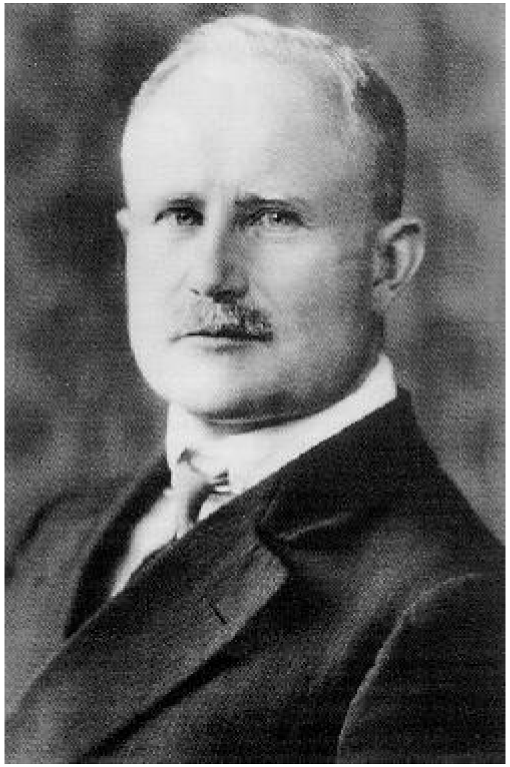
“Ablak a gondolatokra?”
Klinikai elektrofiziológiai vizsgálatok helye a pszichiátriában.
Lehetőségek és korlátok

Csibri Éva

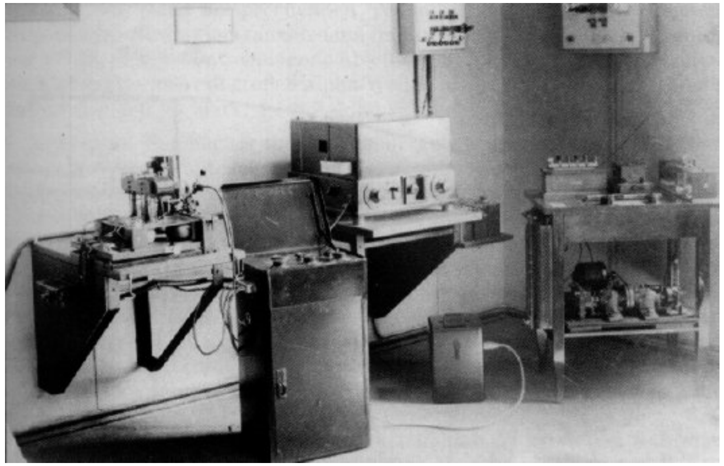
Klinikai elektrofiziológia

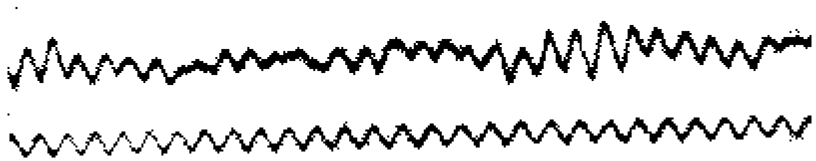
- Történeti háttér
- Módszerek
- Vizsgálatok
- Előnyök és korlátok
- Folytatás?

Hans Berger álma
“ablak a gondolatokra”



1873 - 1941

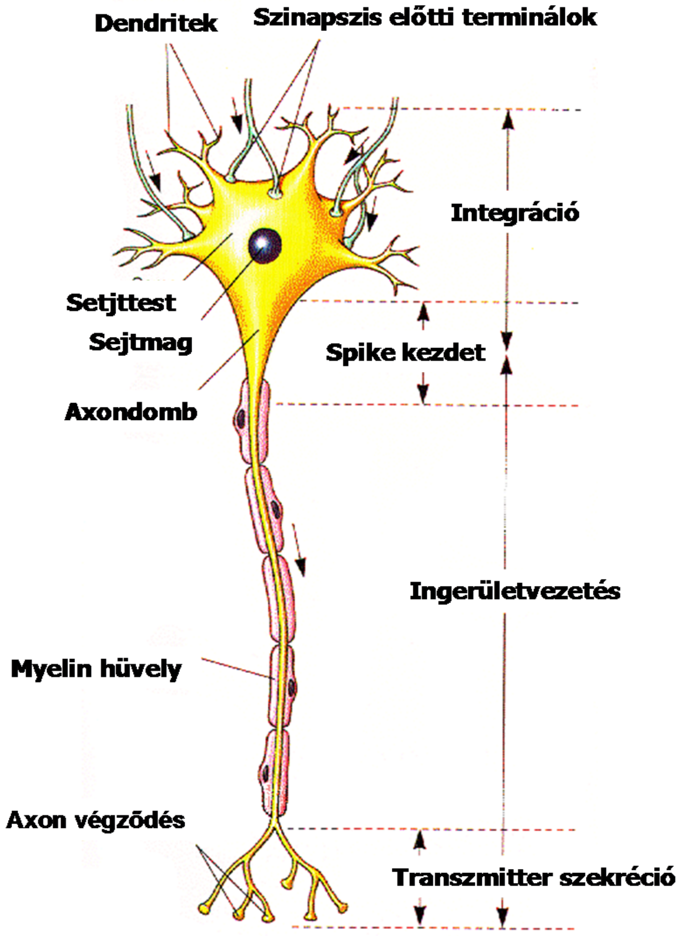


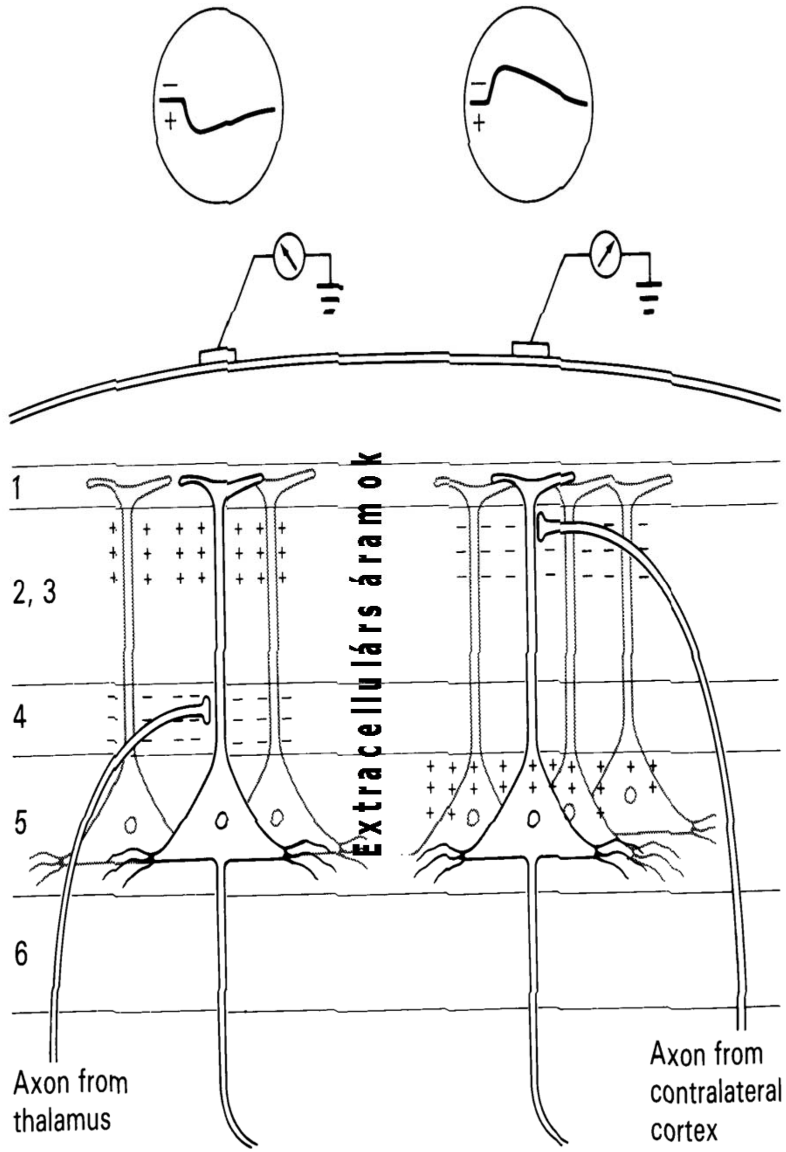


1924

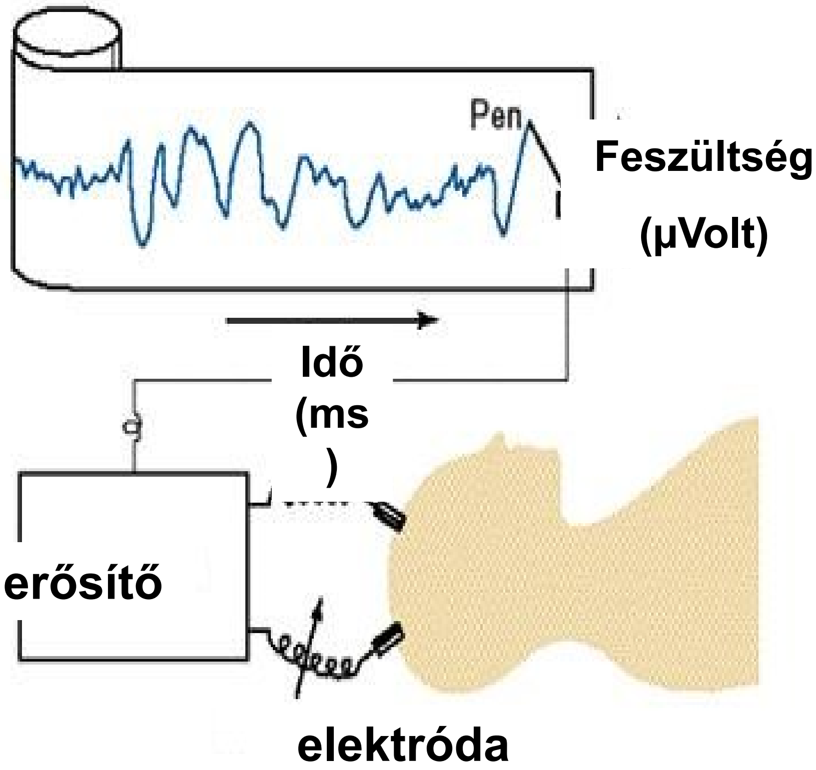
1929

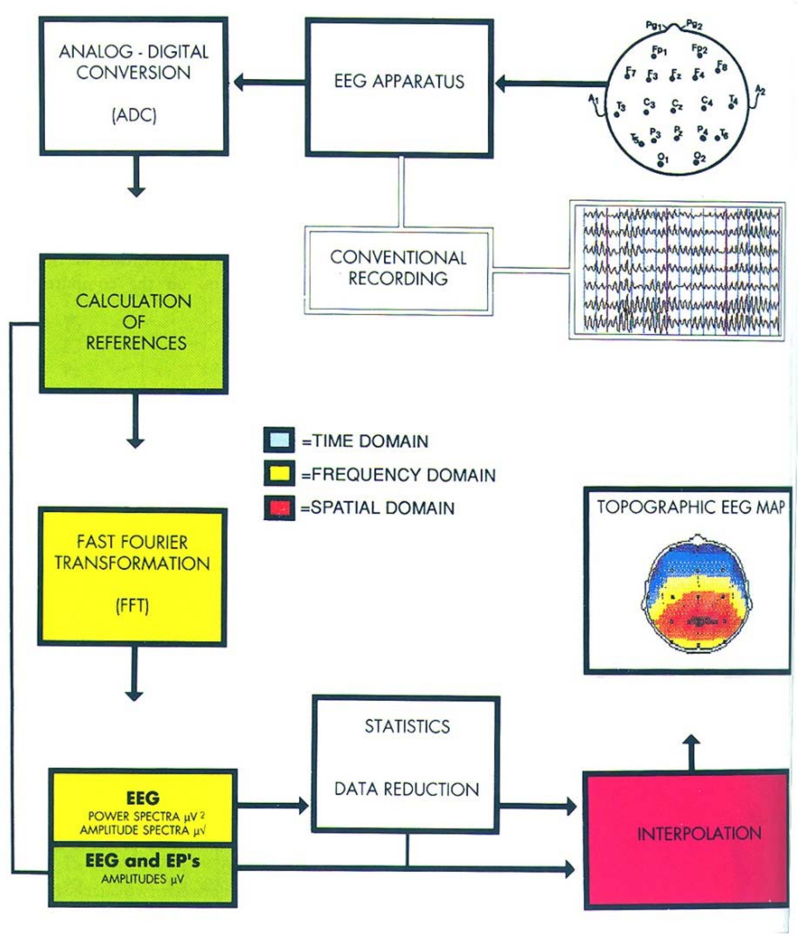
Akciós potenciál





EEG, qvantiatív/QEEG





Kiváltott válaszok

vizuális, akusztikus, szomatoszenzoros, motoros

Exogen komponensek

az inger primer feldolgozása

korai – közép – késői komponensek

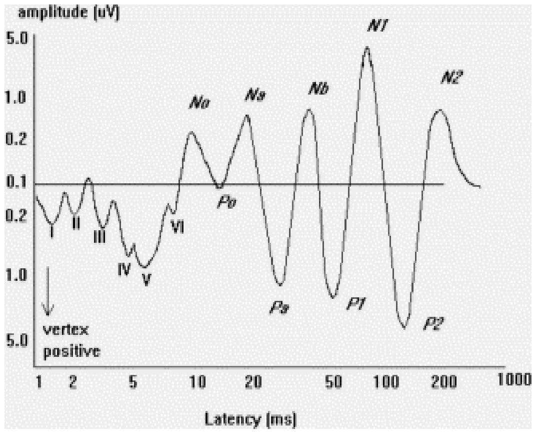
Endogen komponensek

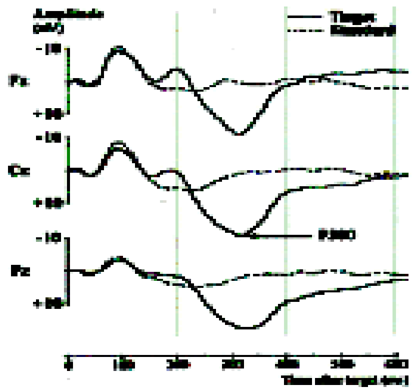
ERP

az információfeldolgozás magasabb szintje

P300, P400

MMN, CNV





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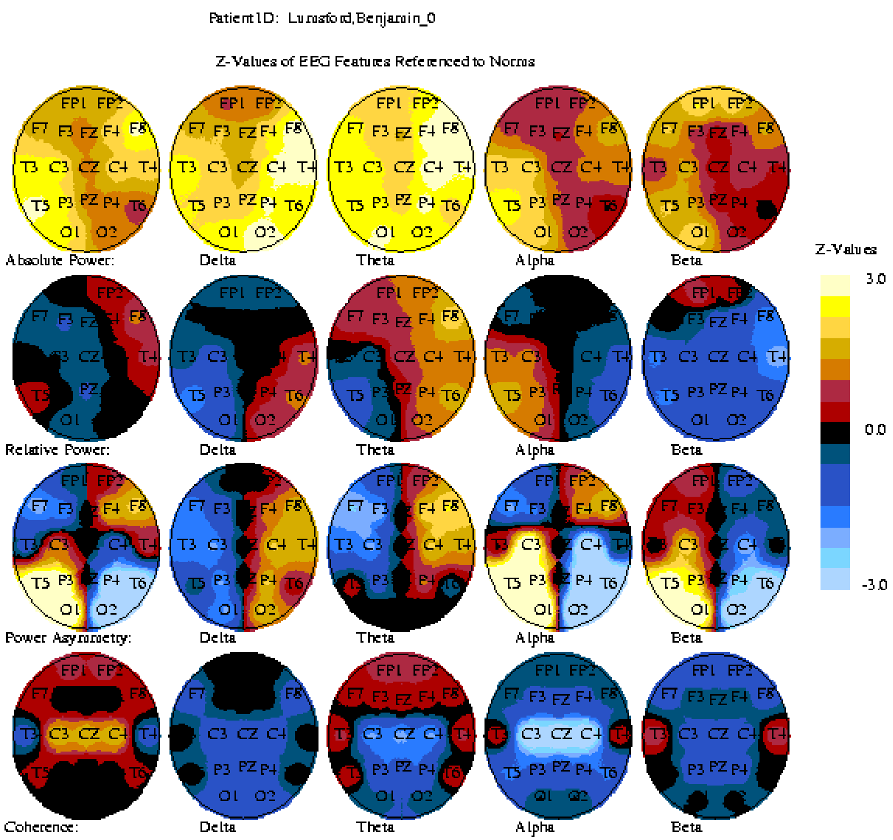
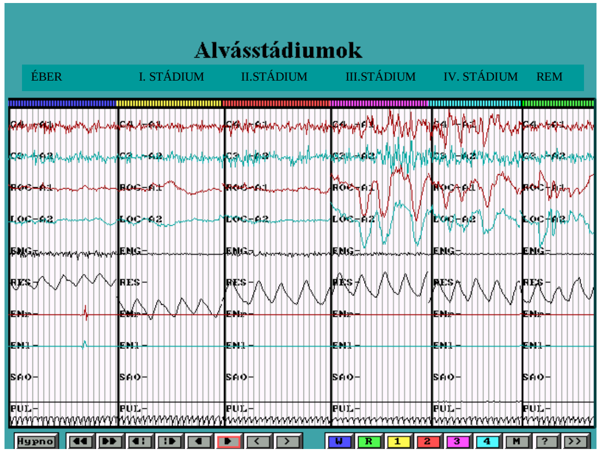
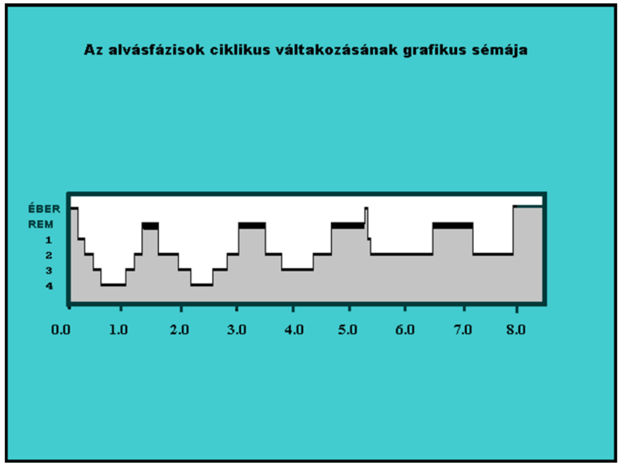


