

Aiken, Steven J.; Picton, Terence W. (2008): Envelope and spectral frequency-following responses to vowel sounds. In: *Hearing research*, Jg. 245, H. 1-2, S. 35–47. Online verfügbar unter doi:10.1016/j.heares.2008.08.004.

**Abstract** Frequency-following responses (FFRs) were recorded to two naturally produced vowels (/a/ and /i/) in normal hearing subjects. A digitally implemented Fourier analyzer was used to measure response amplitude at the fundamental frequency and at 23 higher harmonics. Response components related to the stimulus envelope ("envelope FFR") were distinguished from components related to the stimulus spectrum ("spectral FFR") by adding or subtracting responses to opposite polarity stimuli. Significant envelope FFRs were detected at the fundamental frequency of both vowels, for all of the subjects. Significant spectral FFRs were detected at harmonics close to formant peaks, and at harmonics corresponding to cochlear intermodulation distortion products, but these were not significant in all subjects, and were not detected above 1500 Hz. These findings indicate that speech-evoked FFRs follow both the glottal pitch envelope as well as spectral stimulus components.

**Schlagwörter** Acoustic Stimulation; Adult; Auditory Thresholdphysiology; Cochlear Microphonic Potentials; Electroencephalographystatistics & numerical data; Female; Fourier Analysis; Humans; Male; Phonetics; Psychoacoustics; Young Adult

Alisov, A. P.; Bikkineeva, D. Kh; Vinnitskiĭ, L. I.; Kozlov, S. P.; Svetlov, V. A.; Tsibuliak, V. N. (1996): [The content of beta-endorphin, met-enkephalin and ACTH in the blood plasma during electric and drug anesthesia]. In: *Anesteziologija i reanimatologija*, H. 3, S. 9–14.

**Abstract** Beta-endorphin, metenkephaline, and ACTH were radioimmunoassayed in the peripheral blood plasma of 4 groups of patients subjected to microsurgery by different techniques. In 3 groups electropulsed exposure of the CNS was a component of general combined ataralgia. In group 1 (13 patients) two Lenar devices were employed, in group 2 (5 patients) Skat-202 device, in group 3 (7 patients) Elean device. Group 4 (17 patients) were controls administered drugs according to the same protocols as in the rest three groups. Anesthesia was considered adequate in all the groups. The hypoalgesic effect of electroexposure was the most expressed in group 1: fentanyl was not injected in 53% cases, and in 47% its dose, 0.74 microgram/kg/h, was 2.25 times lower than in controls (1.58 micrograms/kg/hm  $p < 0.05$ ); the drug doses in groups 2 and 3 (0.82 and 0.8 microgram/kg/h) were 1.9 and 2 times lower than in controls, respectively,  $p < 0.05$ . The levels of ACTH and opioid peptides were measured at 6 stages: 1) several days before surgery; 2) after premedication, 10-15 min after the patient was brought into the operation room; 3) before discontinuing nitrogen oxide; 4) after discontinuing nitrogen oxide; 5) when the patient regained consciousness after the end of surgery; and 6) after extubation of the trachea. During surgery under electromedicamentous anesthesia the level of ACTH in the plasma was the same as initially or comparable to the level of this hormone at the same stages in the control group. The content of opioid peptides changed at stressogenic stages of anesthesia and surgery. In patients administered drug anesthesia beta-endorphin levels were shifted, in those operated on under electromedicamentous anesthesia the metenkephaline compound of the opiate system was altered. Activation of various components of endogenous opiate system in electromedicamentous and drug anesthesia may be due to differences in the mechanisms of this types of anesthesia at the given level of the antinociceptive system of the organism. No stable reaction of endorphin level on the electroexposure could be detected. There was no evident relationship between changes in the levels of opioid peptides and the decrease of fentanyl consumption. Besides, it is possible that the analgesic effect of electroexposure is mediated not only by the opioid, but by other mechanisms of endogenous antinociceptive system as well.

**Schlagwörter** Adrenocorticotrophic Hormoneblood; Adult; Anesthesia, Intravenous; Anesthetics,

Intravenous; Electronarcosisinstrumentationmethods; Enkephalin, Methionineblood; Female; Fentanyl; Humans; Intraoperative Period; Male; Microsurgery; Middle Aged; Monitoring, Intraoperativemethods; Neuroleptanalgesia; beta-Endorphinblood

Alling, F. A.; Johnson, B. D.; Elmoghazy, E. (1990): Cranial electrostimulation (CES) use in the detoxification of opiate-dependent patients. In: *Journal of substance abuse treatment*, Jg. 7, H. 3, S. 173–180.

