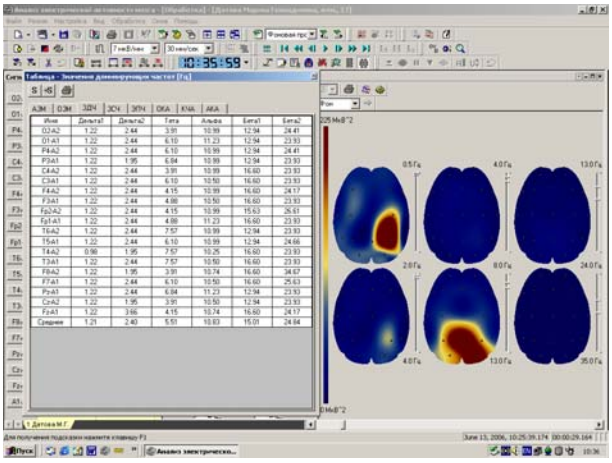
20.02.06. after RBC-therapy



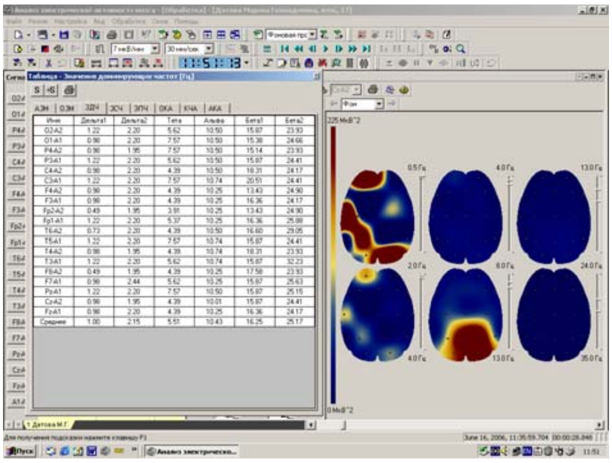


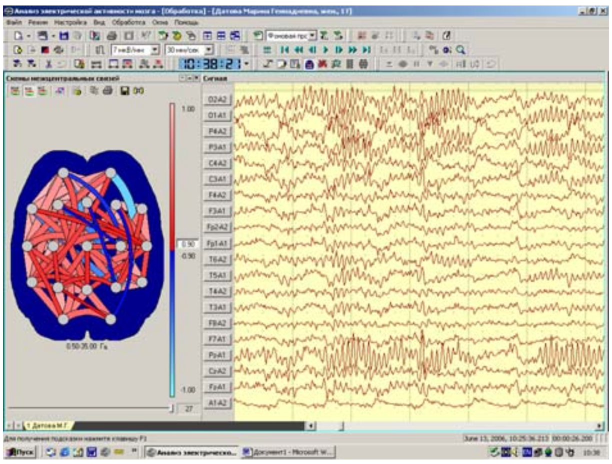
2. Patient M. G.

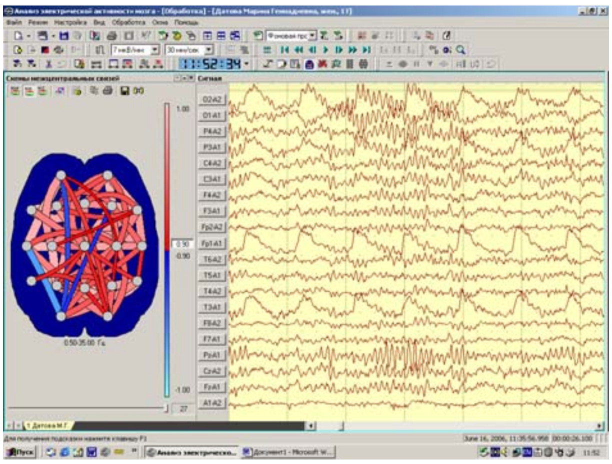
13.06.06. before RBC-therapy



16.06.06. after RBC-therapy

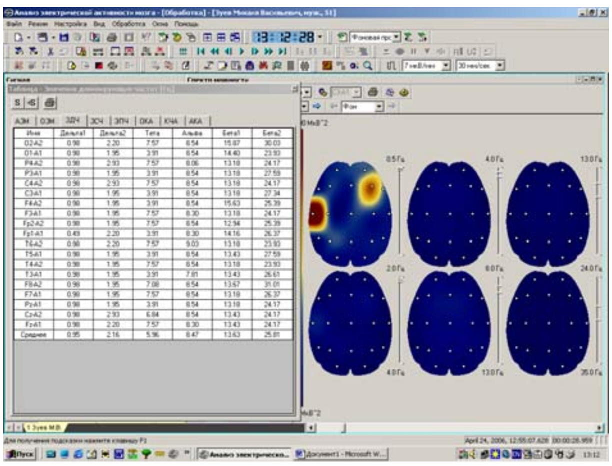




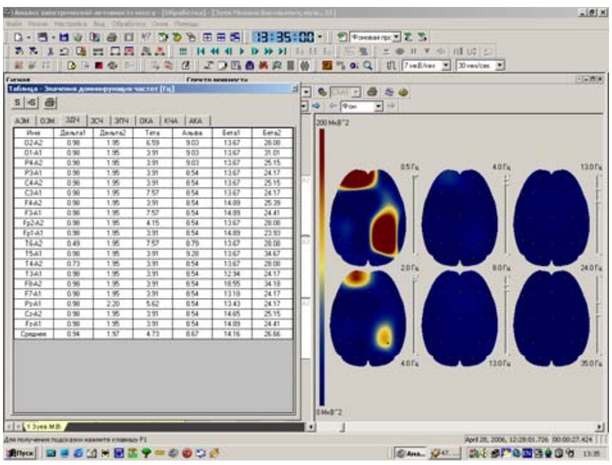


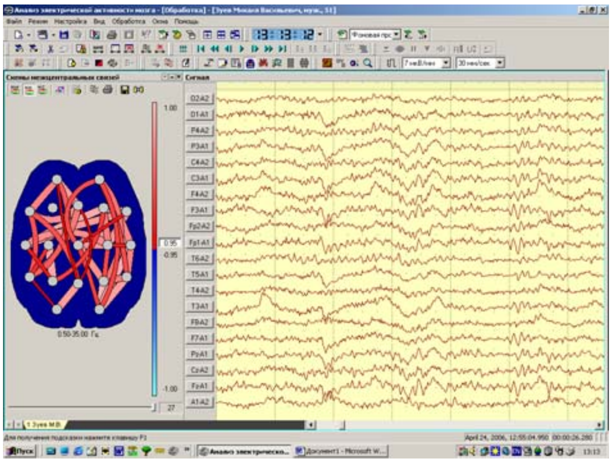
Patient M. V.

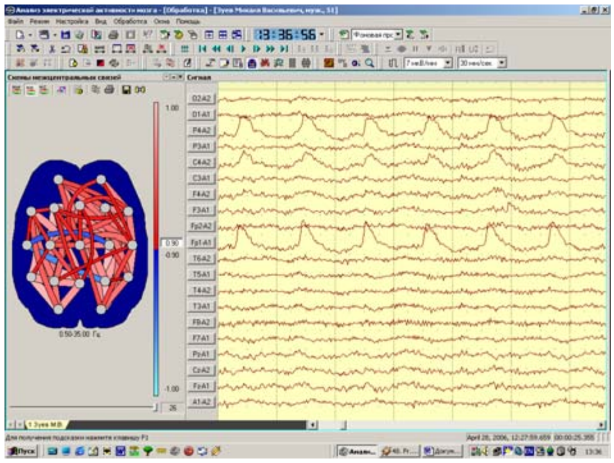
24.04.06. before RBC-therapy.



28.04.06. after RBC-therapy



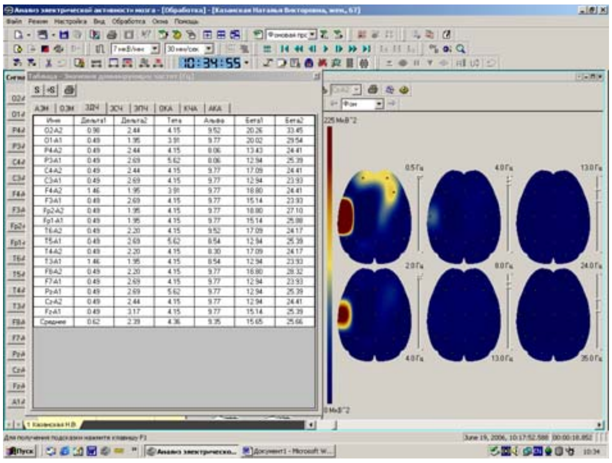


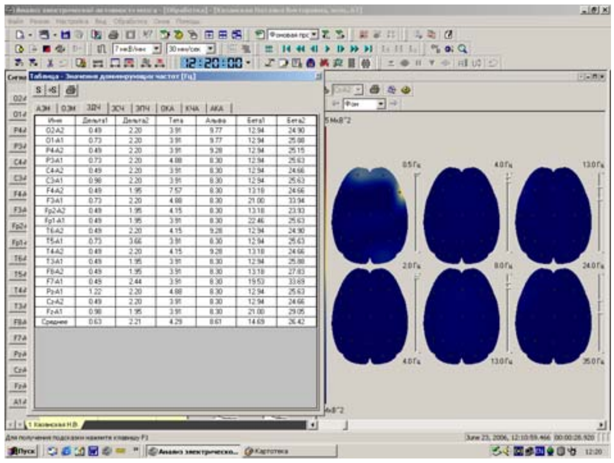


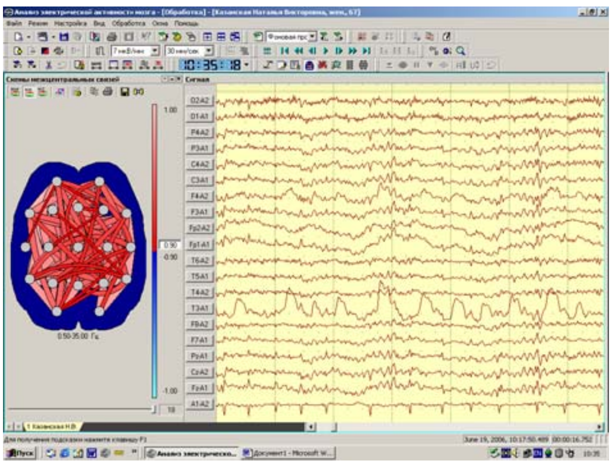
Patient N. V.