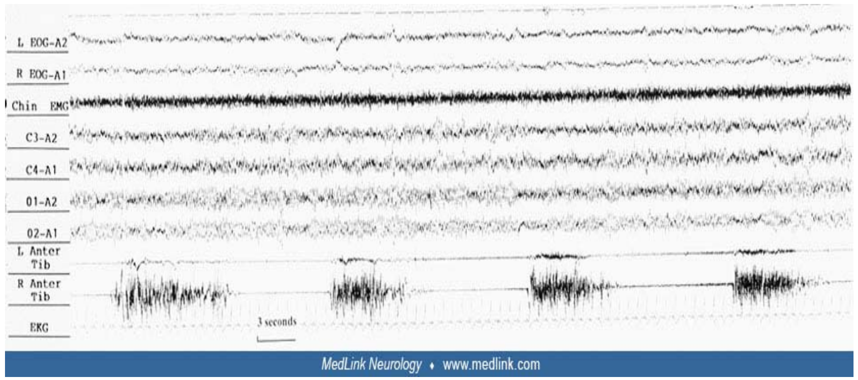
John, et al

VideoEEG

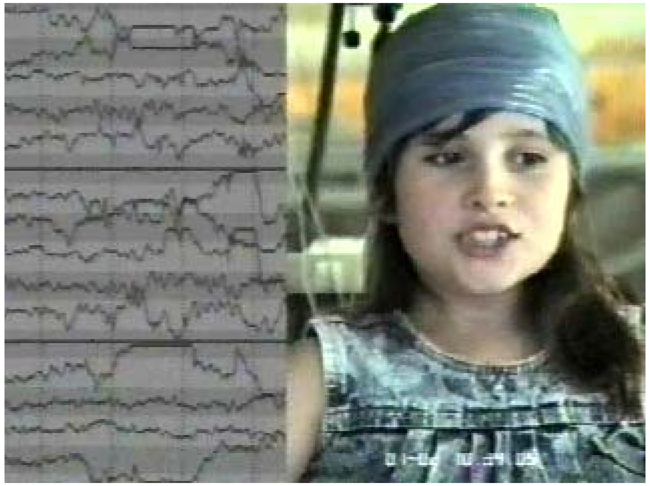
Poliszomnográfia

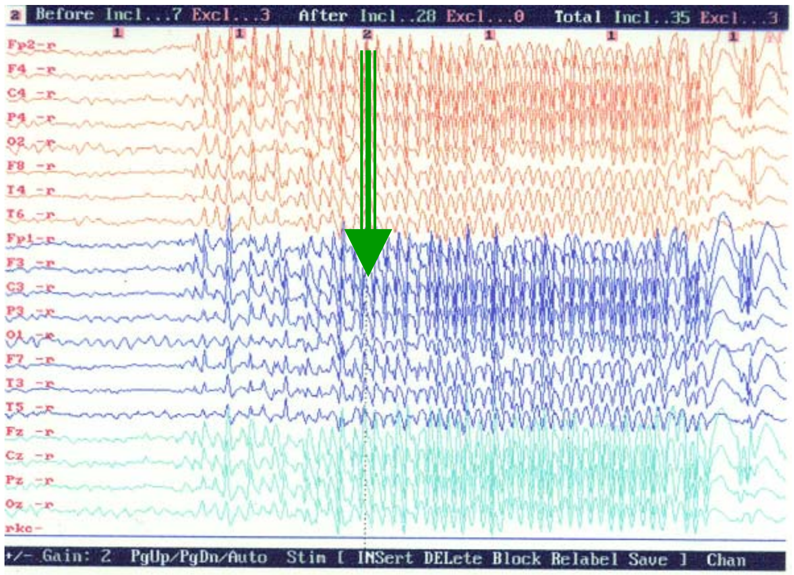


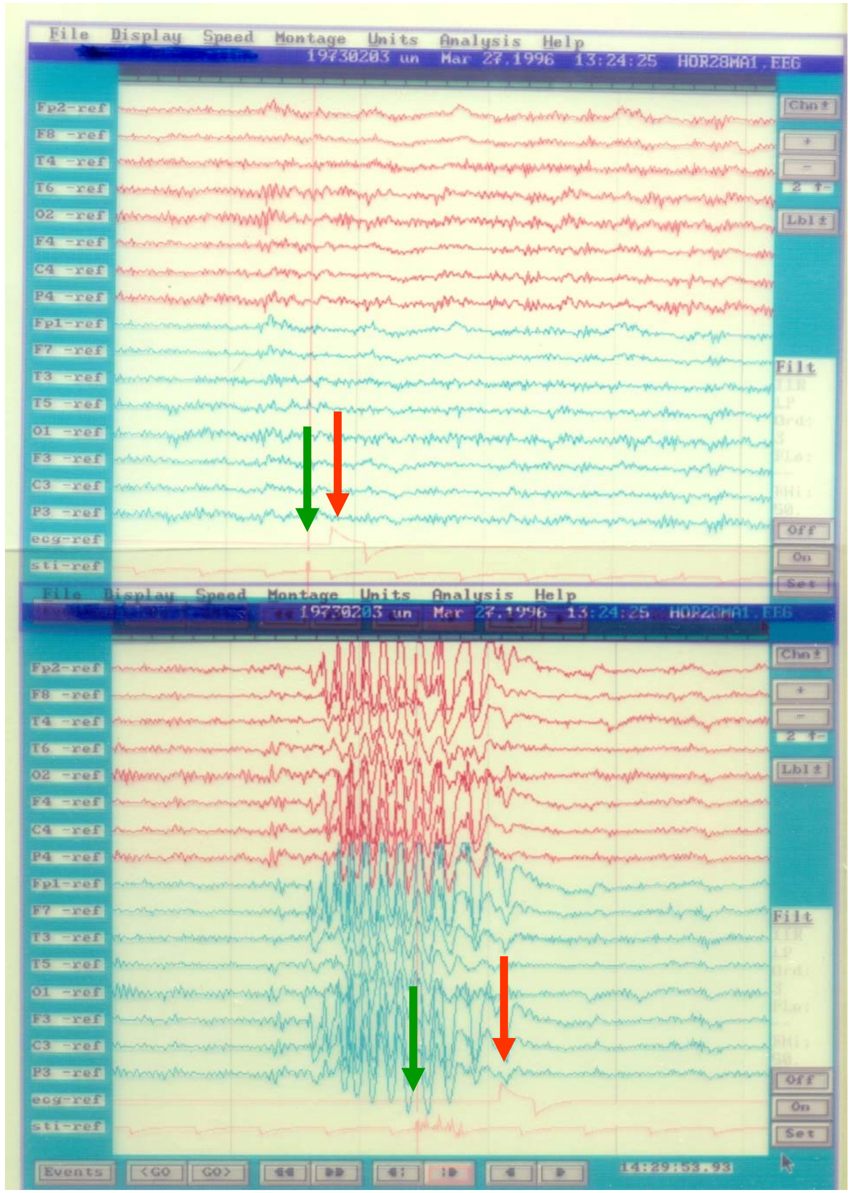




Átmeneti kognitív zavar
TCI



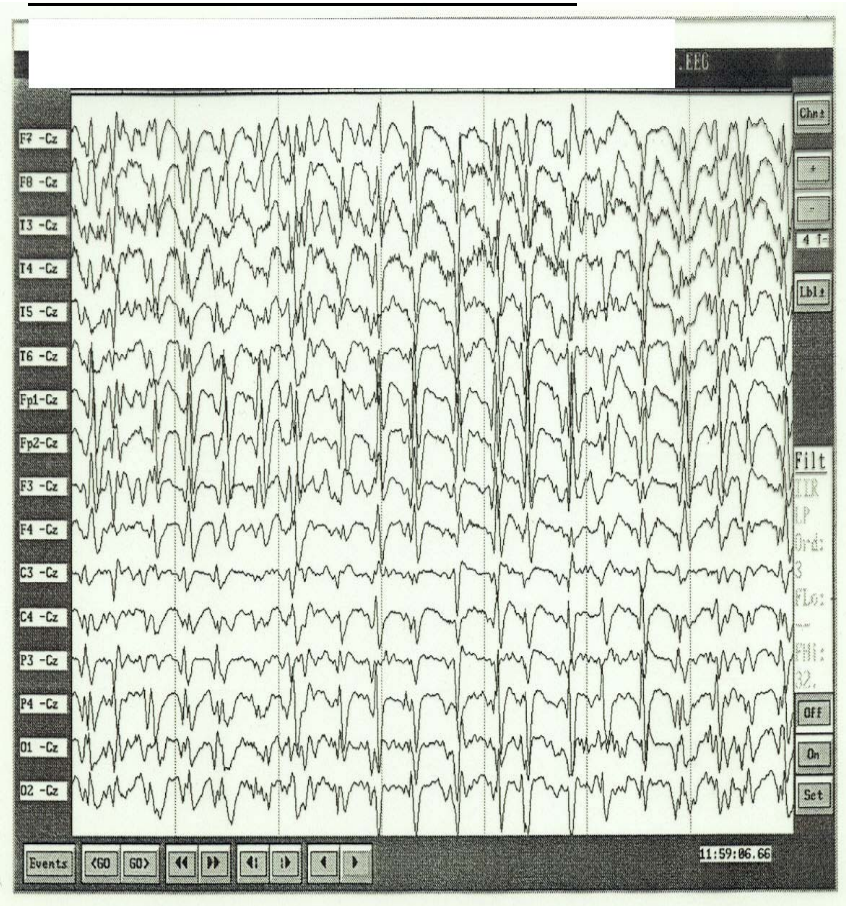




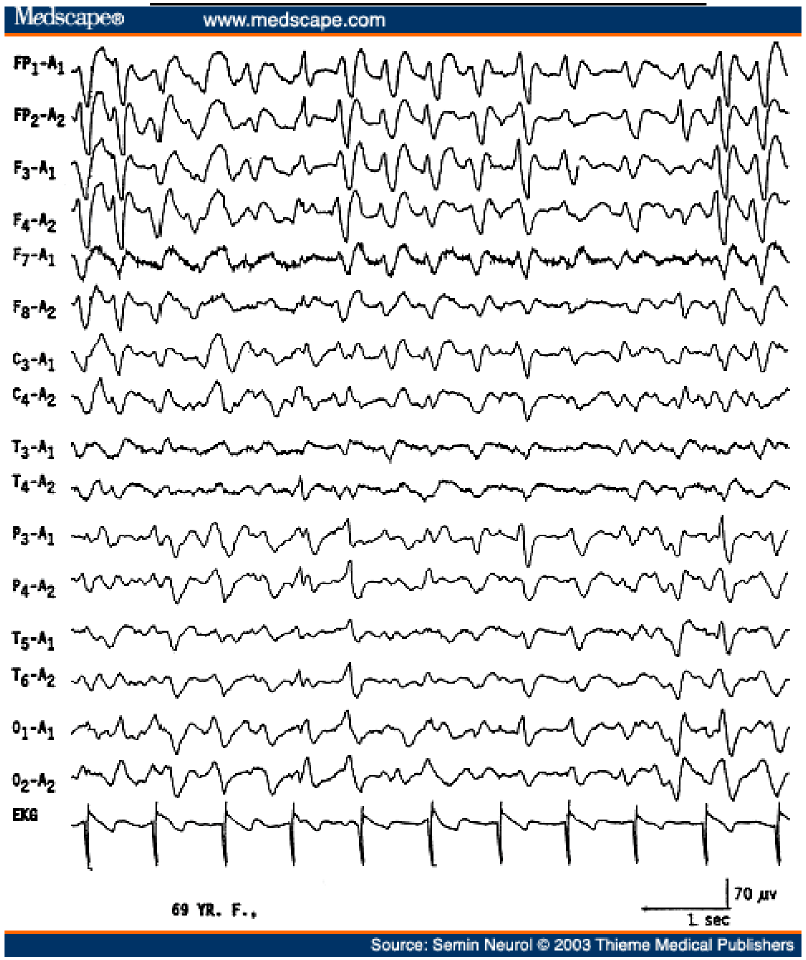
Tudatzavar

EEG & kognitív hanyatlás

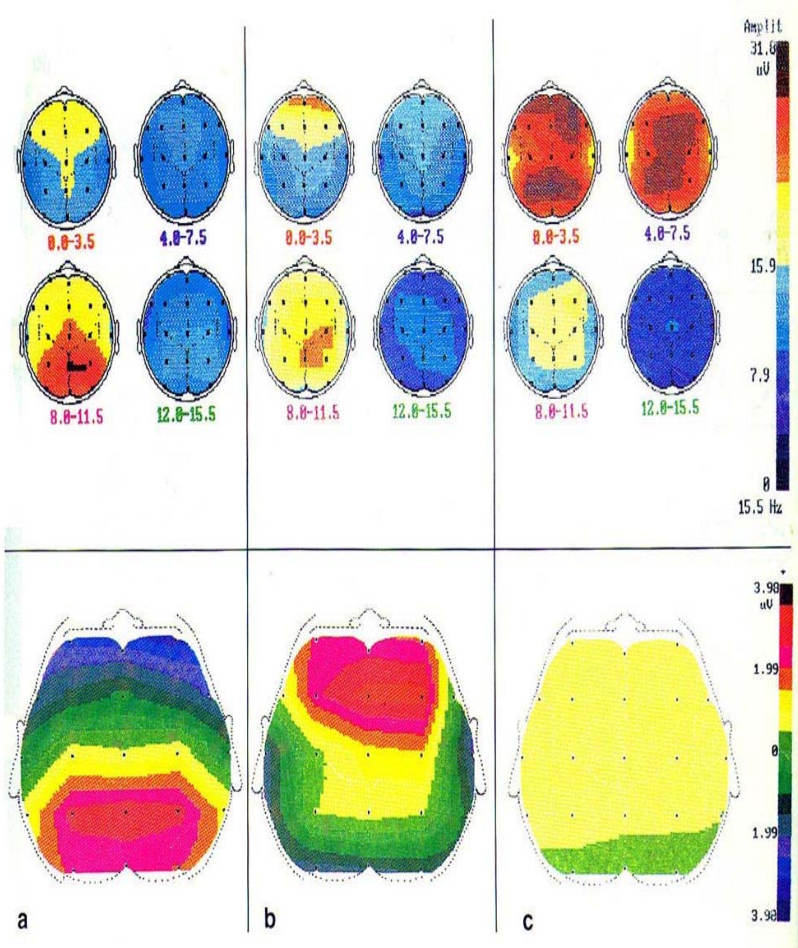
Prion betegség



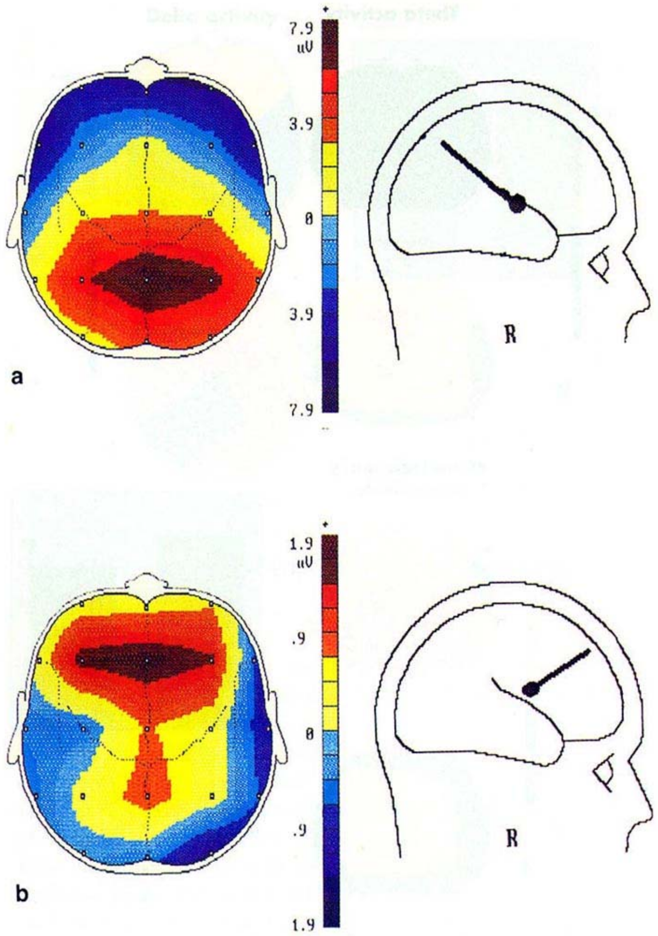
Hepaticus encephalopathia



Alzheimer kór reprodukált vizsgálatok



kontroll mérsékelt súlyos



kontroll

AD

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International Journal of Psychophysiology 65 (2007) 252 – 260
INTERNATIONAL JOURNAL OF PSYCHOPHYSIOLOGY
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Changes of EEG spectra and coherence following performance in a cognitive task in Alzheimer's disease