Abstract

This paper reviews the scientific literature on cranial electrostimulation (CES) as a non-chemical means to alleviate opiate withdrawal symptoms. CES involves applying small amounts of electrical stimulation through electrodes applied to the skin surface over the cranium. The paper summarizes major theories (gate, endorphin, and Chinese acupuncture) which attempt to explain how CES may help alleviate drug withdrawal and craving. Two of the studies reviewed show that CES patients experienced more severe withdrawal during the early part of treatment than comparison groups of methadone patients. Other studies show that CES patients did better than methadone patients. The findings from all studies reviewed, however, were limited because of low participation rates, high dropout rates, difficulties in blinding subjects and evaluators, and the absence of standardized procedures and equipment. The evidence reviewed suggests that CES is a promising line of inquiry for continued efforts to develop nonchemical ways to detoxify opiate-dependent individuals. Improved research designs, larger sample sizes, more integrity in data collection, and improved data analysis are needed in the future.

Schlagwörter

Acupuncture Therapy; Braindrug effects; Electric Stimulation; Humans; Methadoneadverse effects; Narcoticsadverse effects; Substance Withdrawal Syndrometherapy

Ballachanda, B. B.; Moushegian, G. (2000): Frequency-following response: effects of interaural time and intensity differences. In: *Journal of the American Academy of Audiology*, Jg. 11, H. 1, S. 1–11.

Abstract

This research investigated whether brainstem neural mechanisms that mediate lateralization of sounds can be extracted from the frequency-following response (FFR). Monaural and binaural FFRs were obtained from normal-hearing subjects to low-frequency (500 Hz) linearly gated tone bursts (4-4-4 msec) at 40, 50, and 60 dB SL and four interaural time differences (ITDs) (0, 333, 500, and 667 microsec). FFRs were also recorded to ITDs and intensity presented in concert and in opposition (lateralization stimuli). The results show that overall intensity and interaural time differentially affect the FFR. The FFRs evoked by ITDs and intensity (in concert and in opposition) are strikingly different. The normalized amplitudes of the binaural interaction component (BIC) are minimally altered by ITDs and intensity. The study presents strong evidence that ITDs of 0, 333, 500, and 667 microsec and lateralization stimuli, easily discriminated perceptually, evoke clearly distinguishable FFR waveforms. These ITDs provide the cues that mammals use to localize sound in a freefield. The BIC is essentially unaffected by overall intensity, ITDs, and lateralization stimuli. Based on the findings of this study, the FFR has the potential to become a tool for identification of normal and abnormal binaural processing at lower brainstem levels.

Schlagwörter

Adult; Brain Stemphysiology; Evoked Potentials, Auditoryphysiology; Evoked Potentials, Auditory, Brain Stemphysiology; Female; Humans; Random Allocation; Sound Localizationphysiology; Time Factors

Batra, R.; Kuwada, S.; Maher, V. L. (1986): The frequency-following response to continuous tones in humans. In: *Hearing research*, Jg. 21, H. 2, S. 167–177.

Abstract

Previous studies of the frequency-following response (FFR) in man suggest that it has multiple sources. Identification of these sources has been complicated by the use of tone bursts to evoke FFRs and the lack of precise methods to calculate their amplitude and latency. Tone bursts produce transient responses which confound measurements of the FFR. The use of continuous tones avoids this problem and

the Fast Fourier Transform can be used to assess accurately and efficiently the presence, amplitude and phase angle of the FFR. In this study we systematically examined the frequency and intensity range over which FFRs to continuous tones could be evoked using FFRs to tone bursts for comparison. We then analyzed FFRs to continuous tones to determine the sources of this potential. FFRs to both stimuli have similar thresholds (65-90 dB SPL) and can be evoked by the same range of frequencies. Neurogenic FFRs in man occur only below 1000 Hz. The source for this potential has a latency of 8.2 +/- 0.1 ms (mean +/- SD) and is consistent with a midbrain source. At higher frequencies FFRs have a latency of less than 1 ms and are most likely cochlear microphonic. The small variation in the latency of the neurogenic FFR suggests this as a possible tool for assessing neurological disorders.