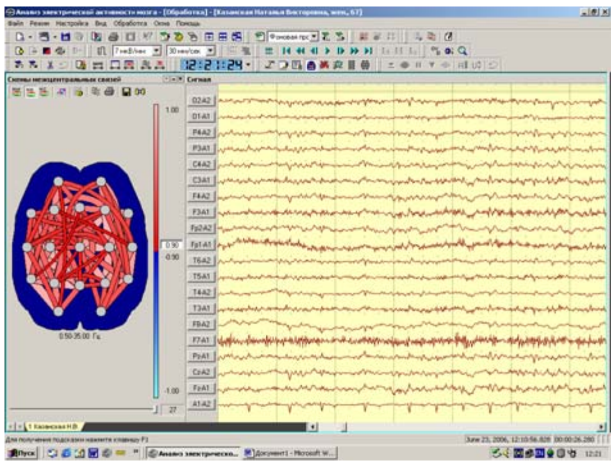
19.06.06. before RBC-therapy.

23.06.06. after RBC-therapy



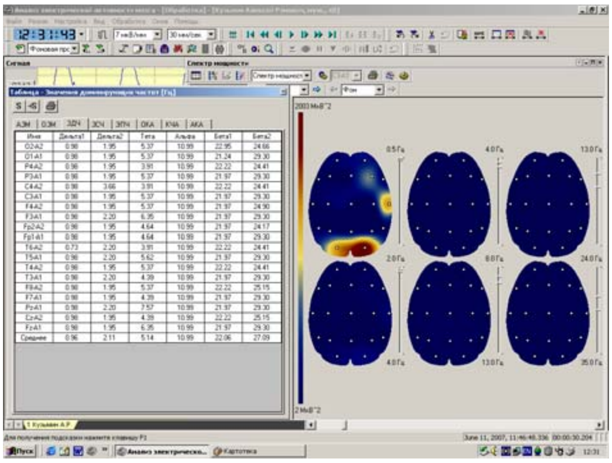




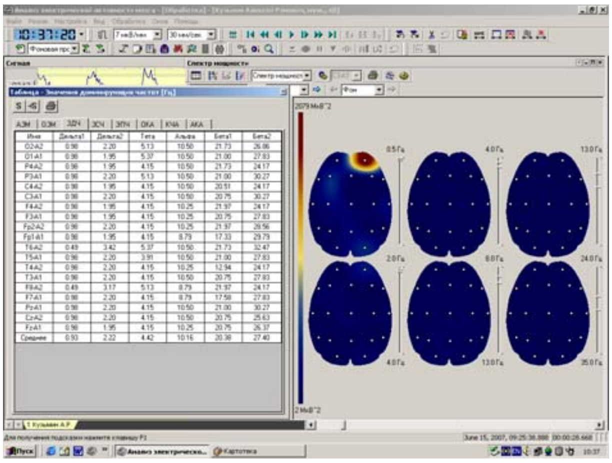


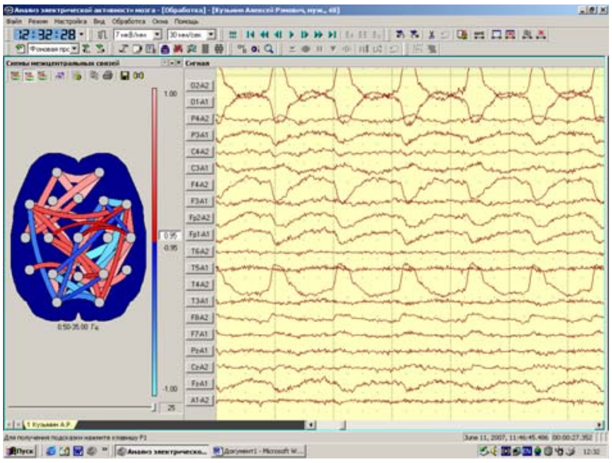
Patient A. R.

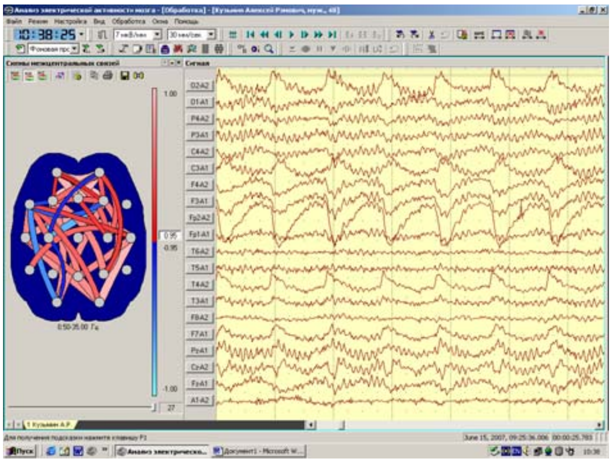
11.06.07. before RBC-therapy.



15.06.07. after RBC-therapy

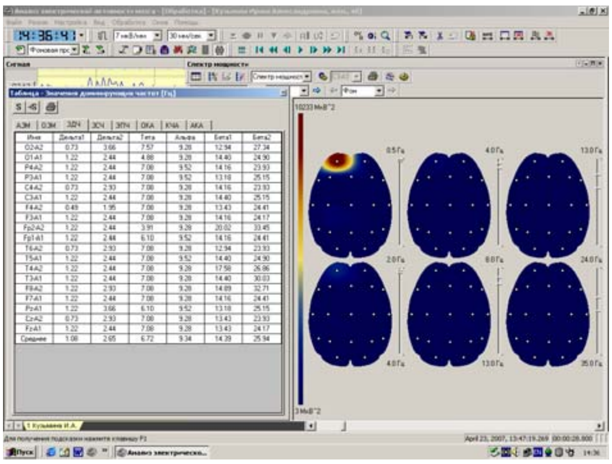




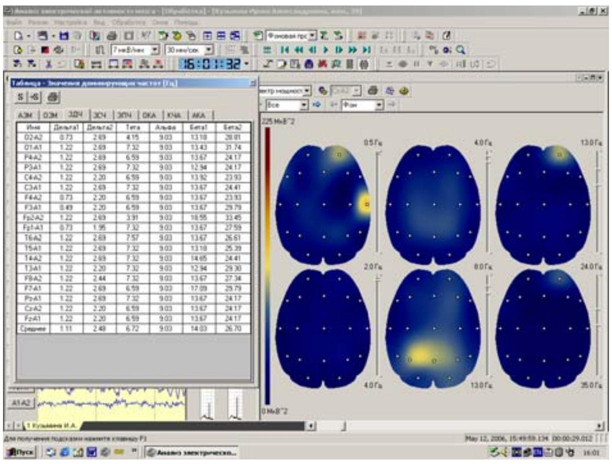


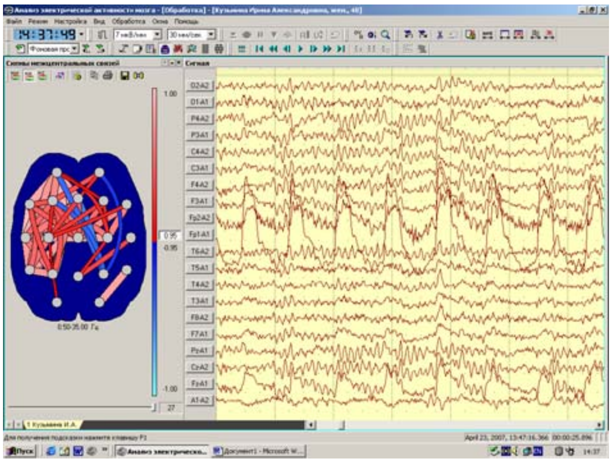
Patient I. A.