Zoltán Hidasi [a], Balázs Czigler [b], Pál Salacz [a], Éva Csibri [a], Márk Molnár [b,*]

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[b] Institute of Psychology, Hungarian Academy of Sciences, Budapest, Szondi u. 83-85. Hungary

Received 27 October 2006; received in revised form 2 March 2007; accepted 3 May 2007
Available online 13 May 2007

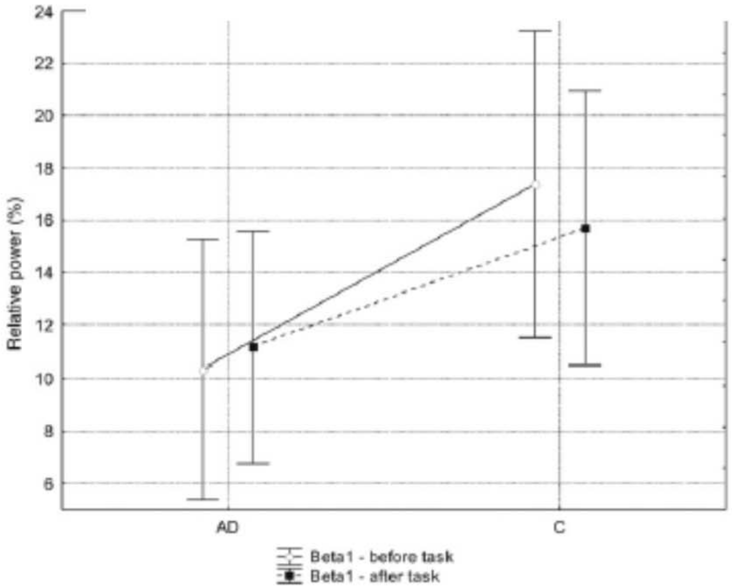

Fig. 2. Changes of the relative beta1 band in the two groups before and after the completion of the reverse counting task. (AD: AD patients, C: controls).

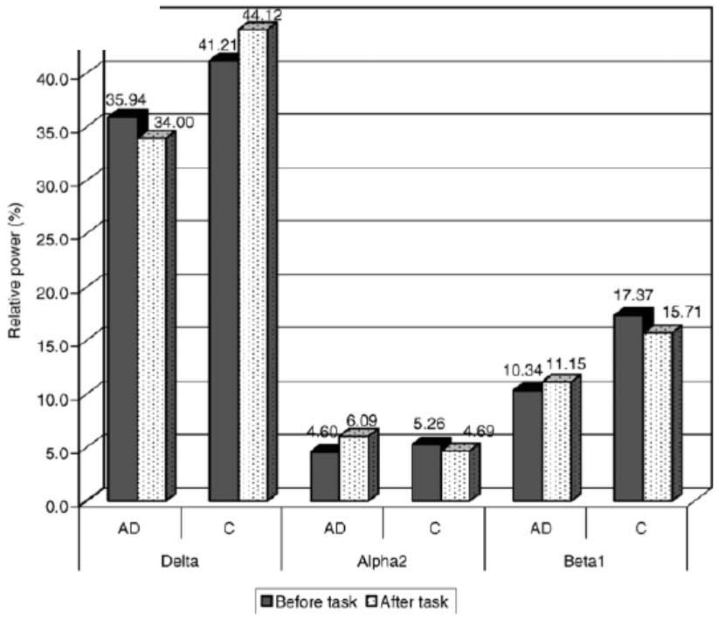

Fig. 3. Changes of the relative frequency spectra of the delta, alpha2, beta1 bands before and after task in AD patients (AD) and in the controls (C).

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International Journal of Psychophysiology 65 (2007) 252–260

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Changes of EEG spectra and coherence following performance in a cognitive task in Alzheimer's disease

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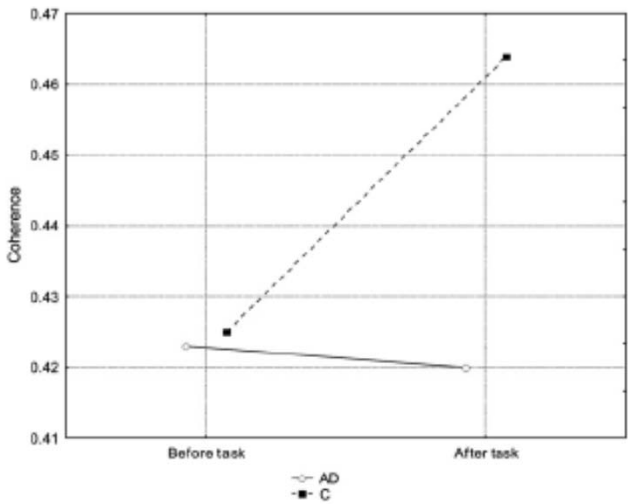


Fig. 4. Changes of the long-range coherence values (shown as averages) in the alpha1 band in the two groups before and after the reverse counting task shown in Table 2. In the Control group (C) the coherence between long-range intrahemispheric electrode-pairs was significantly higher in the "after task period" but it was slightly lower in the AD group (AD).

Quantitative EEG in early Alzheimer's disease patients — Power spectrum and complexity features

Balázs Czigler [a,*], Dóra Csikós [a], Zoltán Hidasi [b], Zsófia Anna Gaál [a], Éva Csibri [b], Éva Kiss [c], Pál Salacz [b], Márk Molnár [a]

B. Czigler et al. / International Journal of Psychophysiology 68 (2008) 75–80

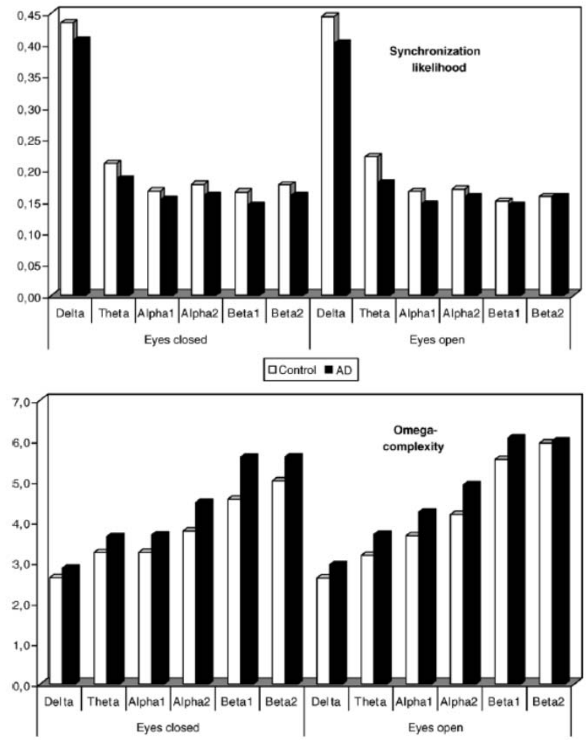
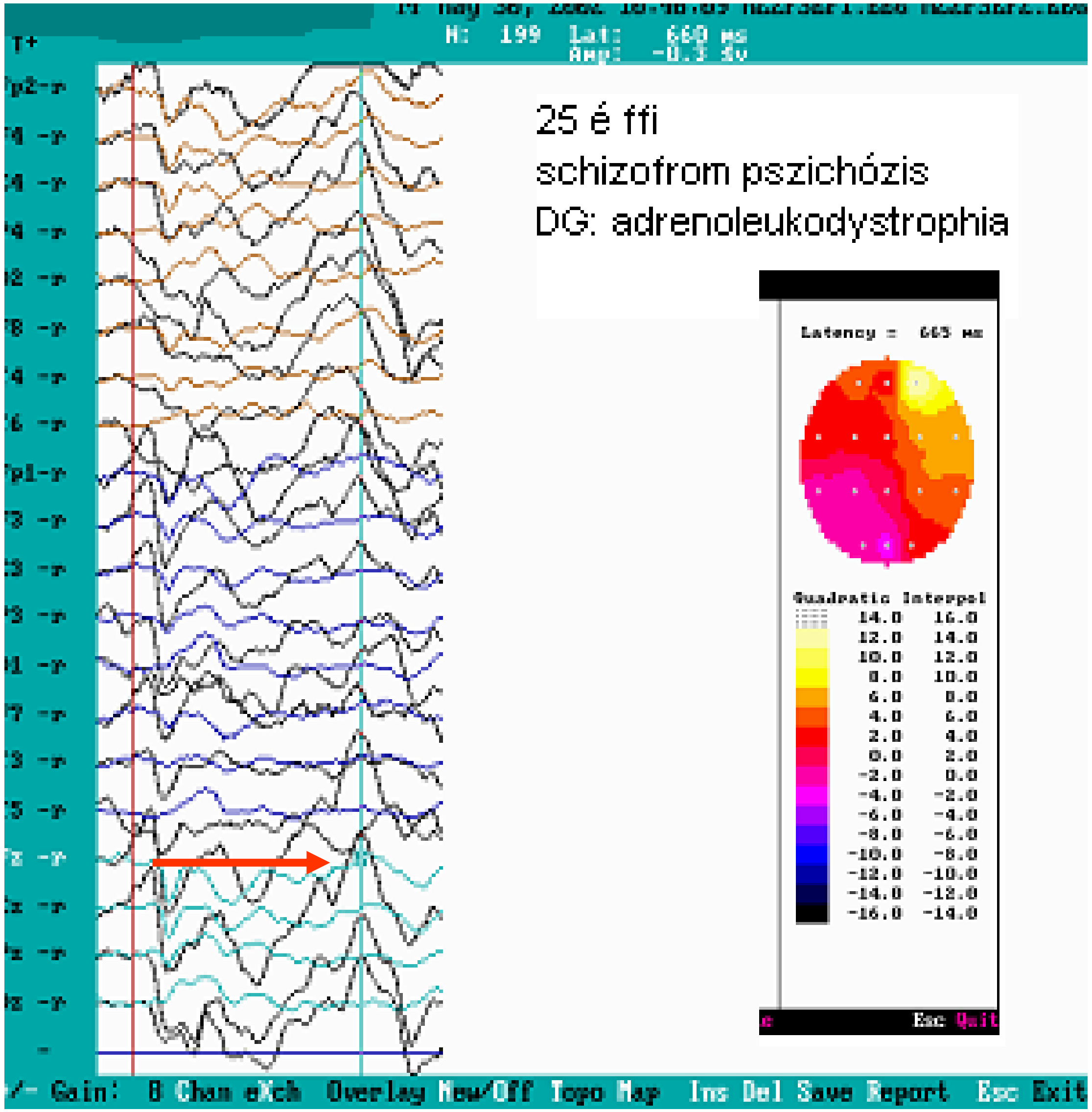
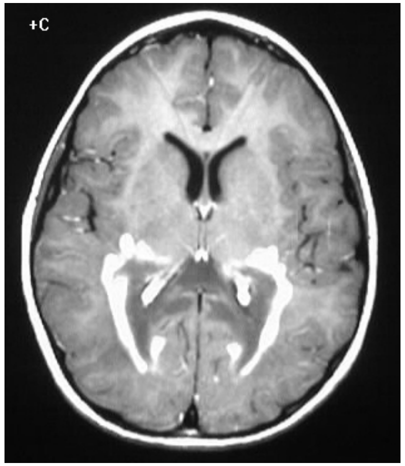


Fig. 2. Synchronization likelihood and Omega-complexity in the two groups in the six frequency bands, in eyes open and eyes closed conditions (averages).

Kiváltott válasz/ERP

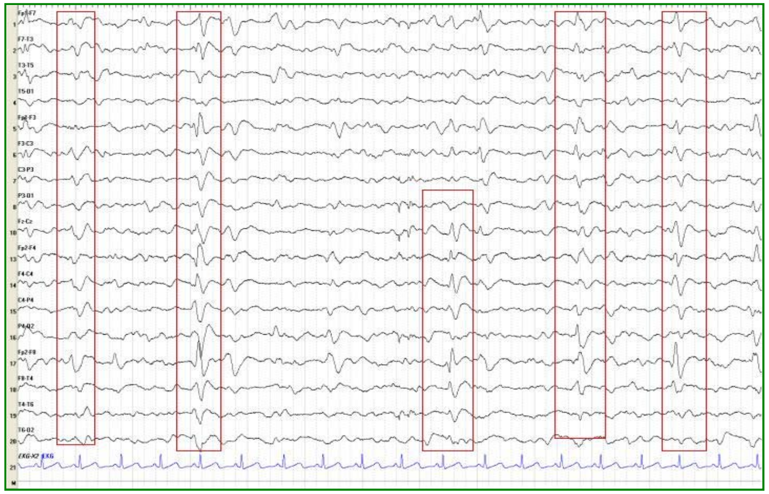


25 é ffi
schizofrom pszichózis
DG: adrenoleukodystrophia



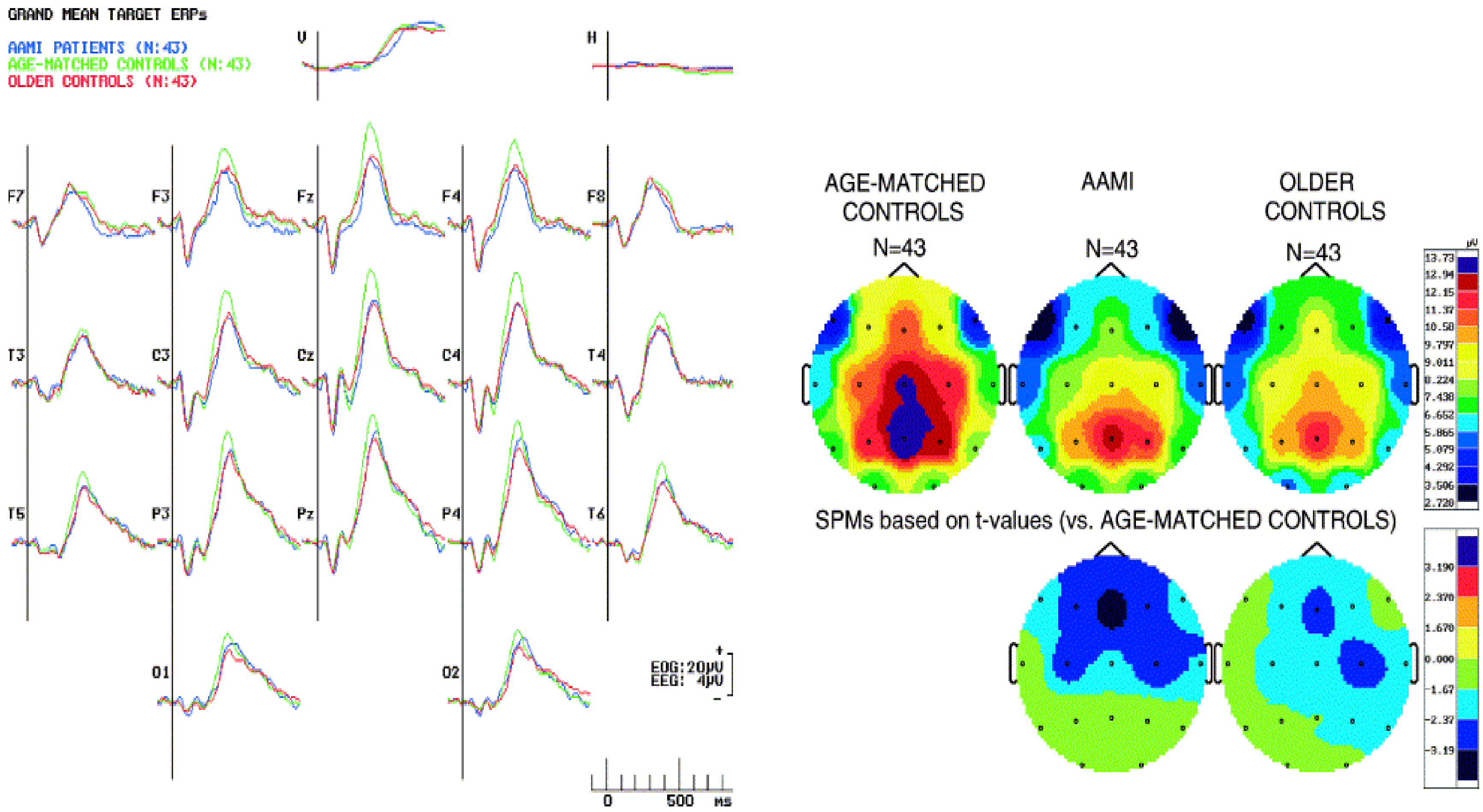
Dementiák

- Trifázisos epileptiform kisülések
  JCD > AD > kontroll
- Temporalis lassú hullámok
  DLBD > AD
- Lassú aktivitás (cholinerg aktivitás)
  DLBD>AD/ApoE4 > AD > FTD
- Huntigton kór:
  low voltage
- Progresszív supranuclearis paresis
  FT > lassulás + FIRDA
- Parkinson kór + dementia
  korai lassú aktivitás
- Vasculáris dementia
  variábilis, gócos, bilaterális lassú epizódok
- TGA : nem epileptiform bilatemporális delta, bioccipitális theta



Neiman, Hanna EEG in Dementia and Encephalopathy Updated: Nov 2009

AAMI



P. Anderer et al. / Neurobiology of Aging 24 (2003) 463–479

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Clinical Neurophysiology 119 (2008) 1534–1545

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Is it possible to automatically distinguish resting EEG data of normal elderly vs. mild cognitive impairment subjects with high degree of accuracy?