Schlagwörter

Adolescent; Adult; Audiometry, Evoked Response; Auditory Pathwaysphysiology; Brainphysiology; Brain Diseasesdiagnosis; Brain Stem; Evoked Potentials, Auditory; Fourier Analysis; Hearing Disordersdiagnosis; Humans; Pitch Perceptionphysiology; Psychoacoustics; Reaction Timephysiology

Becker, Robert O. (1961): Search for Evidence of Axial Current Flow in Peripheral Nerves of Salamander. In: Science (New York, N.Y.), Jg. 134, H. 3472, S. 101–102. Online verfügbar unter doi:10.1126/science.134.3472.101.

Abstract

The demonstrated association of the d-c bioelectric field with central nervous system elements implies the longitudinal flow of charge carriers within that system. Transverse d-c voltages, attributed to the Hall effect, have been obtained from the extremities of intact salamanders under circumstances suggesting such electric current. These voltages disappeared after nerve section, and their magnitude was related to the depth of anesthesia.

Becker, Robert O. (2004): Exploring new horizons in electromedicine. In: Journal of alternative and complementary medicine (New York, N.Y.), Jg. 10, H. 1, S. 17–18. Online verfügbar unter doi:10.1089/107555304322848904.

Schlagwörter

Electromagnetic Phenomena; Evidence-Based Medicinestandards; Humans; Mind-Body Relations (Metaphysics)

Berendt, Joachim E. (2007): Nada Brahma. Die Welt ist Klang: Suhrkamp.

Abstract

Lehmanns Fachbuchhandlung: 3895

Berger, Lutz (Hg.) (1997): Musik, Magie und Medizin. Neue Wege zu Harmonie und Heilung: Junfermann.

Abstract

Lehmanns Fachbuchhandlung: Seit Jahrtausenden haben Menschen Musik gemacht. Sie haben getrommelt, gerockt und geraved. In Höhlen und an Lagerfeuern, vom Regenwald bis zum Polarkreis erklang Musik zur Unterhaltung, Heilung und zum Gottesdienst. Musik - die einzige Sprache, die jeder Mensch versteht.

Berger, Lutz; Byatt, Greg; Wunsch, Alexander (Hg.) (1992): Das Equinox-System. Theorie und Praxis der Electrostimulation. Heidelberg.

Boutros, N. N.; Krupitsky, E. M. (1998): Cranial electrostimulation therapy. In: Biological psychiatry, Jg. 43, H. 6, S. 468–469.

Schlagwörter

Anxietytherapy; Brainphysiology; Depressive Disordertherapy; Electric Stimulation Therapy; Humans

Braitenberg, Valentin; Schüz, Almut (1989): Cortex: hohe Ordnung oder größtmögliches Durcheinander. In: Spektrum der Wissenschaft, H. 5, S. 74–86.

Carter, Calvin (2008): Healthcare performance and the effects of the binaural beats on human blood pressure and heart rate. In: Journal of hospital marketing & public relations, Jg. 18, H. 2, S. 213–219.

## CES - Citavi

**Abstract** Binaural beats are the differences in two different frequencies (in the range of 30-1000 Hz). Binaural beats are played through headphones and are perceived by the superior olivary nucleus of each hemisphere of the brain. The brain perceives the binaural beat and resonates to its frequency (frequency following response). Once the brain is in tune with the binaural beat it produces brainwaves of that frequency altering the listener's state of mind. In this experiment, the effects of the beta and theta binaural beat on human blood pressure and pulse were studied. Using headphones, three sounds were played for 7 minutes each to 12 participants: the control,- the sound of a babbling brook (the background sound to the two binaural beats), the beta binaural beat (20 Hz), and the theta binaural beat (7 Hz). Blood pressure and pulse were recorded before and after each sound was played. Each participant was given 2 minutes in-between each sound. The results showed that the control and the two binaural beats did not affect the 12 participant's blood pressure or pulse ( $p > 0.05$ ). One reason for this may be that the sounds were not played long enough for the brain to either perceive and/or resonate to the frequency. Another reason why the sounds did not affect blood pressure and pulse may be due to the participant's age since older brains may not perceive the binaural beats as well as younger brains.