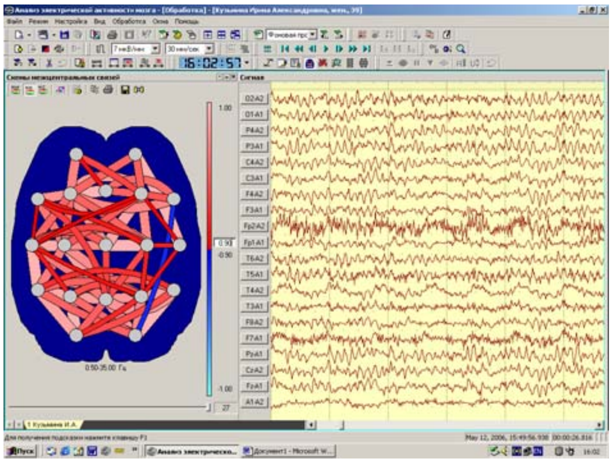
23.04.07. before RBC-therapy.



12.05.06. after RBC-therapy.



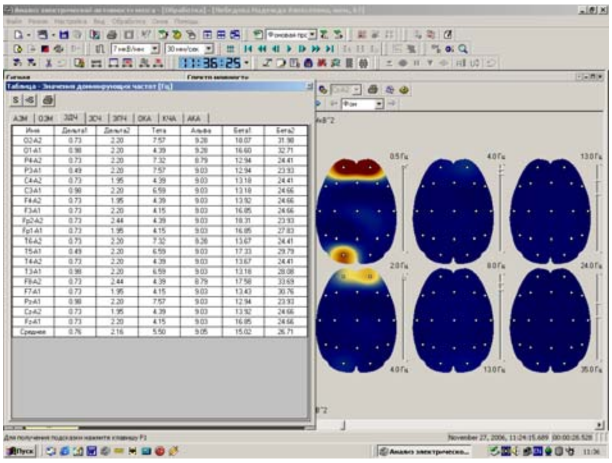


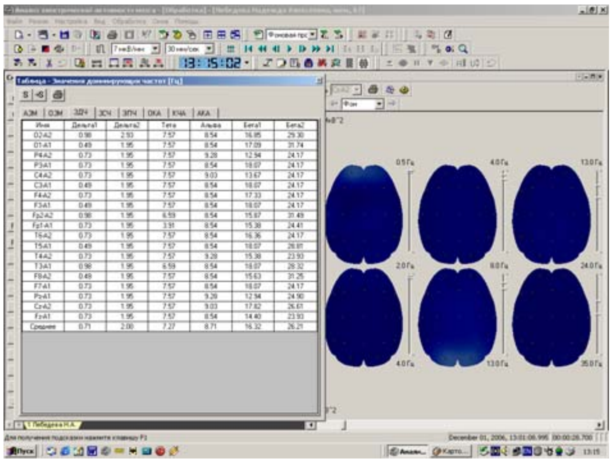


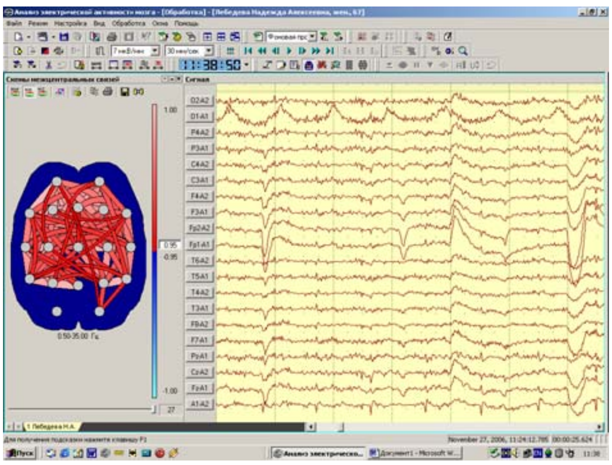
Patient N. A.

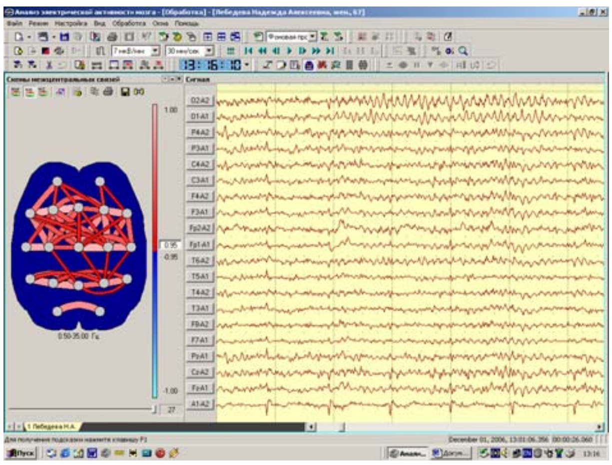
27.11.06. before RBC-therapy.

01.12.06. after RBC-therapy.



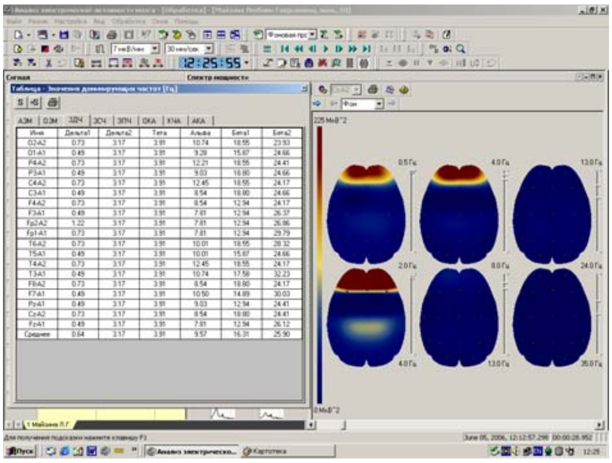




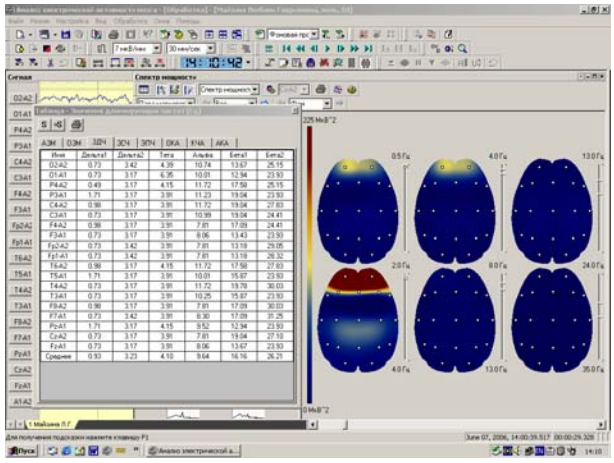


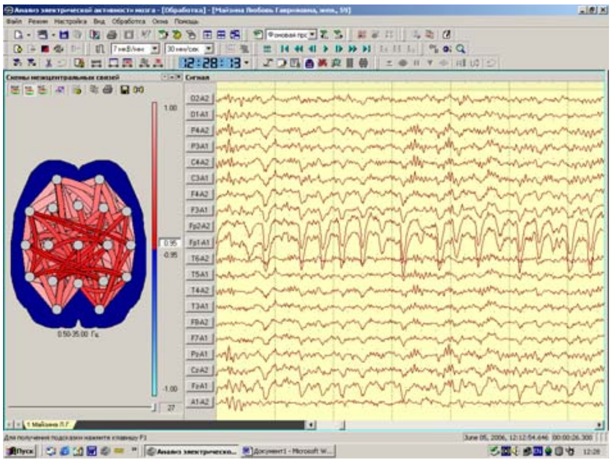
Patient L. G.

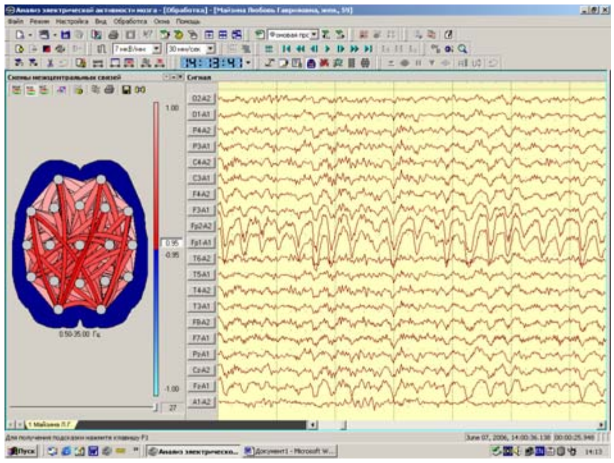
05.06.06. before RBC-therapy.



07.06.06. after RBC-therapy.