Paolo M. Rossini[a,b,c,*], Massimo Buscema[d], Massimiliano Capriotti[d], Enzo Grossi[e], Guido Rodriguez[f], Claudio Del Percio[g], Claudio Babiloni[a,b,h]

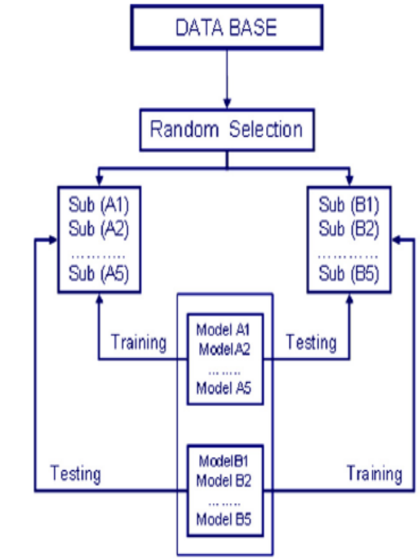


Fig. 2. 5 × 2 validation protocol for the independent identification of the spatial invariants of EEGs. *Legend:* Sub, Subject.

Objective: It has been shown that a new procedure (implicit function as squashing time, IFAST) b (ANNs) is able to compress eyes-closed resting electroencephalographic (EEG) data into spatial inva butions for an automatic classification of mild cognitive impairment (MCI) and Alzheimer's diseas accuracy of individual subjects higher than 92%.

Methods: Here we tested the hypothesis that this is the case also for the classification of individual normal elderly (Nold) vs. MCI subjects, an important issue for the screening of large populations at high risk of AD. Eyes-closed resting EEG data (10–20 electrode montage) were recorded in 171 Nold and in 115 amnesic MCI subjects. The data inputs for the classification by IFAST were the weights of the connections within a nonlinear auto-associative ANN trained to generate the instant voltage distributions of 60-s artifact-free EEG data.

Results: The most relevant features were selected and coincidently the dataset was split into two halves for the final binary classification (training and testing) performed by a supervised ANN. The classification of the individual Nold and MCI subjects reached 95.87% of sensitivity and 91.06% of specificity (93.46% of accuracy).

Conclusions: These results indicate that IFAST can reliably distinguish eyes-closed resting EEG in individual Nold and MCI subjects.

Significance: IFAST may be used for large-scale periodic screening of large populations at risk of AD and personalized care.

ERP / MCI

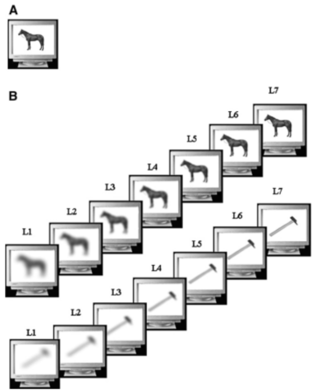


Fig. 1. Schematic illustration of procedure. (A) In the study phase, stimuli were presented in complete version. (B) In the test phase, studied and unstudied stimuli were presented in ascending sequence of seven levels of spatial filtering. L, level.

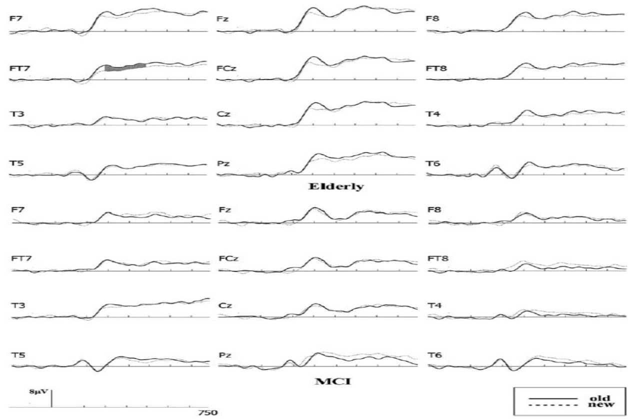


Fig. 3. Grand average scalp distribution of ERP repetition effects in elderly controls and MCI patients. In the former group, the frontal effect in 250–450-ms time window is shaded in grey.

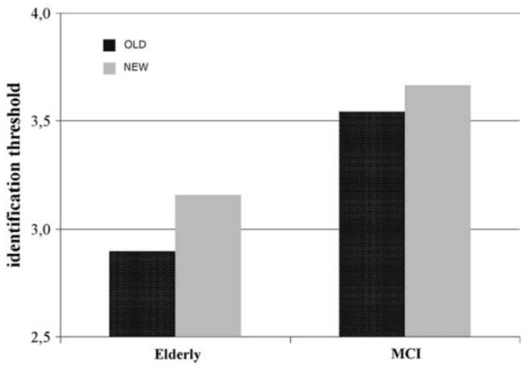


Fig. 2. Identification thresholds (%) indexing behavioral priming effects in MCI patients and elderly controls.

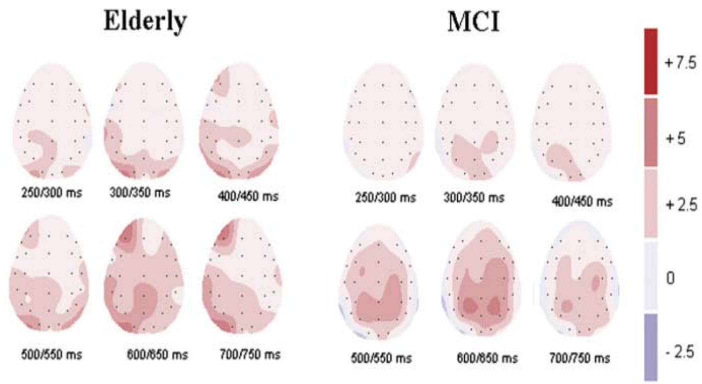


Fig. 4. Differential voltages (microvolts) at level before identification (old minus new stimuli). Strongest color intensity corresponds to maximal amplitude difference (old minus new stimuli).

Gallia et al, Alzheimer's & Dementia 2010

Szkizofrénia

Reprodukált vizsgálatok

Ingerszelekció, percepció, feldolgozás

neuronális hálózatok, kapcsolatok funkcionális intergitása ↓

- P50 („filter")
- N1 (primer kéreg)
- Gamma oszcilláció (>30Hz)
- EP coherencia

Bucci et al,
Clin. EEG and Neuroscience 2007

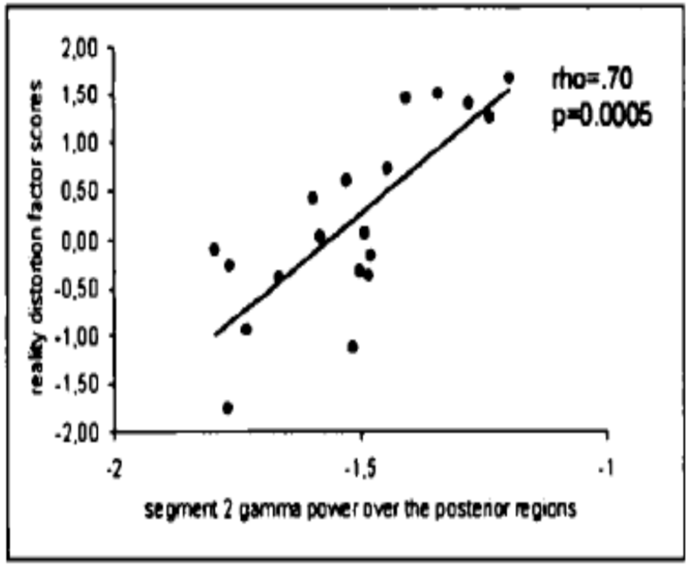


Figure 4.
Correlation analysis between gamma power and psychopathological dimensions. A significant positive correlation was observed between gamma power for target stimuli of segment 2 (from -150 to 150 msec) over the posterior regions and the reality distortion factor scores in the whole group of schizophrenic patients.

P300 amplitudó szkizofréniában

metaanalízis

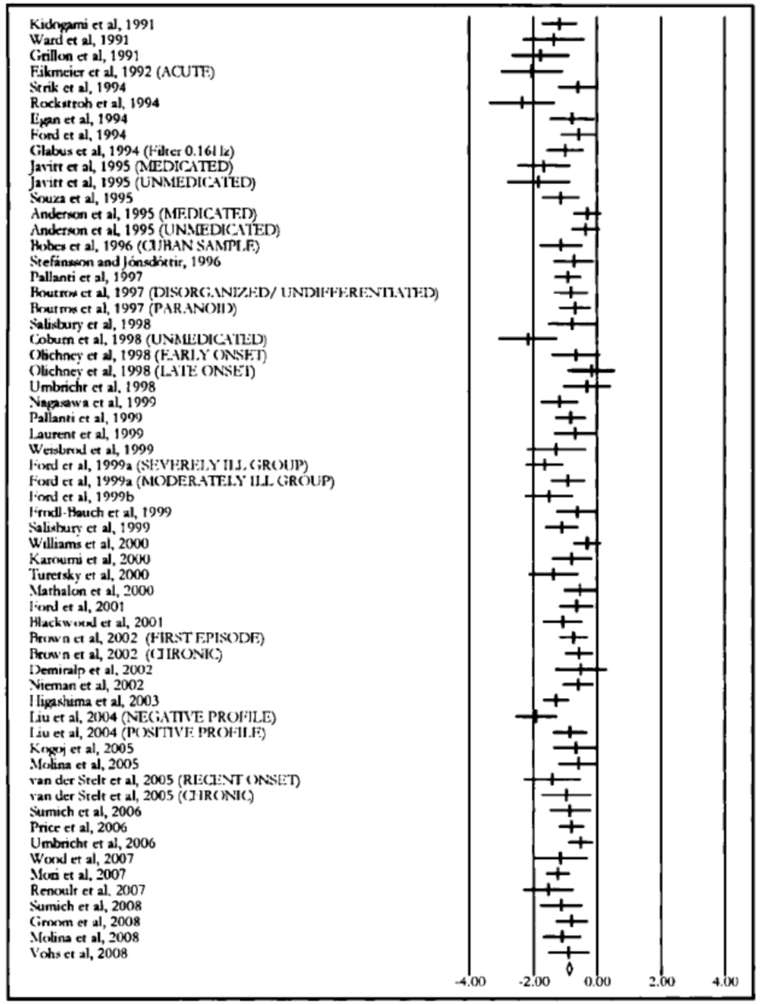
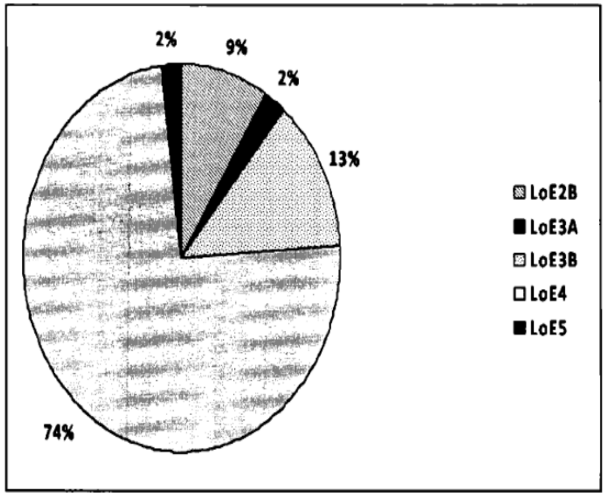


Figure 10.
P300 amplitude: Standardized differences (means: 95% CI) for Patients with Schizophrenia vs Healthy Controls. Values are negative when patients have lower amplitude than controls.

CLINICAL EEG and NEUROSCIENCE ©2009 VOL. 40 NO. 2

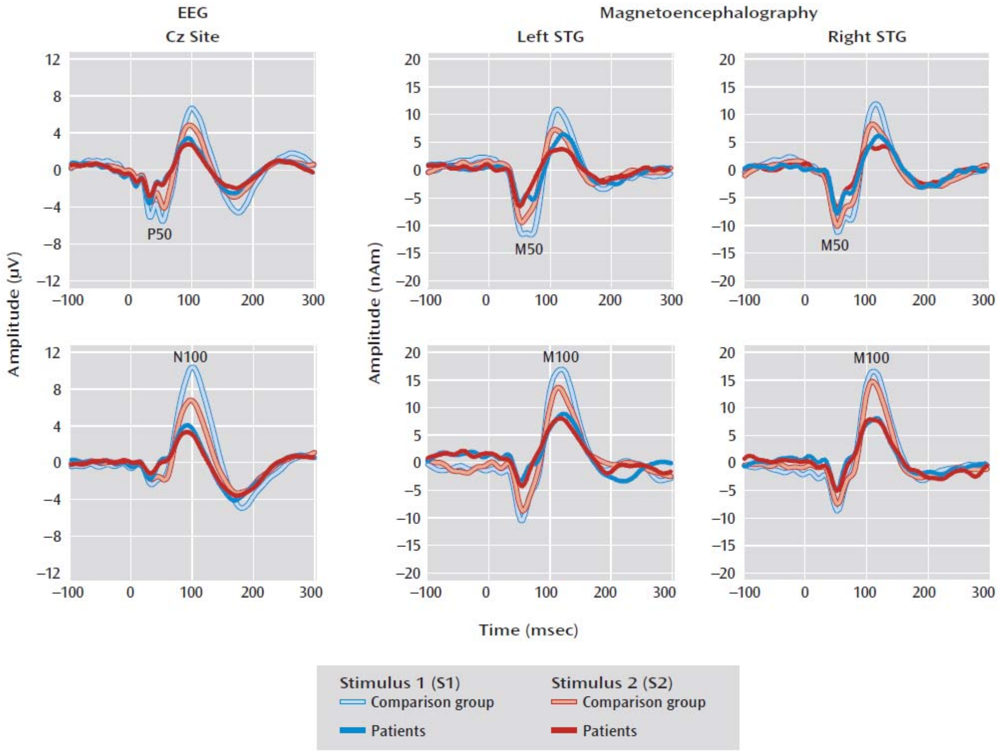
Figure 9.
P300 in Schizophrenia: Classification of papers according to Oxford Centre for Evidence-Based Medicine Levels of Evidence (LoE) (see Table 1).



Galderisi, Mucci,Volpe,Boutros, 2009

P50, P150 & SCH

FIGURE 1. Paired-Click Waveforms at Electrode Cz and at Left and Right Superior Temporal Gyrus (STG) in 73 Comparison Subjects and 79 Patients With Schizophrenia[a]



[a] Numbers of subjects varied slightly because of outliers (see online data supplement and Results section for more information).

Smith et al, Am J Psychiatry 167:10, October 2010

SCH: nerve growth factor/NGF és P300 → pozitív korreláció

serum NGF (p=0.001), P300 ampl Fz (p=0.003)

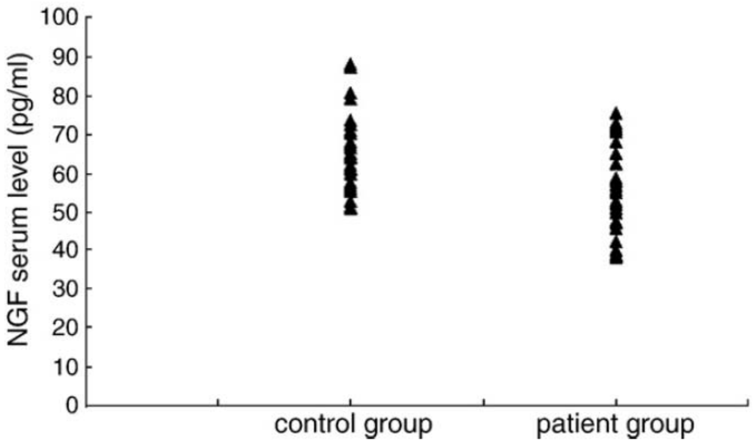


Fig. 1. Serum NGF levels in control subjects ($n=28$) and first episode schizophrenic patients($n=30$). Patient group vs. control group ($P<0.001$).