**Schlagwörter** Auditory Perception; Delivery of Health Carestandards; Heart Rate; Humans; Hypertension; Psychoacoustics

Chambers, R. D.; Feth, L. L.; Burns, E. M. (1986): The relation between the human frequency-following response and the low pitch of complex tones. In: The Journal of the Acoustical Society of America, Jg. 80, H. 6, S. 1673-1680.

**Abstract** The relation between the auditory brain stem potential called the frequency-following response (FFR) and the low pitch of complex tones was investigated. Eleven complex stimuli were synthesized such that frequency content varied but waveform envelope periodicity was constant. This was accomplished by repeatedly shifting the components of a harmonic complex tone upward in frequency by delta  $f$  of 20 Hz, producing a series of six-component inharmonic complex tones with constant intercomponent spacing of 200 Hz. Pitch-shift functions were derived from pitch matches for these stimuli to a comparison pure tone for each of four normal hearing adults with extensive musical training. The FFRs were recorded for the complex stimuli that were judged most divergent in pitch by each subject and for pure-tone signals that were judged equal in pitch to these complex stimuli. Spectral analyses suggested that the spectral content of the FFRs elicited by the complex stimuli did not vary consistently with component frequency or the first effect of pitch shift. Furthermore, complex and pure-tone signals judged equal in pitch did not elicit FFRs of similar spectral content.

**Schlagwörter** Acoustic Stimulation; Adult; Evoked Potentials, Auditory; Female; Humans; Male; Pitch Perceptionphysiology; Psychoacoustics; Sound Spectrography

Cousto, Hans (2004): Die kosmische Oktave. Der Weg zum universellen Einklang: Synthesis.

Cousto, Hans (2007): Die Töne der kosmischen Oktave. Zur Anwendung der Planeten-Ton-Stimmgabeln: Simon + Leutner.

Cousto, Hans (2007): Die Oktave - das Urgesetz der Harmonie. Planeten, Moleküle, Atome, Töne, Farben, Kräfte innerer Schwingungen: Simon-Weidner, Thomas.

Cousto, Hans; Pauschel, Matthias (1992): Orpheus-Handbuch. Die Wirkung der Rhythmen unserer Erde auf Körper, Seele und Geist; Edition Harmonik: Simon-Weidner, Thomas.

(1984): Diagnostic and therapeutic technology assessment. Cranial electrostimulation. In: JAMA : the journal of the American Medical Association, Jg. 251, H. 8, S. 1094.

**Schlagwörter** Anxietytherapy; Depressiontherapy; Electronarcosis; Humans

Die heilsame Planetenton Klangmassage Meditation - Die Klangapotheke. 6er-CD-Set mit 18 Planetenfrequenzen (2009): Traumzeit-Verlag.

Dittrich, Adolf (1985): Ätiologie-unabhängige Strukturen veränderter Wachbewußtseinszustände. Ergebnisse empir. Unters. über Halluzinogene I. u. II. Ordnung, sensor. Deprivation, hypnagoge Zustände, hypnot. Verfahren sowie Reizüberflutung ; 119 Tab. Stuttgart: Enke.

Enin, L. D.; Akoev, G. N.; Lebedev, V. P.; Potekhina, I. L. (1991): [Changes in the excitability of the skin mechanoreceptors in the rat against a background of transcranial electrostimulation]. In: Neirofiziologija = Neurophysiology, Jg. 22, H. 4, S. 495-500.

Abstract Alterations in excitability of low-, medium- and high-threshold single mechanoreceptors (SMRs) of hairless hind paw skin elicited by transcranial electrical stimulation (TES) in analgesic regime were studied in anesthetized rats. Evoked impulsations of low- and medium-threshold SMRs were blocked by TES that lasted for about 1 and 5 min, respectively. TES for 18-20 min in duration abolished the reactions of high threshold SMRs activated only by nociceptive stimuli. Inhibitory effects of TES on all SMR types under study were eliminated by preliminary intraperitoneal or local intracutaneous (near SMRs location) injection of naloxone. Possible mechanisms of analgesic TES effects are discussed. An assumption is made that alterations of the SMR function are connected with an increase of the output of endogenous opioid peptides from the brain during TES.