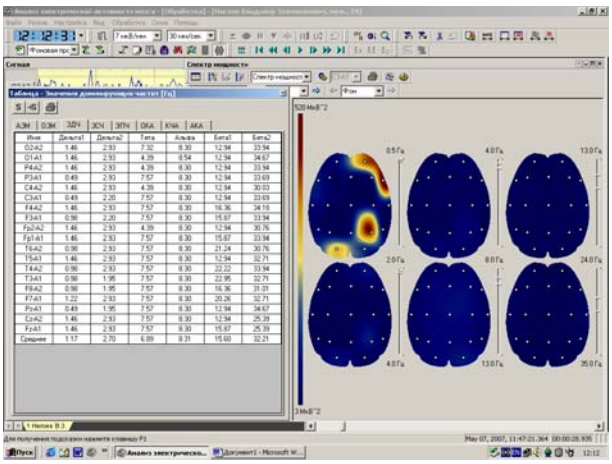




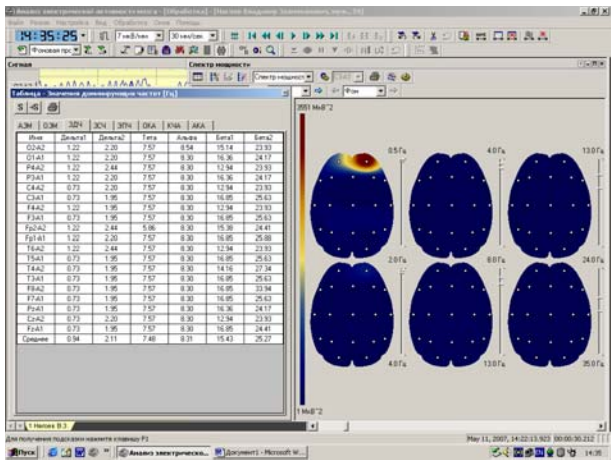


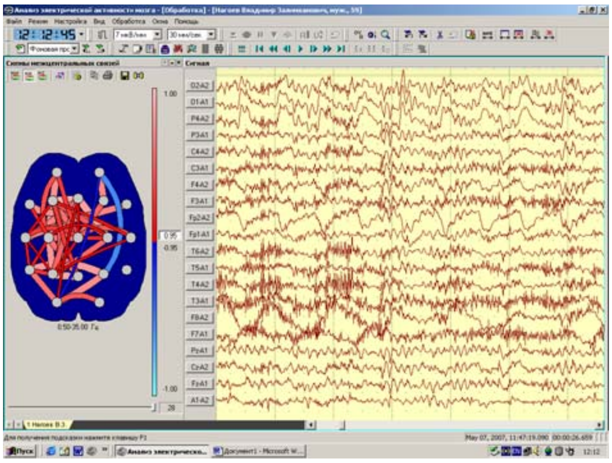
Patient V. Z.

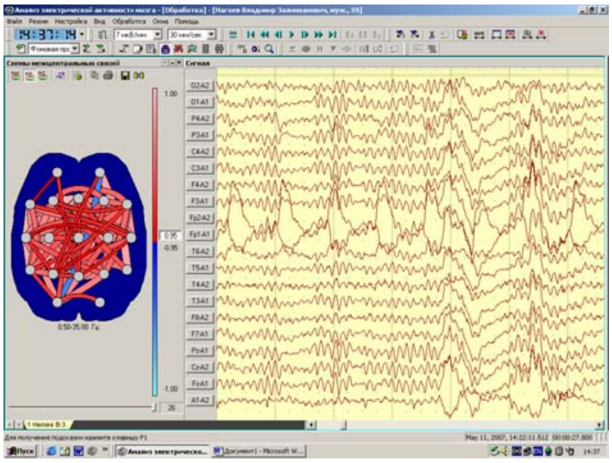
07.05.07. before RBC-therapy.



11.05.07. after RBC-therapy.



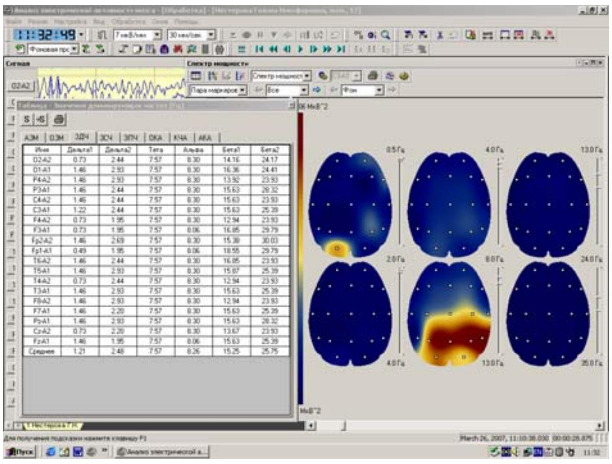


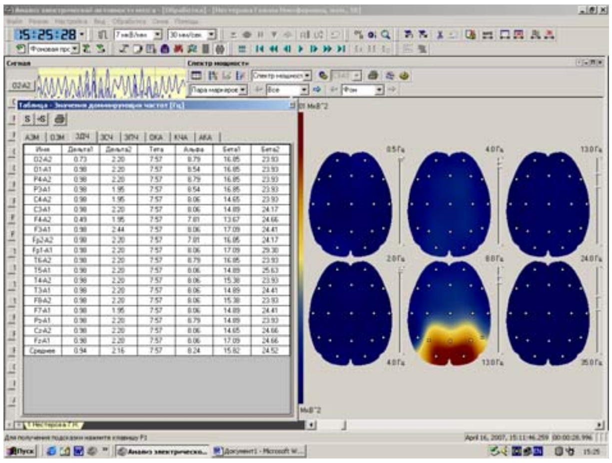


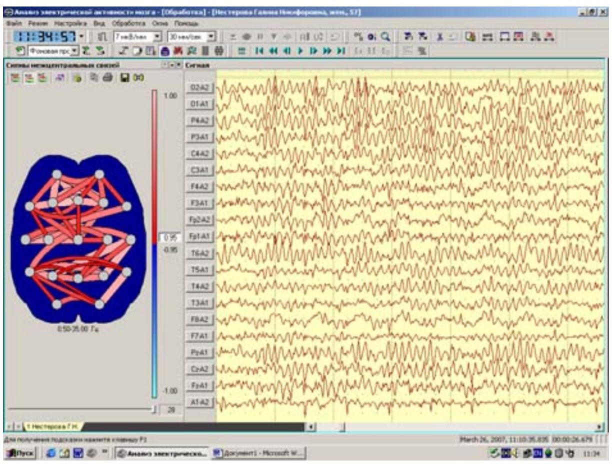
Patient G. N.

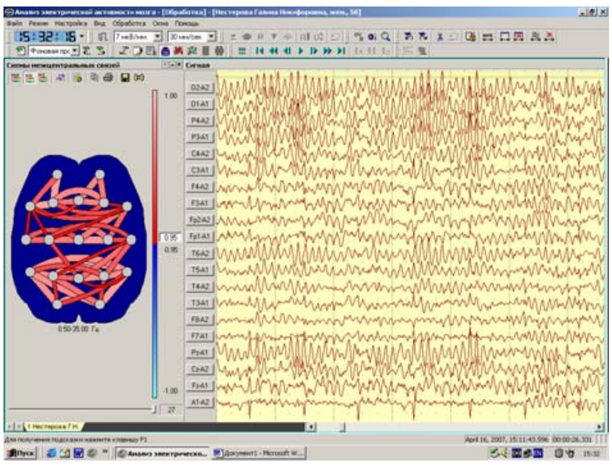
26.03.07. before RBC-therapy.

16.04.07. after RBC-therapy.



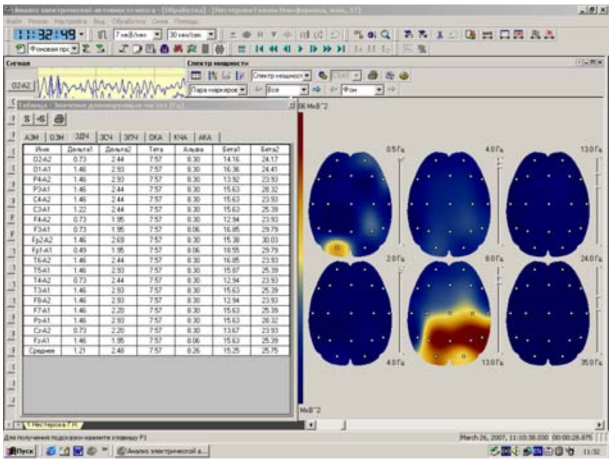




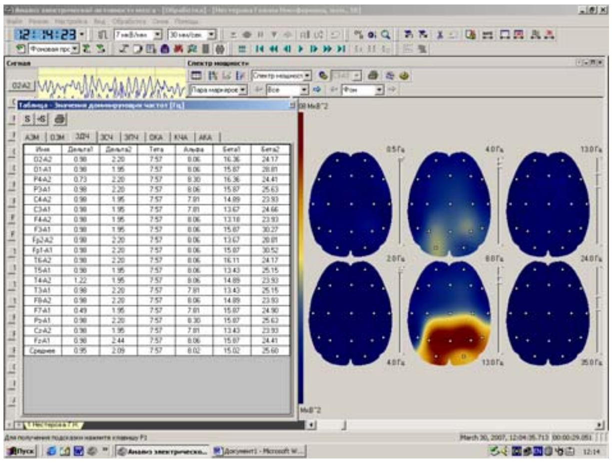


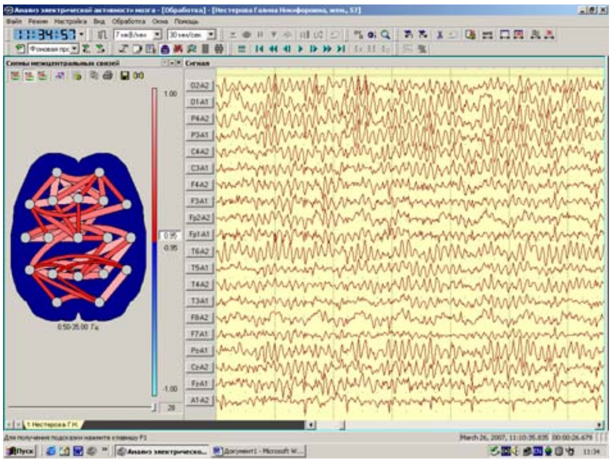
Patient G. N.