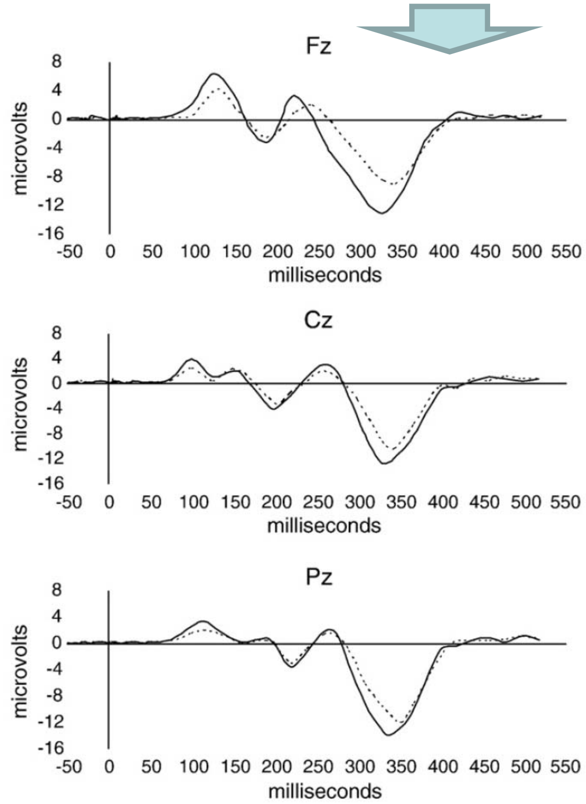


Fig. 2. ERPs to auditory targets from healthy control subjects(solid line) and schizophrenic patients dash line recorded from Fz, Cz and Pz. Time in milliseconds is on the *x*-axis, and voltage in microvolts is on the *y*-axis.

Xiong et al, Schizophrenia Research 119 (2010) 34–39

Alfa – gamma oszcilláció & sch
EEG+fMRI

Szenzoros
információfeldolgozás zavara

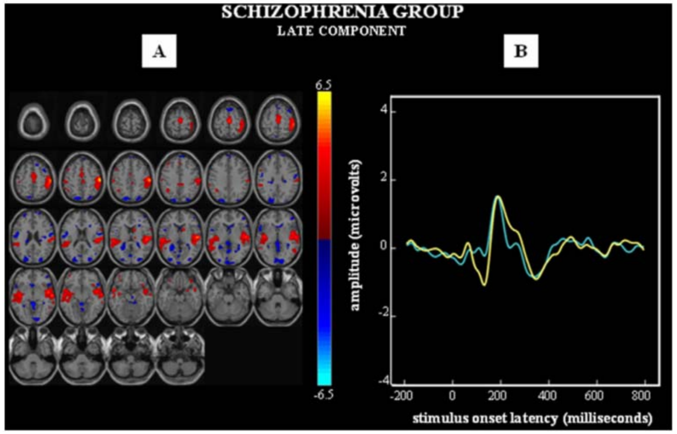


Fig. 6. ICA decomposition of ERP and fMRI joint showing the 'late' somatosensory component in the schizophrenia group. (A) Spatial representation of component loadings overlaid on a standard T1-weighted MR-image with positive loadings in red and negative loadings in blue on a *Z*-score scale. Images are displayed according to the radiological convention. (B) Temporal response of this network (cyan) overlaid on the grand average schizophrenia group ERP (yellow).

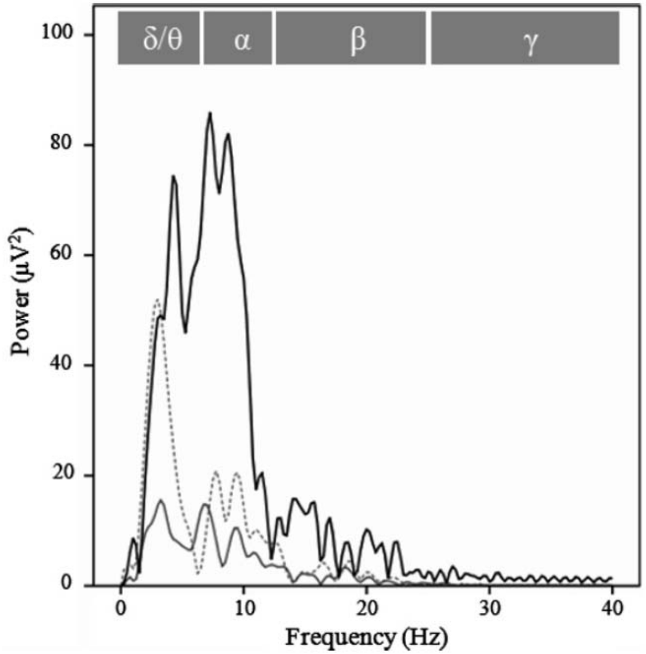


Fig. 7. Fast fourier transform of component time course from 0–500 ms poststimulus showing maximal power in alpha in the healthy group joint ERP/fMRI component (black) and reduced alpha power in both the early (grey) and late (grey dashed) schizophrenia group components.

White et al. / Clinical Neurophysiology 121 (2010)

Alfa – gamma oszcilláció & sch
EEG+fMRI

Szenzoros
információfeldolgozás zavara

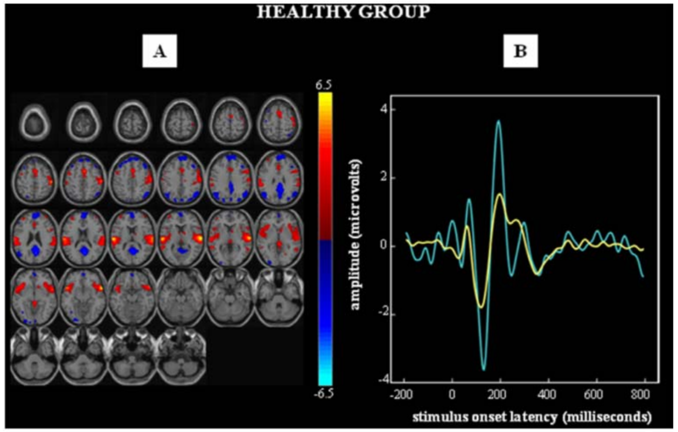


Fig. 4. ICA decomposition of ERP and fMRI joint data for somatosensory stimuli in the healthy group. (A) Spatial representation of component loadings overlaid on a standard T1-weighted MR-image with positive loadings in red and negative loadings in blue on a Z-score scale. Images displayed according to radiological convention. (B) Temporal response of this network (cyan) overlaid on the grand average healthy ERP at Cz (yellow).

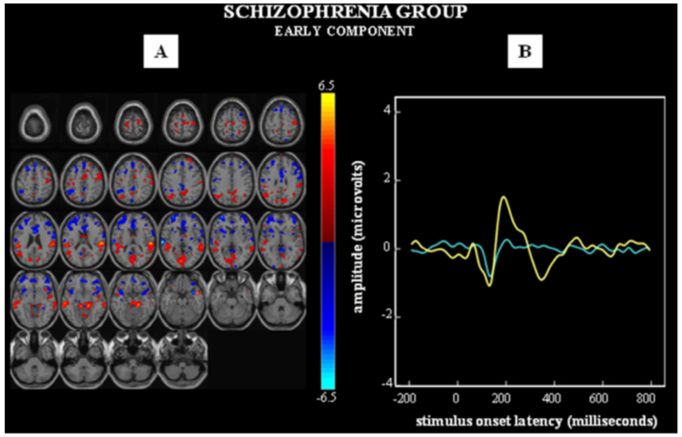
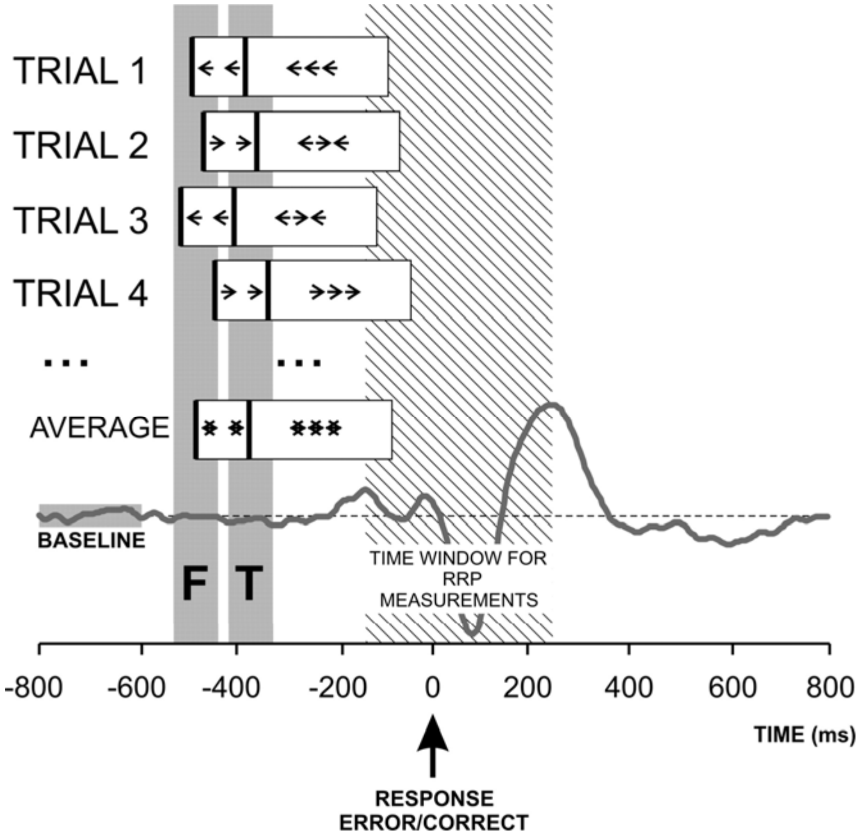
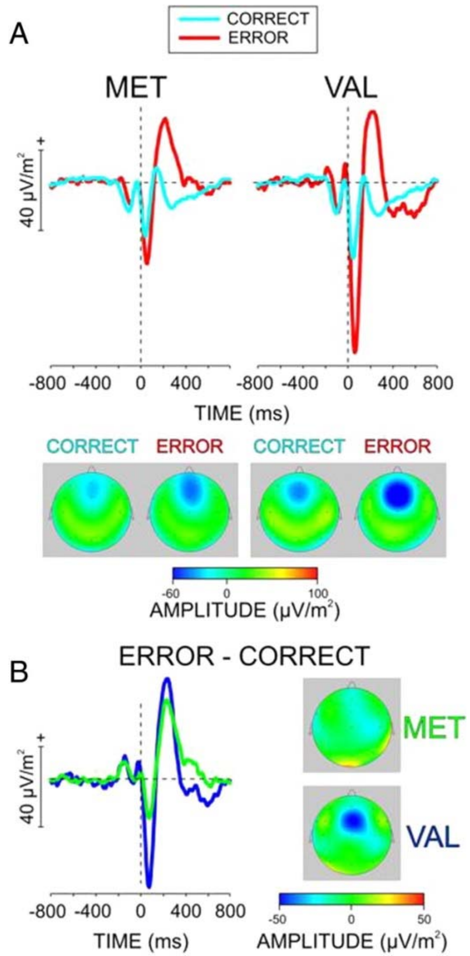


Fig. 5. ICA decomposition of ERP and fMRI joint data showing the 'early' somatosensory component in the schizophrenia group. (A) Spatial representation of component loadings overlaid on a standard T1-weighted MR-image with positive loadings in red and negative loadings in blue on a Z-score scale. Images displayed according to the radiological convention. (B) Temporal response of this network (cyan) overlaid on the grand average schizophrenia group ERP (yellow).

White et al. / Clinical Neurophysiology 121 (2010)

Brain-derived neurotrophic factor/BDNF & Val66Met polymorphismus → neuronális szinkronizáció moduláció





Beste et al, JNEUROSCI.2010

ERP, biomarker & szkizotípia

Korai szenzoros eltérés

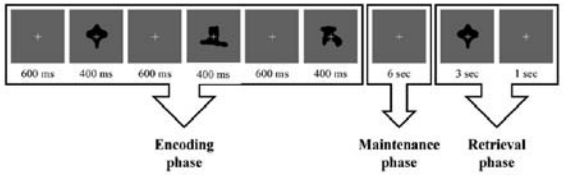


Fig. 1. Delayed discrimination working memory task. During encoding one, two or three images were presented for 400 ms each separated by an interstimulus interval of 600 ms. A delay period of 6 s ensued (maintenance phase). A target image then appeared and remained on the screen for 3 s and the participants were required to indicate by pressing a button whether it was shown during the encoding phase or not (retrieval phase). An interstimulus interval of 1 s separated the trials.

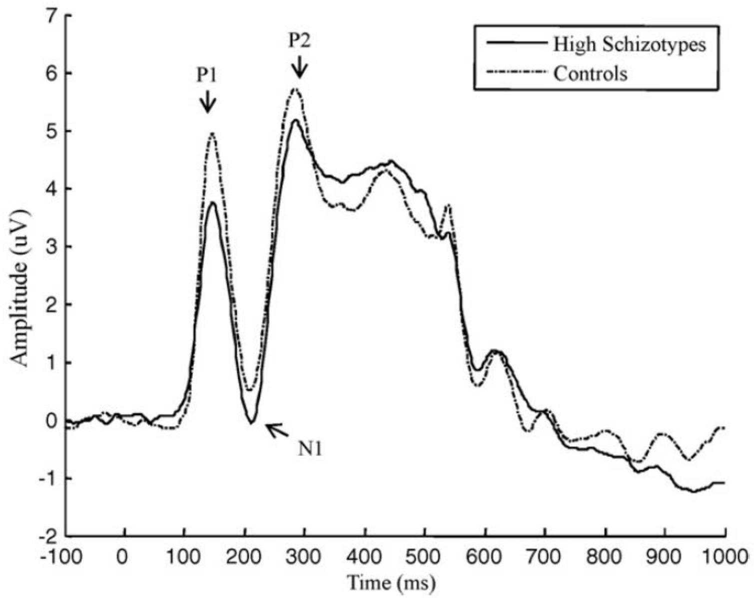


Fig. 3. Grand averaged waveforms for the encoding conditions in high schizotypes (black solid line) and control groups (black lines and dots). Plot is the average for electrodes PO7, PO8, PO3, PO4, O1 and O2. Amplitude in microvolts on the vertical axis and time in milliseconds on the horizontal axis.

Koychev et al, Neuropsychologia 48 (2010)

ERP, biomarker & szkizotípia

I. Koychev et al. / Neuropsychologia 48 (2010) 2205–2214 2209

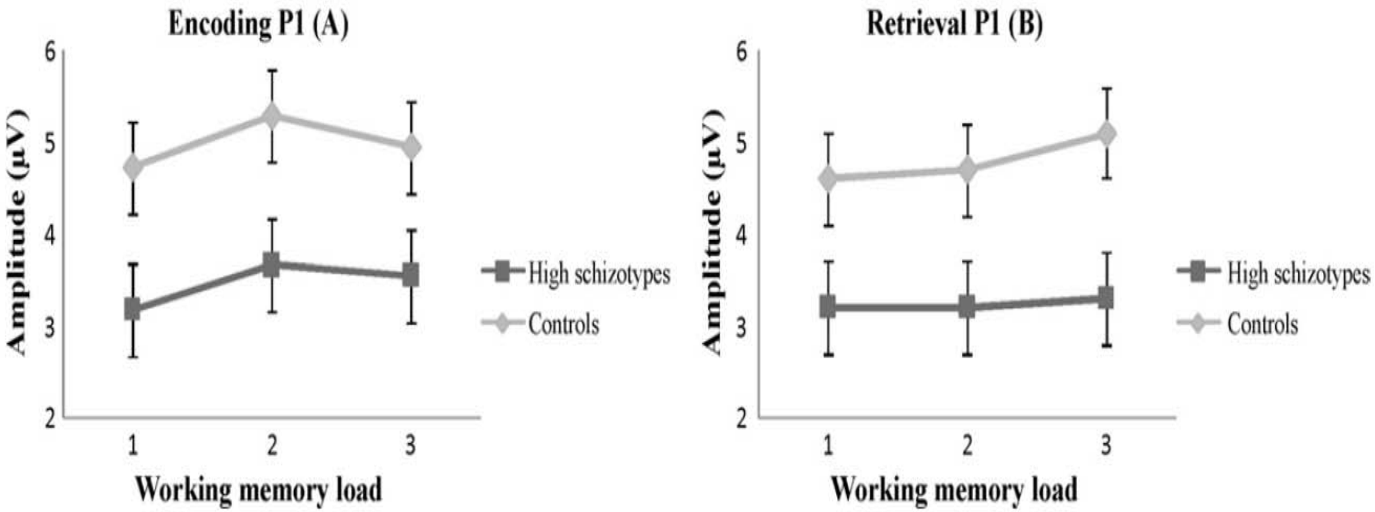


Fig. 4. Amplitude of the P1 in response to the encoding (A) and retrieval (B) stimuli for high schizotypes (light grey) and controls (dark grey). Amplitude in microvolts on the vertical scales and working memory load on the horizontal scales.