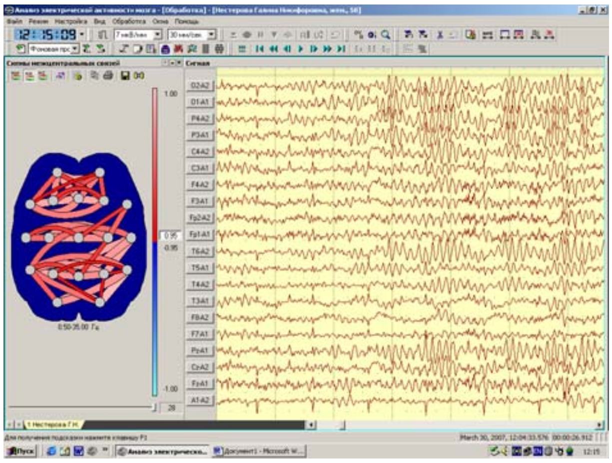
26.03.07. before RBC-therapy.



30.03.07. after RBC-therapy.

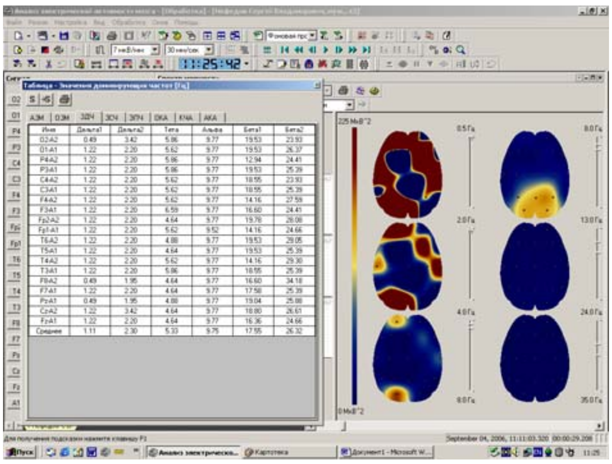




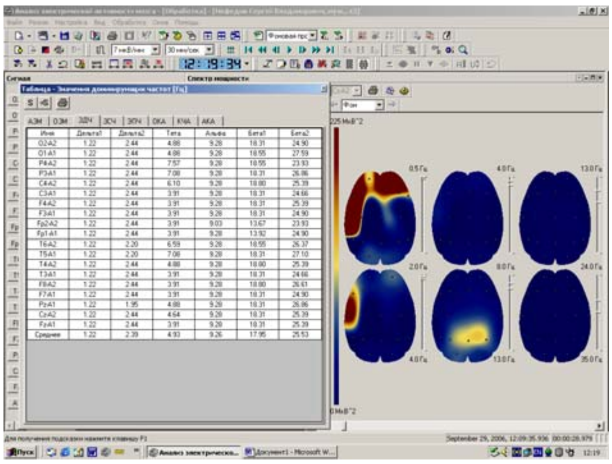


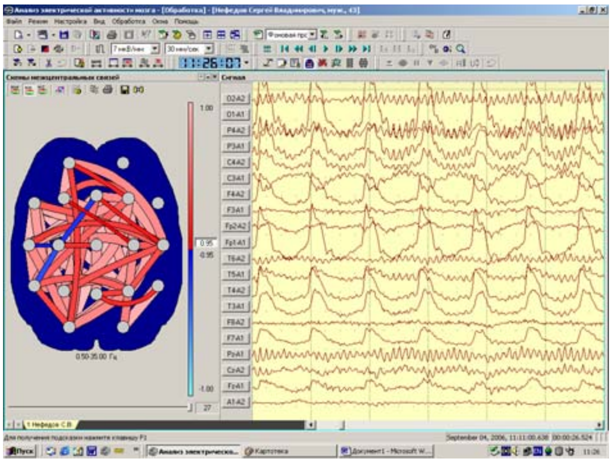
Patient S. V.

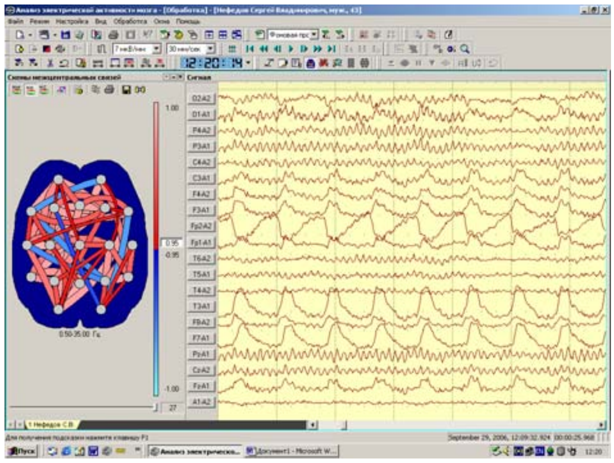
04.09.06. before RBC-therapy.



29.09.06. after RBC-therapy.



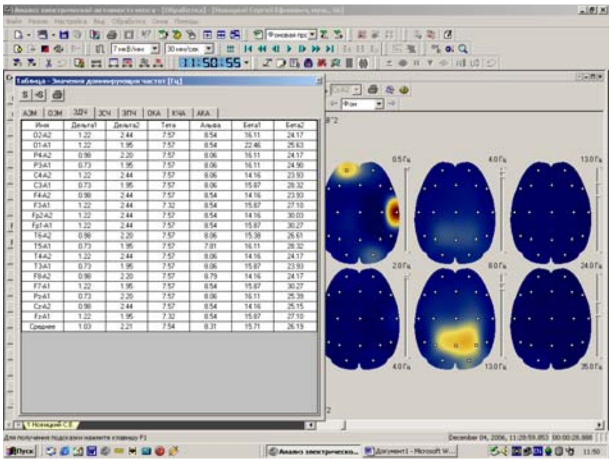


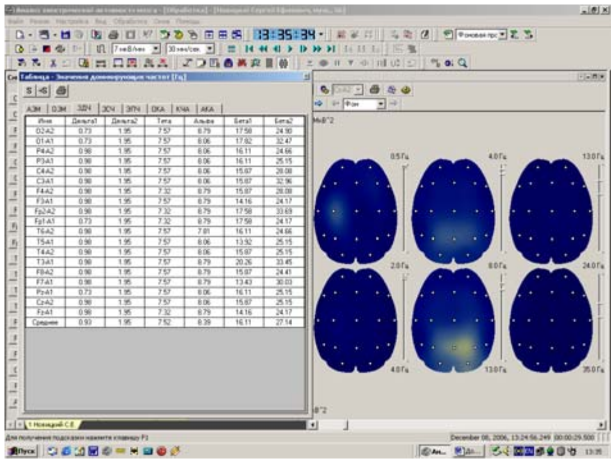


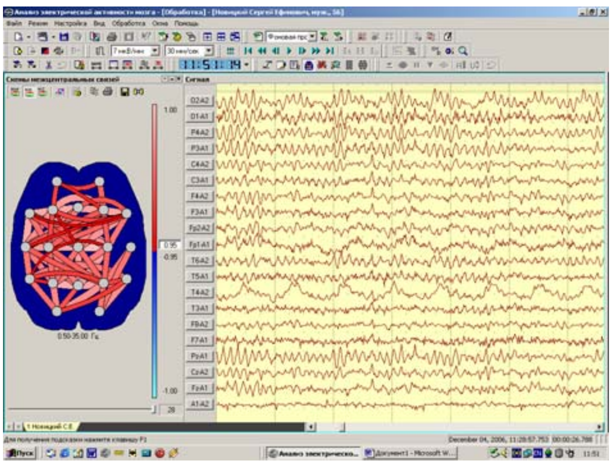
Patient S. E.

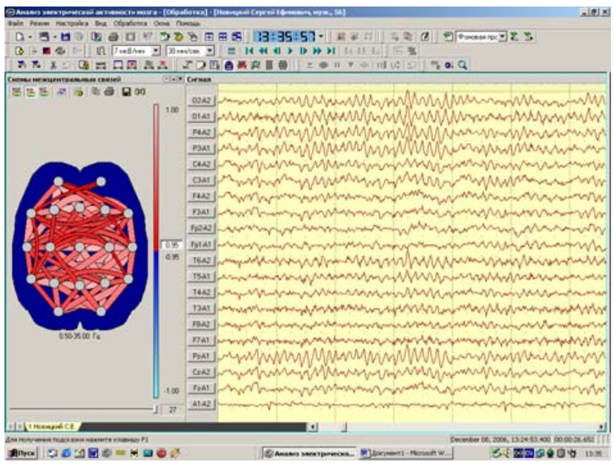
04.12.06. before RBC-therapy.

08.12.06. after RBC-therapy.