Koychev et al, Neuropsychologia 48 (2010)

Gamma coherencia & bipoláris zavar

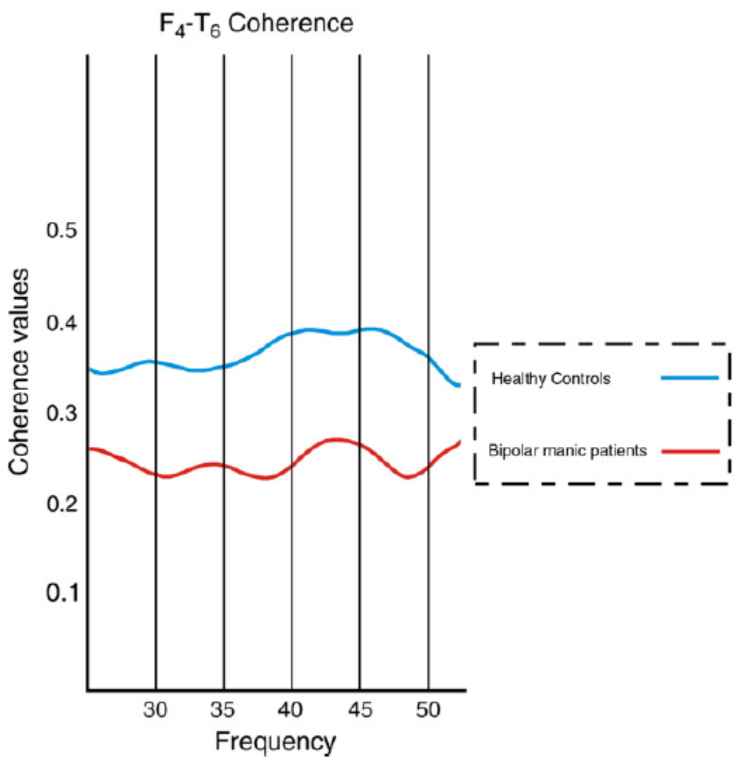
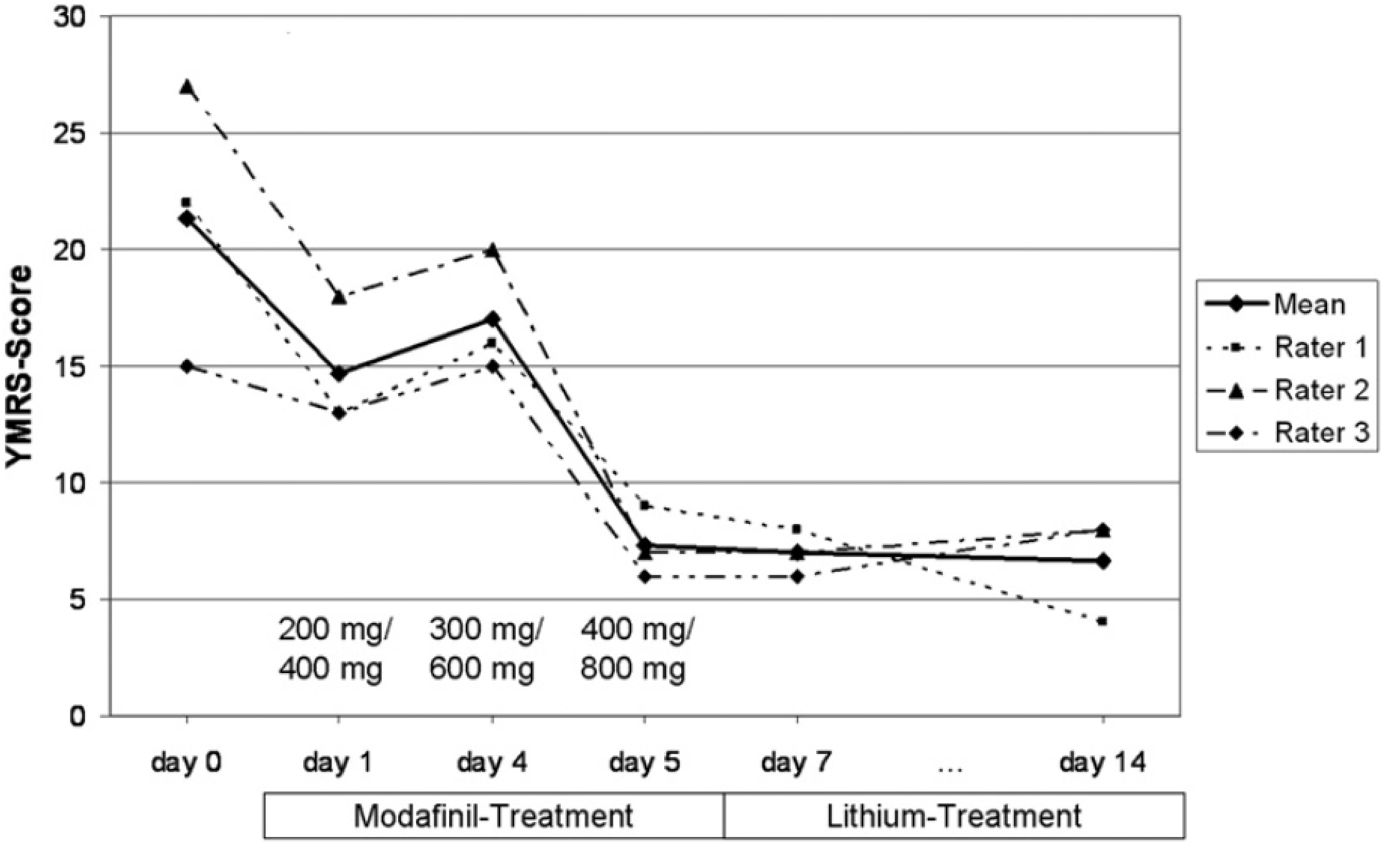


Fig. 1. The grand average of post-stimulus coherence function between F4 and T6 locations in the patients before medication (red line) in comparison to the controls (blue line). The frequency window is 28–48 Hz. At baseline, patients presented 35.41% lower coherence function compared to healthy controls.

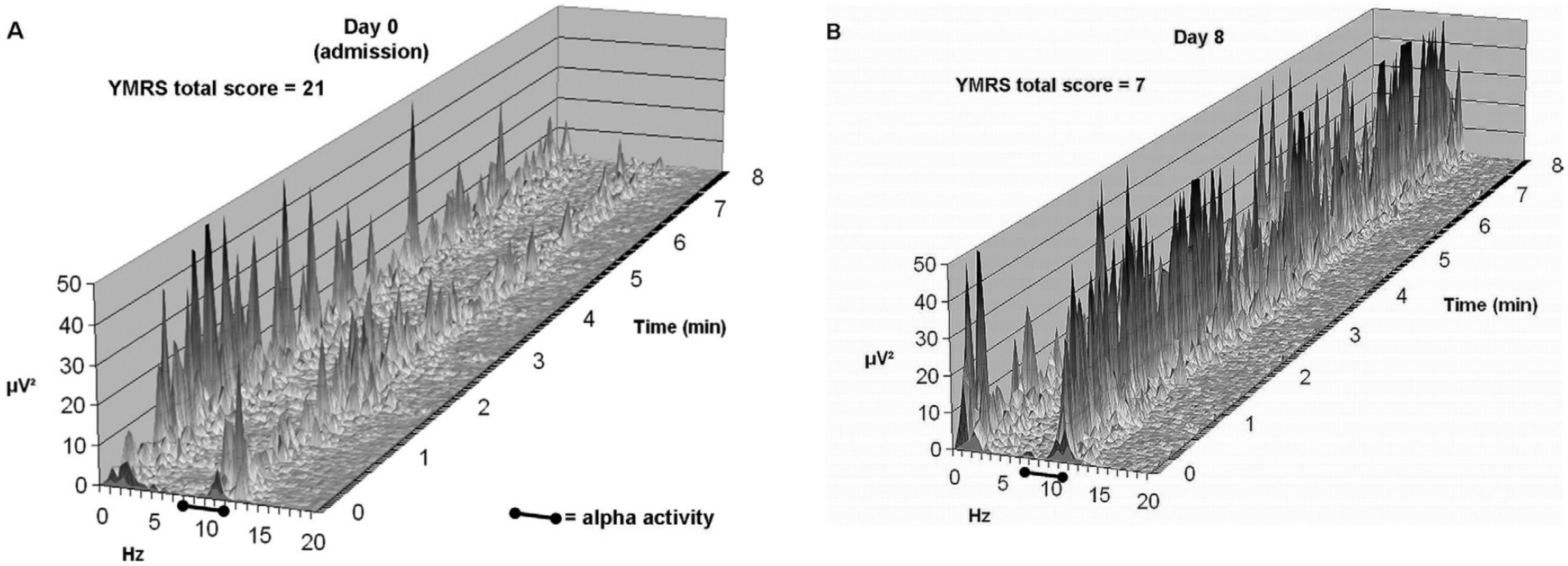
A. Özerdem et al. / Progress in Neuro-Psychopharmacology & Biological Psychiatry 34 (2010) 861–865

Terápia hatása
Akut mánia



Schoenknecht et al BIOL PSYCHIATRY 2010

Terápia hatása
Akut mánia



Schoenknecht et al BIOL PSYCHIATRY 2010

Csibri Éva SEPPK

ELSEVIER

Clinical Neurophysiology 119 (2008) 1578–1589

www.elsevier.com/locate/clinph

Neurophysiological evidence of cognitive inhibition anomalies in persons with major depressive disorder

Heather E. McNeely[a,b,*], Mark A. Lau[a,b,*], Bruce K. Christensen[a,b], Claude Alain[c,d]

[a] Centre for Addiction and Mental Health, 250 College Street, Toronto, Ontario, Canada, M5T 1R8
[b] Department of Psychiatry, University of Toronto, Toronto, Ontario, Canada, M5T 1R8
[c] Rotman Research Institute, 3560 Bathurst Street, Toronto, Ontario, Canada, M6A 2E1
[d] Department of Psychology, University of Toronto, Toronto, Ontario, Canada, M5T 1R8

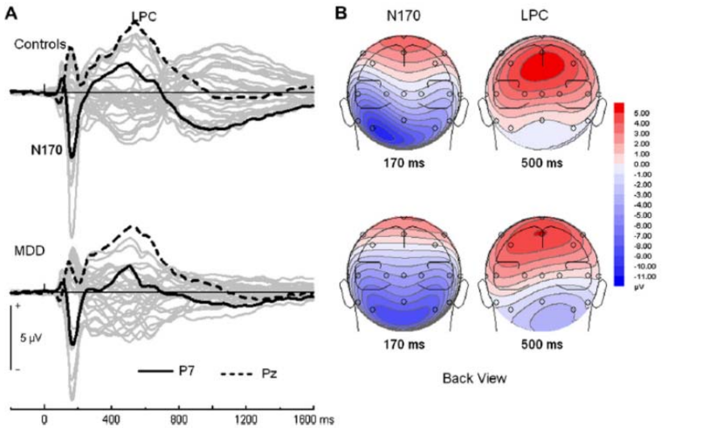


Fig. 1. (A) Butterfly plots showing the group mean ERPs averaged over stimulus type in controls and patients with MDD. Each gray line represents the evoked response recorded at a particular electrode. The ERPs recorded over the left parietal (P7) and midline parietal site (Pz) are shown in black. (B) Isocontour maps showing the topographic distribution (view from the back) of the N170 and late positive complex (LPC).

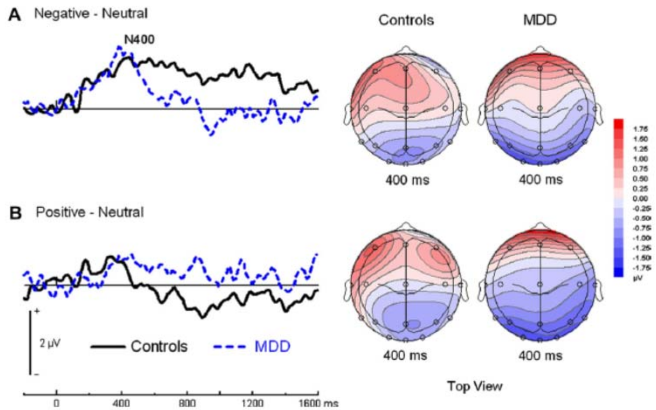


Fig. 5. (A) Difference wave between ERPs elicited by either negative (top) or positive (bottom) words and those evoked by neutral words in both groups. The traces reflect activity recorded over the left lateral frontal cortex (i.e., F7). Note that the polarity of the ERPs is inverted relative to those recorded over the midline frontal and central scalp areas. (B) Isocontour maps showing the amplitude distribution at 400 ms after sound onset (bird's eye view).

H.E. McNeely et al. / Clinical Neurophysiology 119. 2008

Terápiás hatás előjelzése

Clinical EEG and Neuroscience; Apr 2007; 38, 2; ProQuest Medical Library
pg. 74

CLINICAL EEG and NEUROSCIENCE

Prediction of Clinical Response to Antidepressants in Patients With Depression: Neurophysiology in Clinical Practice

Oliver Pogarell, Georg Juckel, Christine Norra, Gregor Leicht, Susanne Karch, Nadine Schaaff, Malte Folkerts, Ahmad Ibrahim, Christoph Mulert and Ulrich Hegerl

Key Words
Antidepressants
Clinical Response Prediction
Evoked Potentials
Loudness Dependence
Noradrenergic System
Serotonergic System

ABSTRACT

Brain monoaminergic neurotransmission is involved in the pathophysiology of various psychiatric disorders including depression. Reliable indicators of central monoaminergic activity might be helpful to specifically identify and differentiate dysfunctions in individual patients in order to selectively adjust medication and predict clinical response.

In patients with depression, predictors of treatment response to serotonergic versus non-serotonergic (e.g., noradrenergic) antidepressants could be of considerable clinical relevance by avoiding unfavorable factors such as a prolonged duration of the disorder, risk of suicidality and therapy-resistance. Consequently, these tools might help to decrease direct and indirect costs of treatment.

The loudness dependence of the N1/P2 component of auditory evoked potentials (LD) has been proposed as a noninvasive neurophysiological indicator of central serotonergic function. This review focuses on recent studies providing evidence for the validity of LD as an indirect serotonergic marker and highlights data on the clinical application in terms of prediction of treatment response in patients with depression.

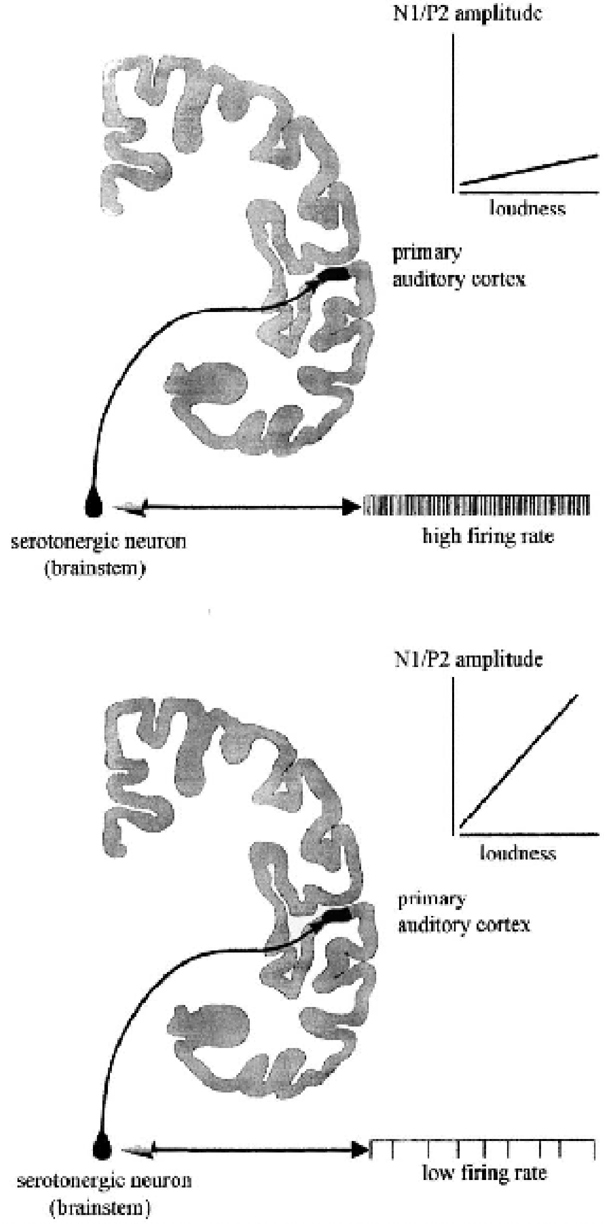


Fig. 1. A strong serotonergic neurotransmission, for example because of a high firing rate of serotonergic neurons, entails a weak loudness dependence of the evoked response from the primary auditory cortex and vice versa.