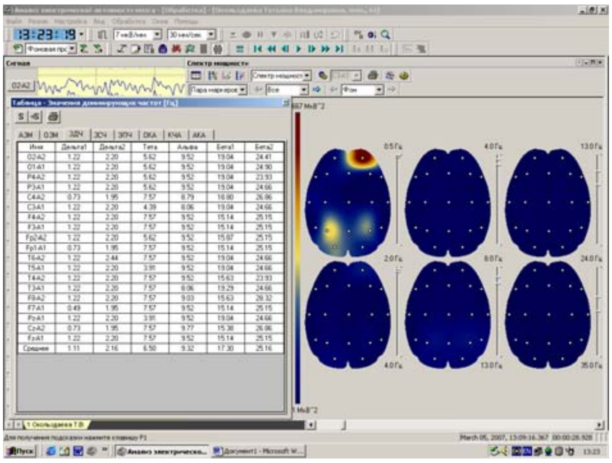




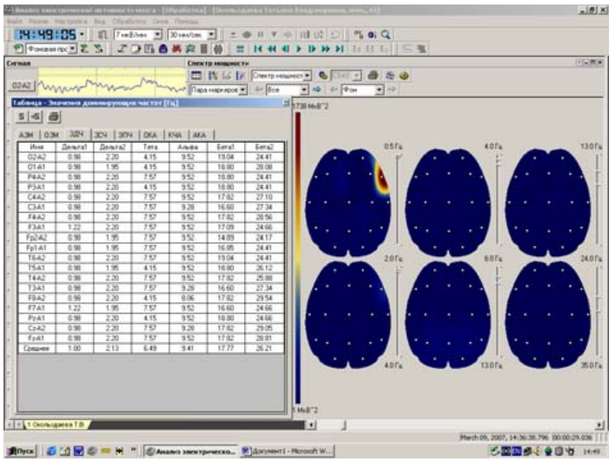


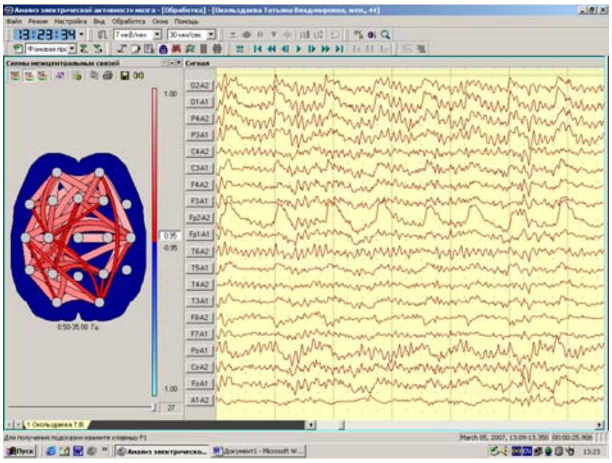
Patient T. V.

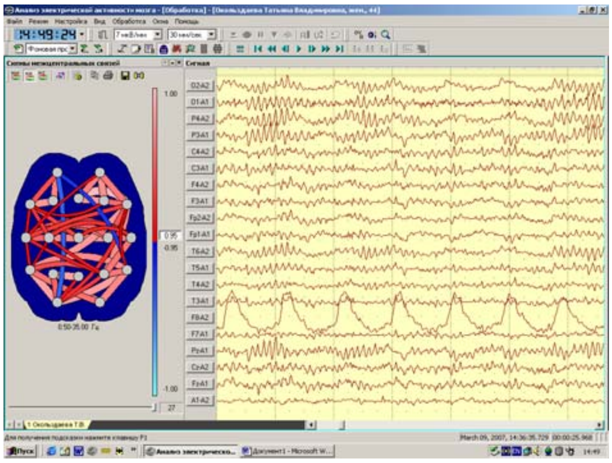
05.03.07. before RBC-therapy.



09.03.07. after RBC-therapy.

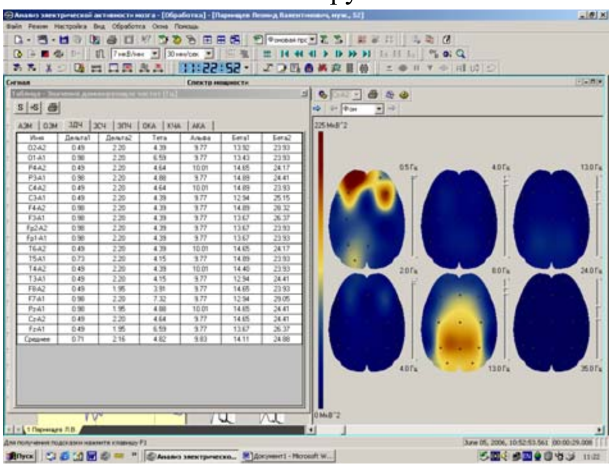




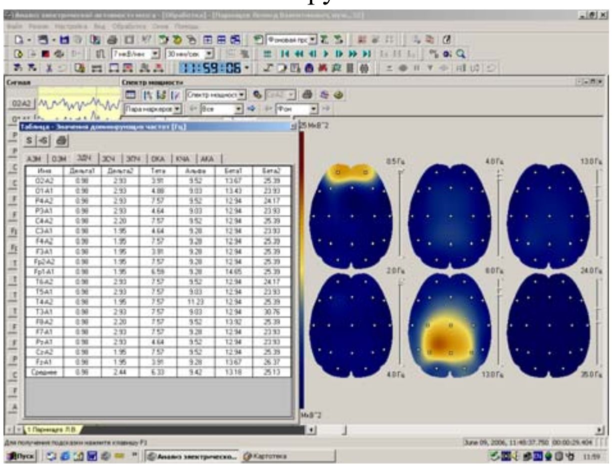


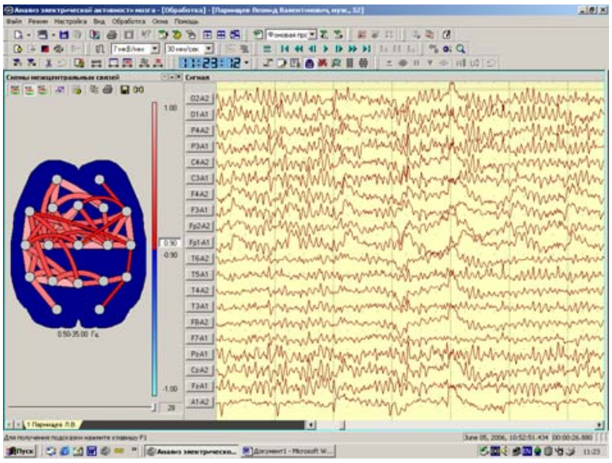
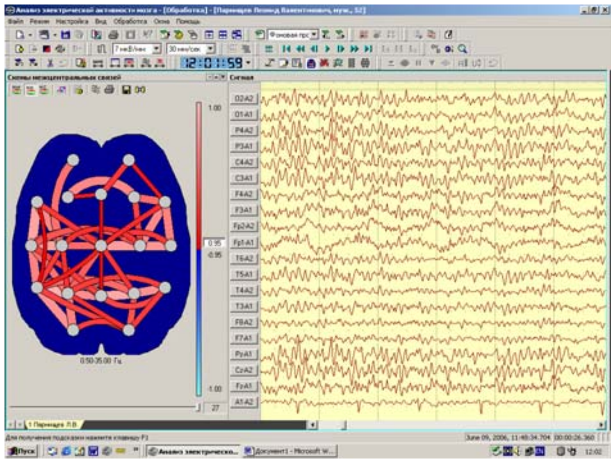
Patient L. V.

05.06.06. before RBC-therapy.



09.06.06. after RBC-therapy.