LDAEP

(loudness **d**ependence of the **a**uditory **e**voked **p**otential)

hangosság függő AEP

↓

serotonerg rendszer

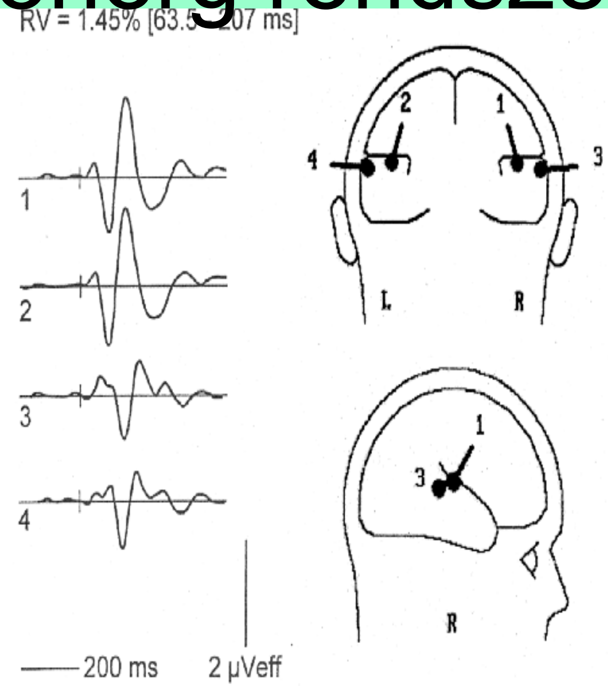


Fig. 2. Brain Electric Source Analysis of grand mean auditory evoked potentials from 32 healthy subjects. With 2 equivalent dipoles per hemisphere more than 98% of the variance of the scalp potentials (32 channels) in the time range of the N1/P2-component can be explained. Most of the variance (about 80%) is explained by the tangential dipoles (1 and 2) which are supposed to reflect mainly activity of primary auditory cortex in the superior temporal plane. The N1/P2 dipole activity of the radial dipoles (3 and 4), reflecting activity of secondary auditory areas, occurs about 40 ms later than that of the tangential dipoles (1 and 2).

U . Hegerl et al . / Journal of Affective Disorders 62 (2001) 93– 100

Terápiás válasz előjelzése reprodukált vizsgálatok

LDAEP

- Erőteljes LDAEP (N1/P2)

  ↓ $p = 0.011$

  SSRI responder major depresszióban

  1. Tien-Wen Lee et al, Rev Psychiatr Neurosc 2005
  2. Nathan PJ Human psychopharmacology. 2006
  3. Pogarell Clin EEG and Neuroscience 2007

- Dopaminerg agonista, noradrenerg AD nem befolyásolja

  1. O'Neill et al. Psychopharmacology 2006
  2. Pogarell Clin EEG and Neuroscience 2007

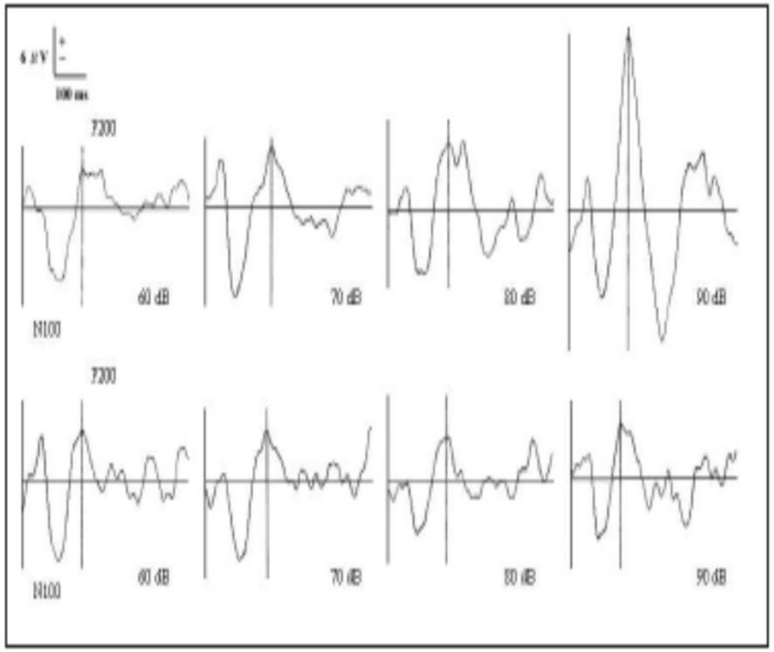


Fig. 1: Grand average waveforms of mean auditory evoked potentials per intensity for groups with strong (top) and weak (bottom) loudness dependence.

LDAEP & serotonerg funkció

Y.-M. Park et al. / Progress in Neuro-Psychopharmacology & Biological Psychiatry 34 (2010) 313–316 315

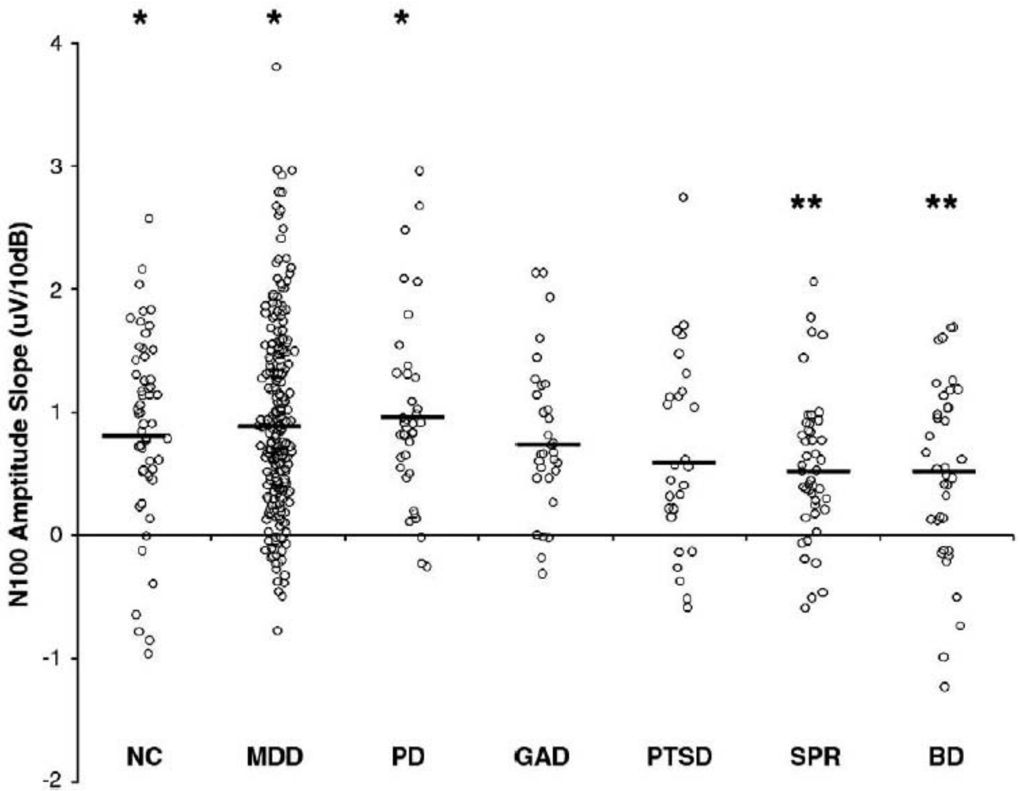


Fig. 1. Comparison of N100 amplitude slope among psychiatric disorders. * Statistically significant difference compared to **. NC, normal control; MDD, major depressive disorder; PD, panic disorder; GAD, generalized anxiety disorder; PTSD, post-traumatic stress disorder; SPR, schizophrenia; BD, bipolar disorder.

Y.-M. Park et al. / Progress in Neuro-Psychopharmacology & Biological Psychiatry 2010

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Use of Clinical Neurophysiology for the Selection of Medication in the Treatment of Major Depressive Disorder: the State of the Evidence

Andrew F. Leuchter, Ian A. Cook, Aimee Hunter and Alex Korb

- LDAEP
- LORETA
- QEEG

Potenciális biomarker

Epileptiform kisülések pszichiátriai betegeknél

CLINICAL EEG and NEUROSCIENCE

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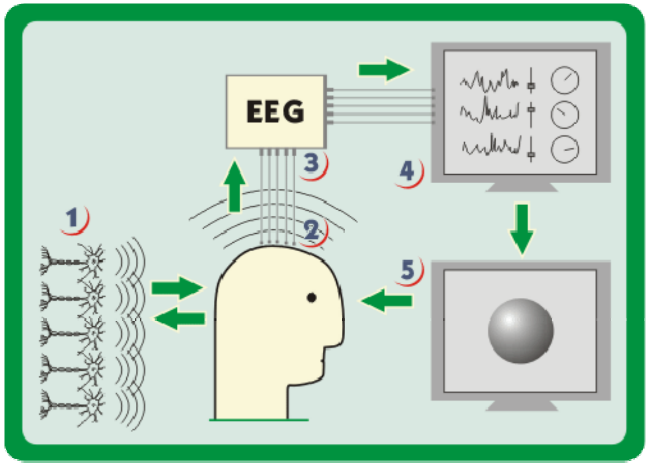
Epileptiform Discharges in Psychiatric Patients: a Controversy in Need of Resurrection

Nash Boutros

- epilepszia spektrum
- autizmus spektrum
- ADHD
- Tourette szindróma

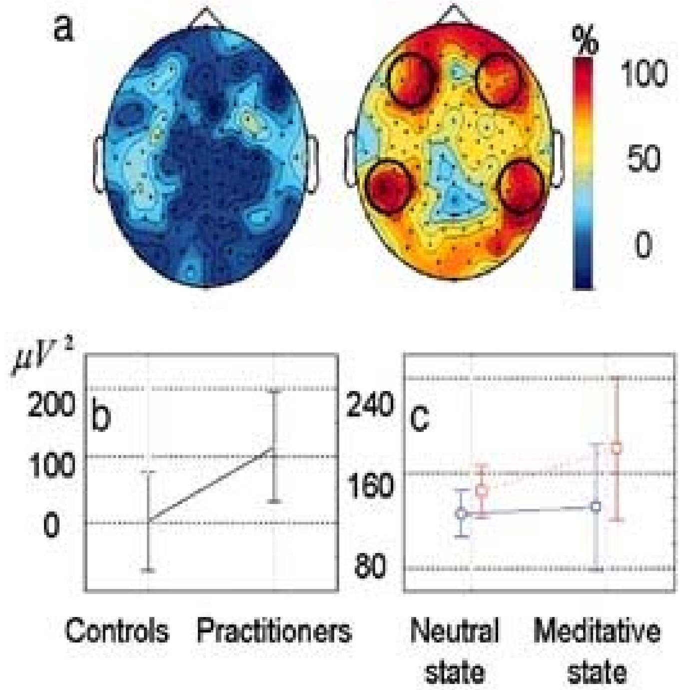
- Terápiás konzekvencia?

Pszichoterápia ↔ EEG



Biofeedback

- Szorongásos zavarok
- Pszichoszomatikus zavarok
- Fájdalom szindrómák
- ADHD
- Epilepszia



gamma szinkronitás

Efficacy of Neurofeedback Treatment in ADHD: the Effects on Inattention, Impulsivity and Hyperactivity: a Meta-Analysis

Martijn Arns, Sabine de Ridder, Ute Strehl, Marinus Breteler and Anton Coenen

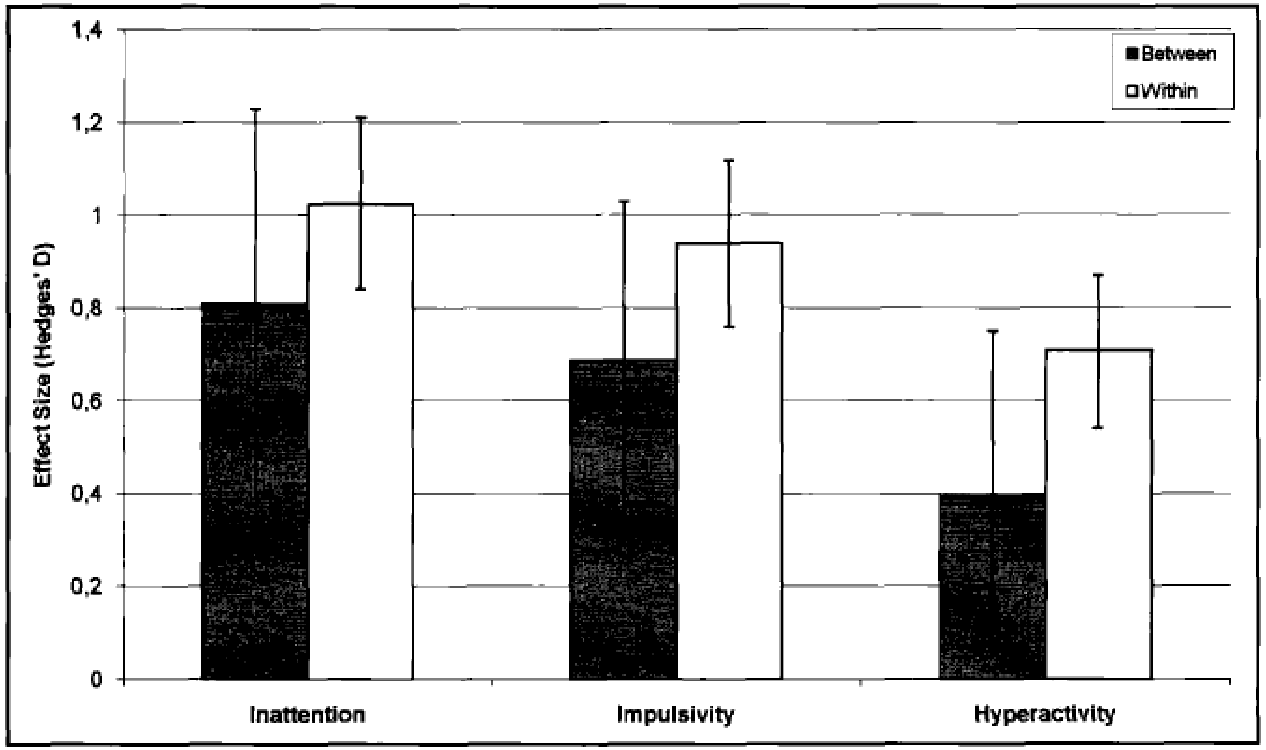


Figure 3.
This figure shows the grand mean ES for the controlled studies compared to the within-subject effect sizes for all studies for all 3 core symptoms. Note that the ES for the controlled studies are slightly smaller, which could be due to the fact that many controlled studies used a "semi-active" control group. Furthermore, given the 95% confidence intervals the ES for inattention, hyperactivity and impulsivity are significant for both comparisons.

Prefrontalis aktiváció & alkohol abuzus

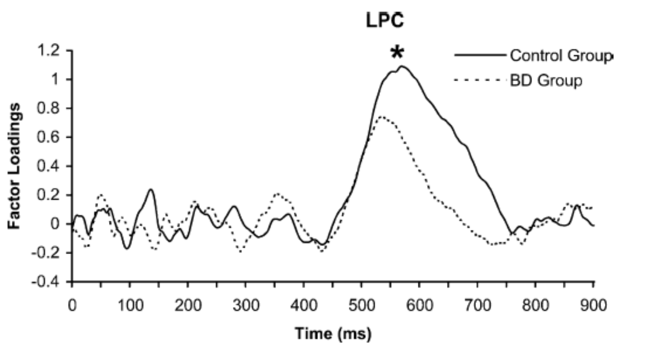


Fig. 6. Factor loadings of the LPC from the control group (solid line) and the BD group (dashed line) in response to the matching stimuli.

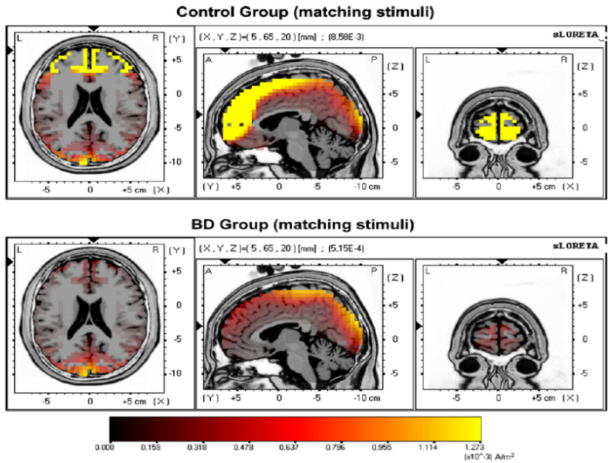


Fig. 7. Grand averages LPC eLORETA images showing exact current density maxima of binge drinkers ($n = 42$) and controls ($n = 53$) for the matching stimuli. Each map consists
…, posterior. (For interpretation of the

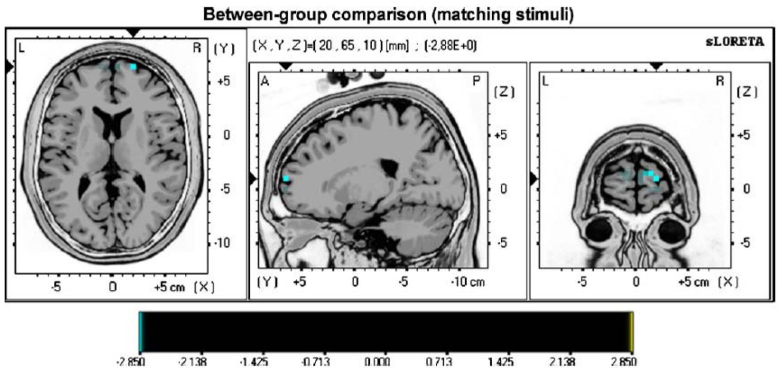
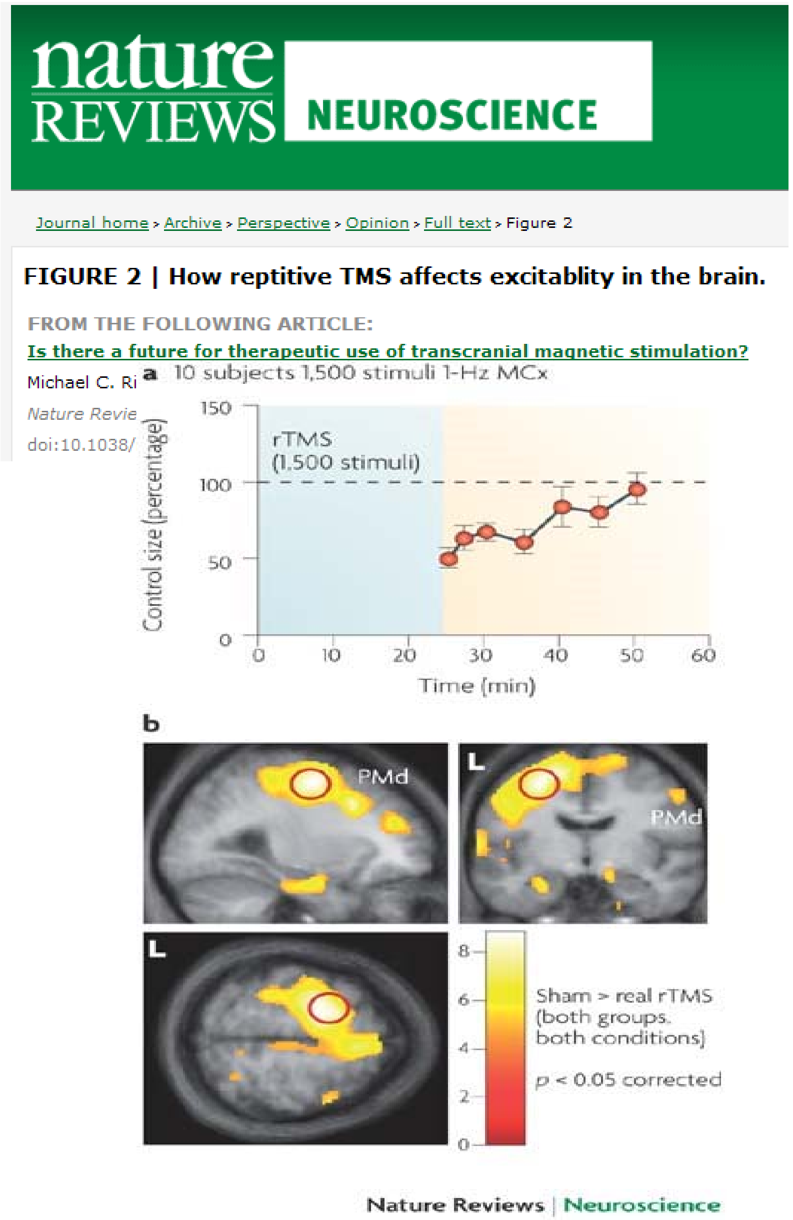
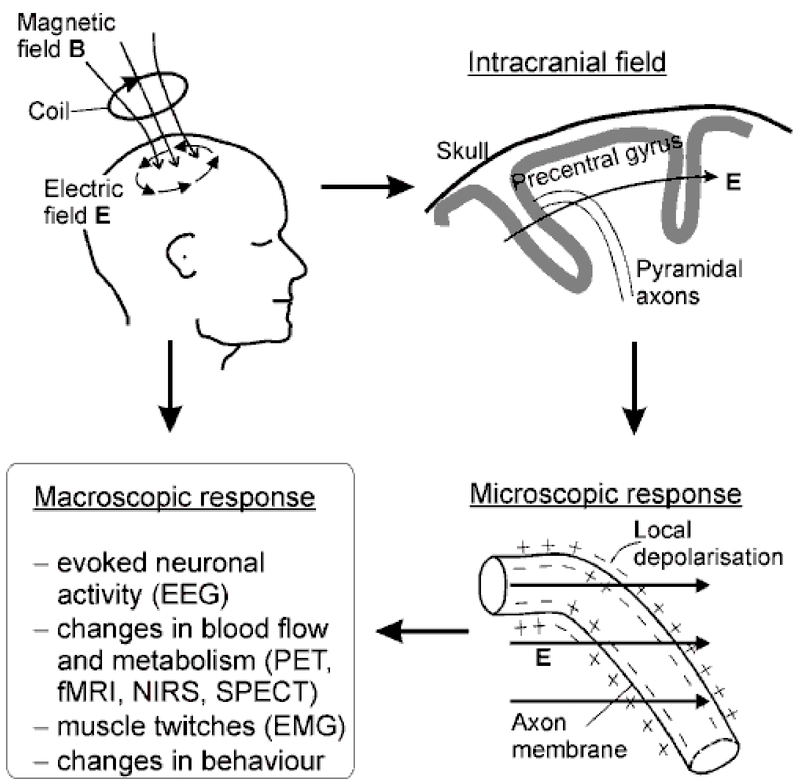


Fig. 8. eLORETA-based statistical non-parametric maps (SnPM) comparing the exact current density values between binge drinkers and control subjects for matching stimuli at LPC. Significantly reduced activation (corrected $P < 0.05$) in binge drinkers relative to controls is shown in blue color. L, left; R, right; A, anterior; P, posterior. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of the article.)

Crego et al. / Drug and Alcohol Dependence 2010

Transzkraniális mágneses stimuláció





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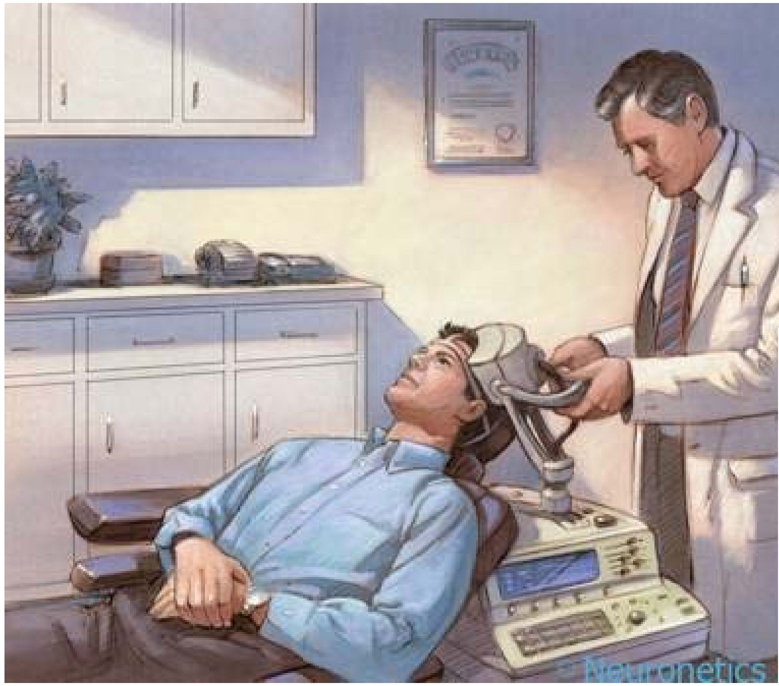
Transcranial and Deep Brain Stimulation Approaches as Treatment for Depression

Anne Rau, Nicola Großheinrich, Ulrich Palm, Oliver Pogarell and Frank Padberg

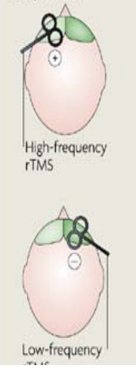


nature REVIEWS NEUROSCIENCE

FIGURE 2 | How reptitive TMS affects excitablity in the brain.

FROM THE FOLLOWING ARTICLE:
Is there a future for therapeutic use of transcranial magnetic stimulation?
Michael C. Ridding & John C. Rothwell
Nature Reviews Neuroscience **8**, 559-567 (July 2007)
doi:10.1038/nrn2169

a Depression



Meta-analysis	Number of studies included	rTMS approach	Outcome measure	Analysis conclusions
Couturier[2]	6	Randomized sham-controlled trials using LDLPFC rTMS	Change in HAM-D	Suggests rTMS no better than sham
Martin *et al.*[3]	14	Most (13 out of 14 studies) used high frequency LDLPFC and sham control	Change in HAM-D (in all studies) and BDI (7 studies)	Real rTMS significantly greater effect than sham on HAM-D when applied for 2 weeks (but not 1 week) No significant difference for BDI
Kozel and George[4]	12	Randomized sham-controlled trials involving LDLPFC rTMS	Change in HAM-D	Real rTMS led to small but significantly greater effect than sham
Burt et al.[6]	16	Randomized controlled (sham or other control) trials predominantly involving LDLPFC/RDLPFC*	Change in HAM-D	Real rTMS significantly better than sham Improvement in HAM-D of ~20% Doubtful clinical significance
Holtzheimer	12	Most (11/12) used LDLPFC	Change in HAM-D	Real rTMS significantly better than sham

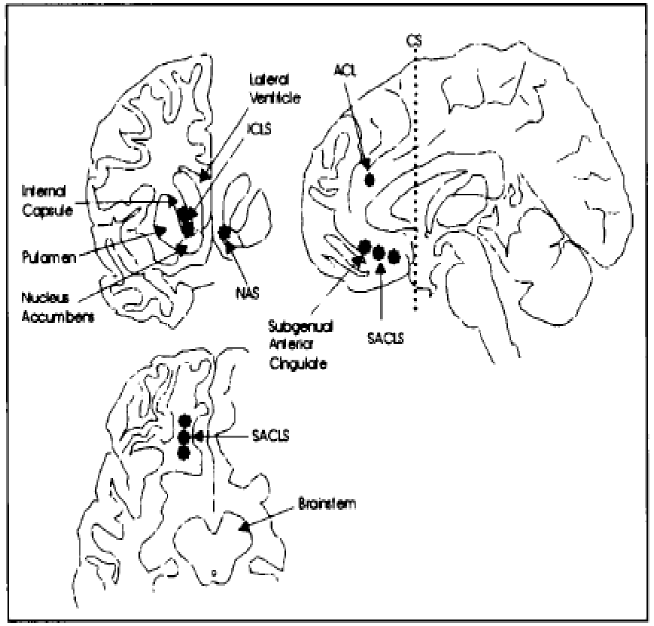
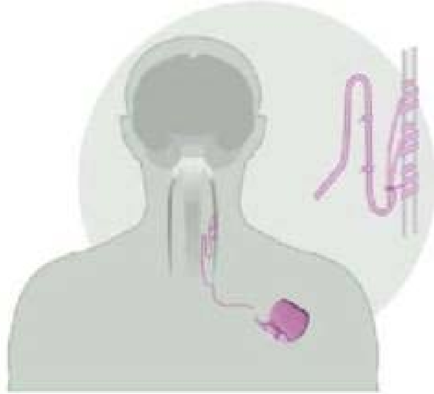
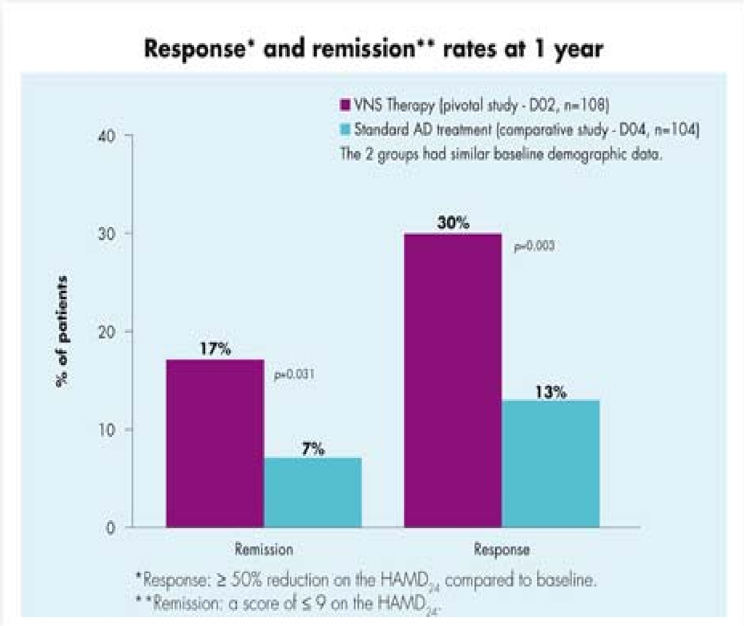
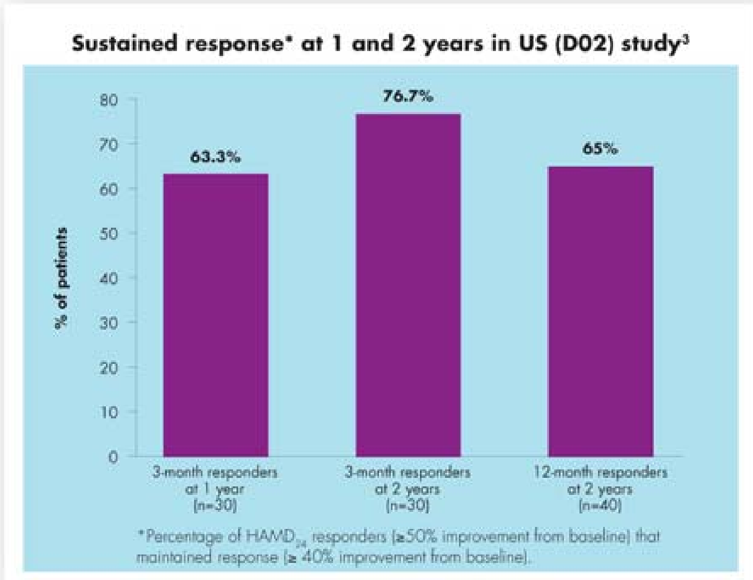


Figure 3.
Localization of DBS target regions in the ventromedial prefrontal lobe. CS=coronal section location, ICLS=internal capsulotomy and stimulation location, SACLS=subgenual and medial orbitofrontal lesion and stimulation location, NAS=shell of nucleus accumbens stimulation location. All interventions were bilateral with the exception of the NAS. For completeness, the supragenual anterior cingulotomy lesion site (ACL) is also shown (reprinted from The Lancet, 14, Ebmeier KP, Donaghey C, Steele JD. Recent developments and current controversies in depression. 153-167, Copyright 2006, with kind permission from Elsevier and K. Ebmeier, Oxford).

Vagus nervus stimuláció
↓
terápiarezisztens depresszió







Frick *et al.* 2005
Sackeim *et al, International Journal of Neuropsychopharmacology*, 2007

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Klinikai elektrofiziológia

Mit tükröz?

Funkciót

- Extitáció & inhibíció
- Neuronális folyamatokra nyújt betekintést

Alkalmazási területek

- Kutatás
  - Pszichofiziológia
  - Patomechanizmus
  - Biomarkerek
- Gyakorlat
  - Differenciáldiagnosztika
  - Terápia – korai indikáció és válaszkészség

Klinikai elektrofiziológia

ELŐNYÖK

- **Időbeli felbontás msec!**
- **A neuronális aktivitást tükrözi!**
- Szenzitívitás
- Funkciót vizsgál
- Dinamikus
- Nem invazív
- Relatív olcsó

KORLÁTOK

- Variábilitás
- Specificitás
- Lokalizáció

Alkalmazás a klinikai gyakorlatban

- Tudatzavarok
- Rosszullétek
- Alvászavarok
- Kognitív zavarokkal járó kórképek

Clin. EEG and Neuroscience 2007

- Friedmann és mts
- Grunwald és mtd
- Taylor és mts
- Pogarell és mts
- Bucci et al

CLINICAL EEG and NEUROSCIENCE ©2009 VOL. 40 NO. 2

Evidence, Evidence-Based Medicine, and Evidence Utility in Psychiatry and Electrophysiology

Monte S. Buchsbaum

- Szkizofrénia: QEEG, P300
- Dementiák: QEEG, ERP
- ADHD theta/beta arány, neurofeedback
- Szorongásos zavarok (arousal)
- Depresszió terápiás válaszkészség

A pszichiátriai betegek és normál kontroll személyek között

- Magasan szignifikáns elektrofiziológiai eltérések
- A szenzitivitás és specificitás mérsékelt

Ígéretes

- A betegség lefolyás követésében
- Terápia követésében, terápiaválasztásban

Jövő útjai a pszichiátriai klinikai elektrofiziológiában

- Kutatás

- Gyakorlat - *feltéve, ha lesznek*
  - Reprodukált klinikai vizsgálatok
  - Pszichiátrai betegekre és betegségekre nyitott elektrofiziológiai laborok