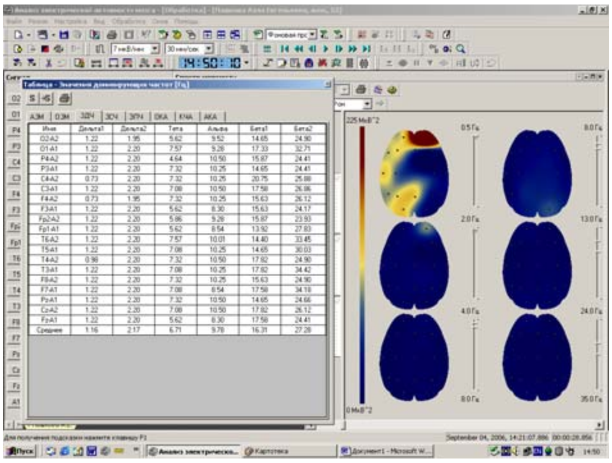
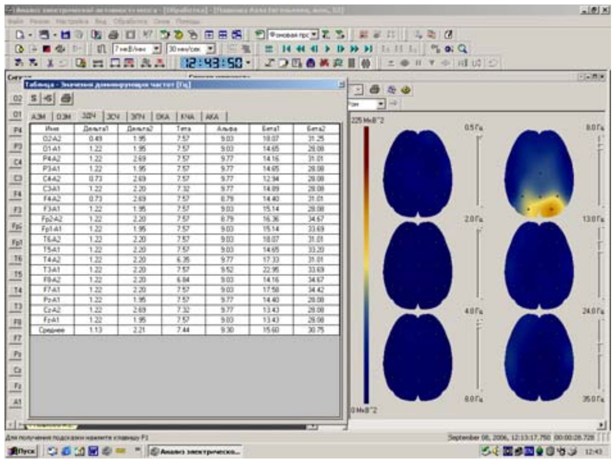
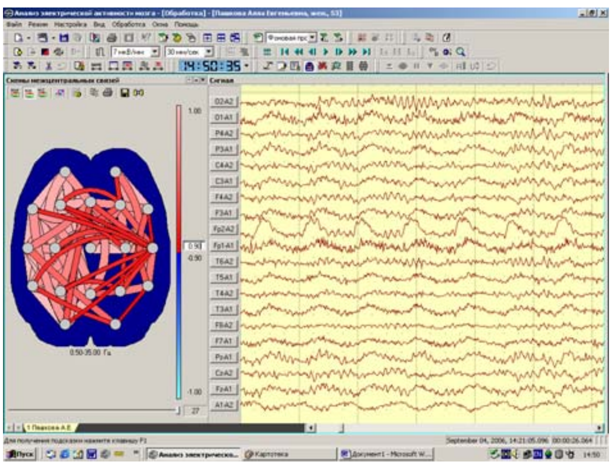
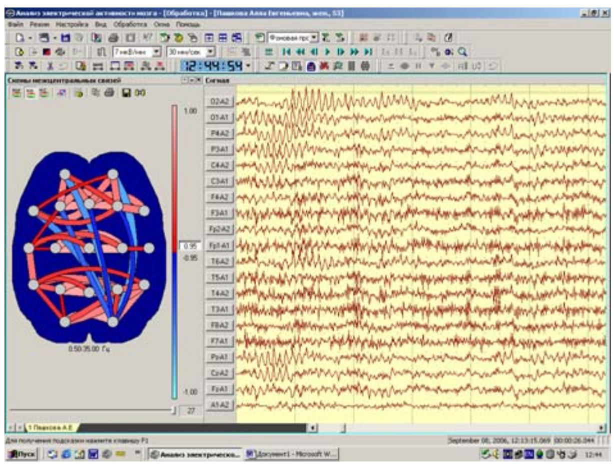


Patient A. E.

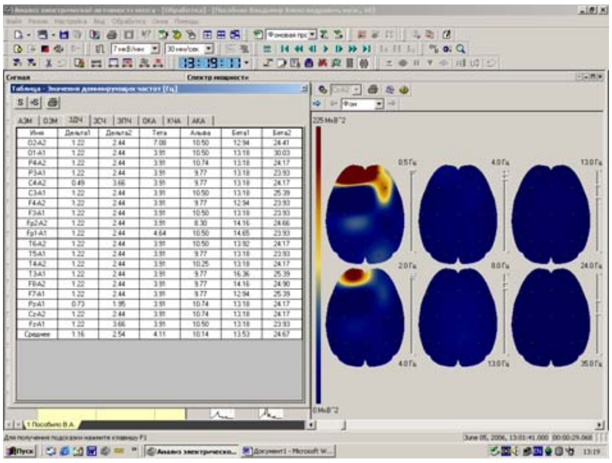
04.09.06. before RBC-therapy

08.09.06. after RBC-therapy.

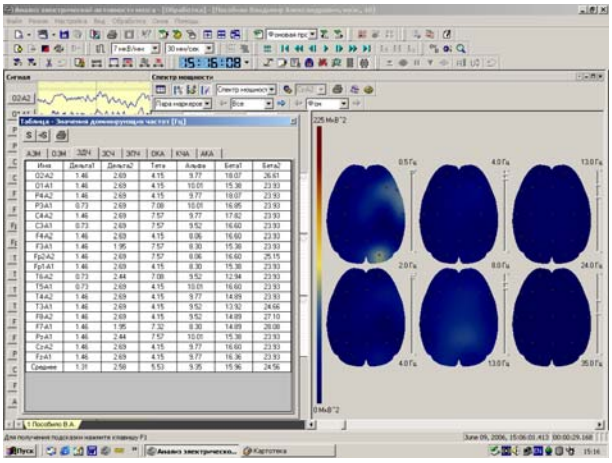





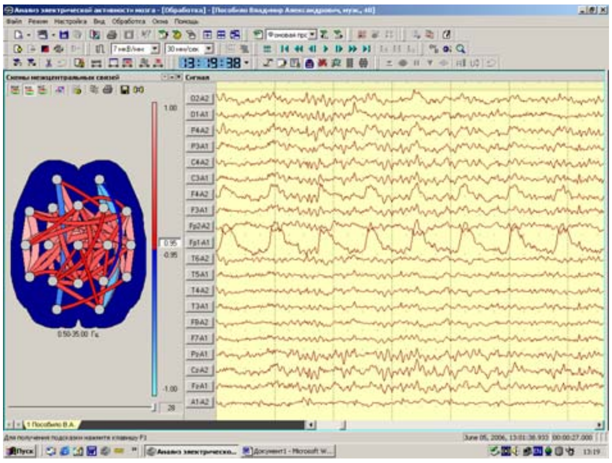
Patient V. A.

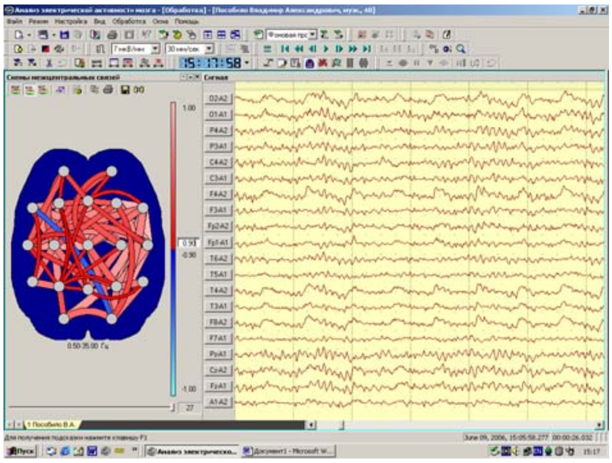
05.06.06. before RBC-therapy.



09.06.06. after RBC-therapy.

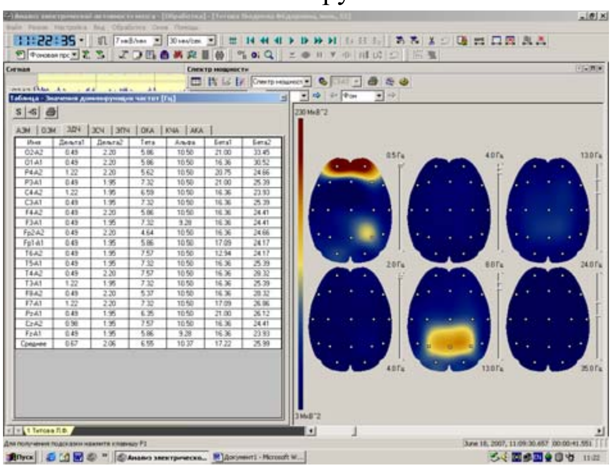




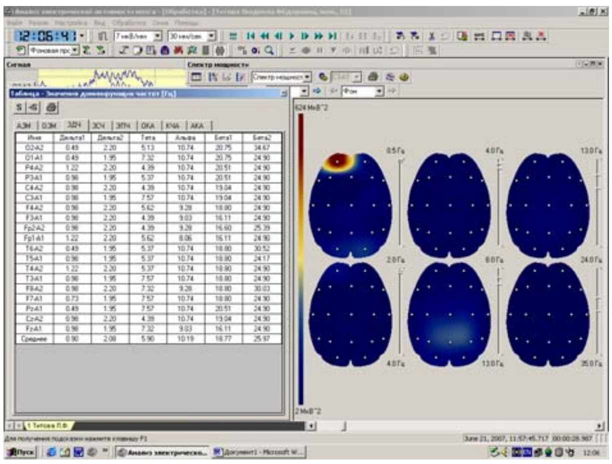


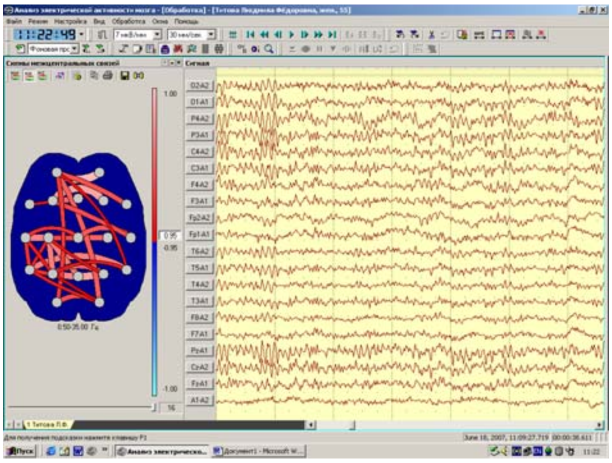
Patient L. F.

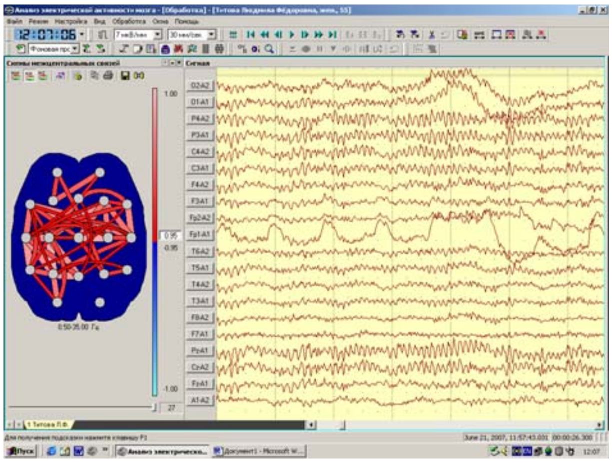
18.06.07 before RBC-therapy



21.06.07. after RBC-therapy.



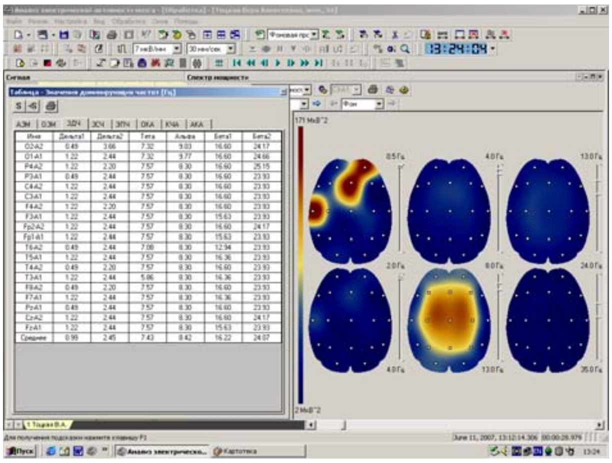


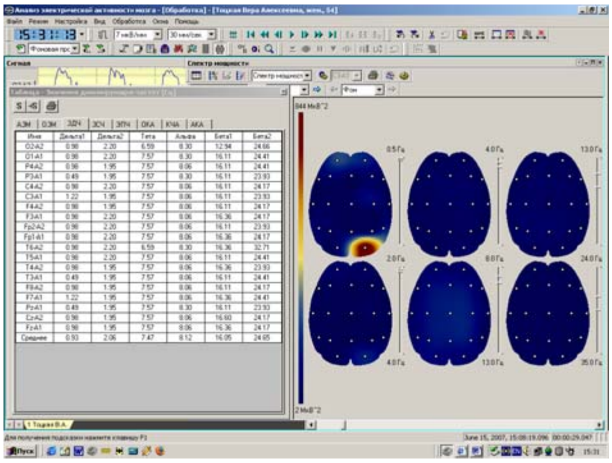


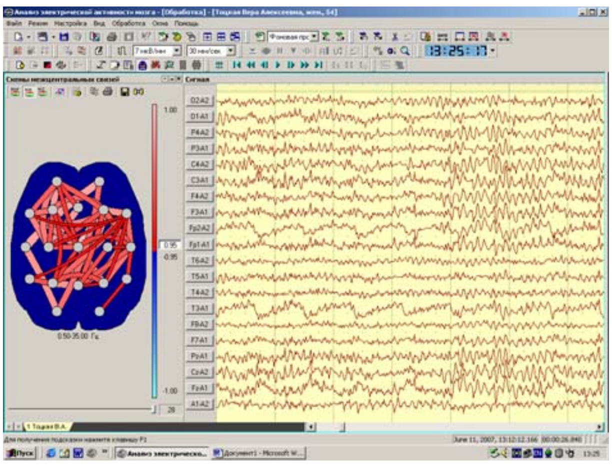
Patient V. A.

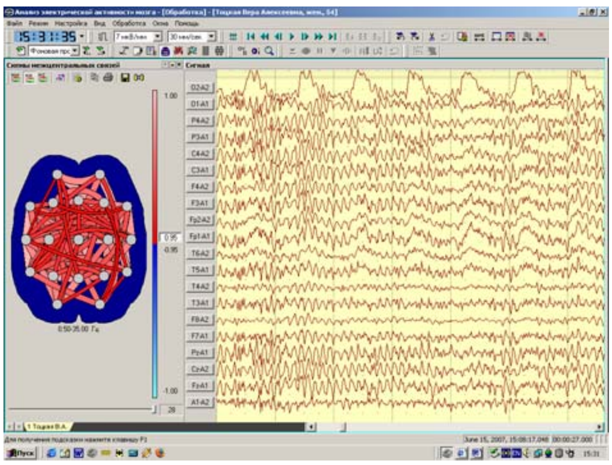
11.06.07. before RBC-therapy.

15.06.07. after RBC-therapy.





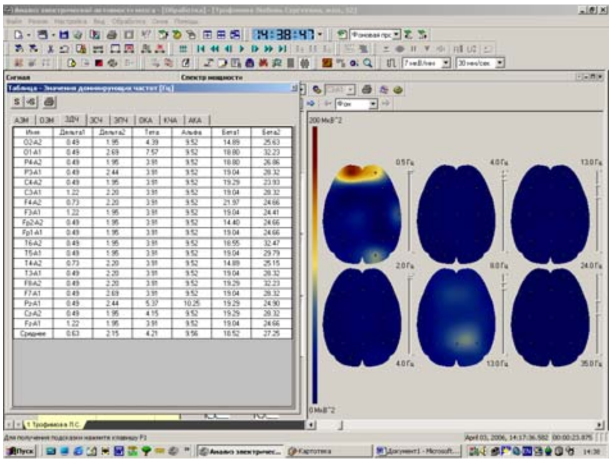


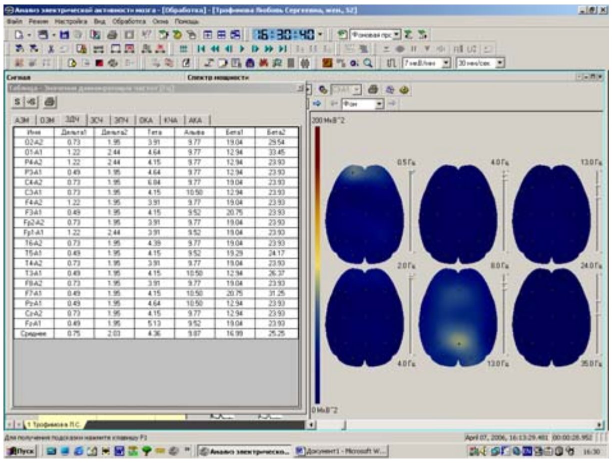


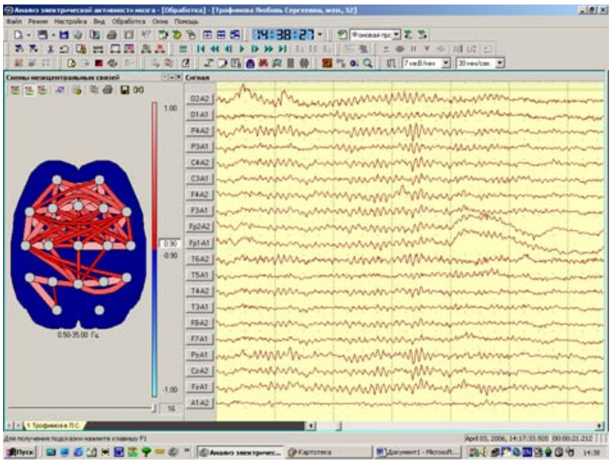
Patient L. S.

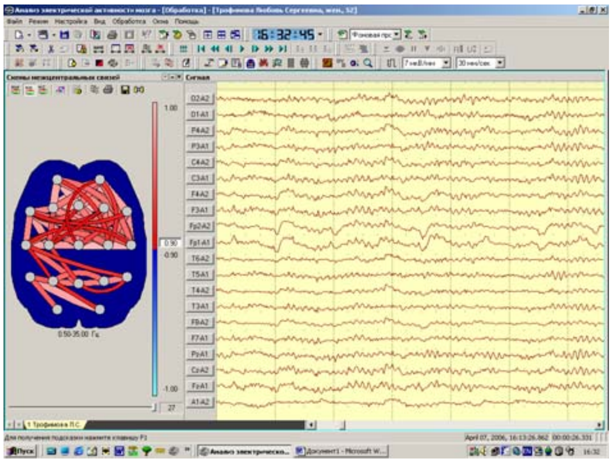
03.04.06. before RBC-therapy.

07.04.06. after RBC-therapy.









Bibliography

1. Psychotherapeutic Encyclopedia. Saint Petersburg, 1998, p.21.
2. I. N. Serov General Course of BIP. 1998, Saint Petersburg.
3. I. N. Serov The phenomenon of consciousness and matrix holography paradoxes. 1999, Saint Petersburg.
4. Jasper H. The ten-twenty electrode system of the International federation. EEG a. Clin. Neurophysiol.1958, v.10, №2, p.371.
5. Ye.V. Gubler, A.A. Genkin. Application of nonparametric criteria of statistics in medical biological studies. Leningrad, 1960.
6. L.P. Latash The Hypothalamus, adaptive activity and electroencephalogram. Moscow, 1968.
7. Synec V.M. The low-voltage electroencephalogram clinical Electroencephalography. 1983, v.14, №2, p.102.
8. Ye. A. Zhirmuskaya. In search of explanation for EEG phenomena. Moscow, 1996.
9. Alexander F., French M., Pollock G. Psychosomatic specificity. Chicago, 1968.
10. Bahnson C.B. Das Krebsproblem in psychosomatischer Dimension Hrsg T.V. UexKuell: Psychosomatische medizin. München: Urban und Schwarzenberg, 1986, S.889.