Schlagwörter Animals; Electronarcosismethods; Male; Mechanoreceptorsdrug effectsphysiology; Naloxonepharmacology; Physical Stimulationinstrumentationmethods; Rats; Rats, Inbred Strains; Skindrug effectsinnervation; Skin Physiological Phenomena; Time Factors

Evtiukhin, A. I.; Dunaevskii, I. V.; Shabut, A. M.; Aleksandrov, V. A. (1998): [The use of transcranial electrostimulation for pain relief in cancer patients]. In: Voprosy onkologii, Jg. 44, H. 2, S. 229-233.

Abstract The report discusses whether transcranial electrostimulation in cancer patients can be accepted. A number of tumors were inhibited in an experiment using 120 rats. The procedure used in 80 cancer patients was followed by favorable changes in the concentration of several hormones. The antinociceptive action of electrostimulation is similar to that of narcotic analgetics.

Schlagwörter Animals; Electric Stimulation Therapymethods; Female; Hormonesblood; Humans; Male; Neoplasmsbloodcomplications; Neoplasms, Experimentalbloodcomplications; Painbloodetiologytherapy; Rats; Skull; Treatment Outcome

Galbraith, G. C. (1994): Two-channel brain-stem frequency-following responses to pure tone and missing fundamental stimuli. In: Electroencephalography and clinical neurophysiology, Jg. 92, H. 4, S. 321-330.

Abstract In 2 separate experiments the brain-stem frequency-following response (FFR) was recorded to a pure tone (200 Hz) and complex "missing fundamental" (MF) stimuli differing in temporal fine structure and envelope modulation depth. FFRs were simultaneously recorded in 2 channels with horizontal and vertical dipole orientations. Horizontal electrodes were identical in both experiments (right-left ear), but the vertical configuration was varied (vertex-left ear; vertex-linked mastoids). The horizontal channel yielded a well defined FFR to tone stimulation at a latency consistent with an origin along the auditory nerve. However, there was no horizontal response to MF stimulation. This latter finding provides electrophysiological support for the conclusion that MFs are not directly coded in the peripheral neural response. Vertical recordings, however, showed equally well defined FFRs to tone and MF stimuli. Thus, a representation of the missing fundamental frequency is registered in the brain-stem. Vertical latencies were consistent with a source at the level of the lateral lemniscus. The FFR is well suited to elucidate certain brain-stem mechanisms of auditory information processing. Important additional information results when responses are compared in horizontal and vertical dipole orientations.

- Thus, the present results provide the first evoked response demonstration of a peripheral-brain-stem dichotomy of MF coding.
- Schlagwörter Acoustic Stimulation; Adolescent; Adult; Analysis of Variance; Electroencephalography; Evoked Potentials, Auditory, Brain Stemphysiology; Humans; Reaction Timephysiology
- Galbraith, G. C.; Buranahirun, C. E.; Kang, J.; Ramos, O. V.; Lunde, S. E. (2000): Individual differences in autonomic activity affects brainstem auditory frequency-following response amplitude in humans. In: *Neuroscience letters*, Jg. 283, H. 3, S. 201–204.
- Abstract Innervation of the cochlea by sympathetic fibers suggests that the autonomic nervous system (ANS) may influence auditory information processing. The brainstem frequency-following response (FFR) and spontaneous skin conductance activity (SCA) were measured while subjects discriminated between long (rare) and short (frequent) duration tones. When subjects were divided into three groups on the basis of SCA, those with low SCA variability had larger FFR amplitudes. These results agree with the only other study to report ANS effects on brainstem auditory evoked responses [28]. It is proposed that individual differences in autonomic response patterns may account for some of the amplitude variation reported in brainstem evoked potential studies.
- Schlagwörter Acoustic Stimulation; Adolescent; Adult; Autonomic Pathwaysphysiology; Brain Stemphysiology; Evoked Potentials, Auditory, Brain Stemphysiology; Galvanic Skin Responsephysiology; Humans; Reaction Timephysiology
- Galbraith, G. C.; Chae, B. C.; Cooper, J. R.; Gindi, M. M.; Ho, T. N.; Kim, B. S. et al. (2000): Brainstem frequency-following response and simple motor reaction time. In: *International journal of psychophysiology : official journal of the International Organization of Psychophysiology*, Jg. 36, H. 1, S. 35–44.
- Abstract Simple motor reaction times (RT) in humans show marked trial-to-trial variations. In the present study, a brief tone (400 Hz, 37.5 ms duration) that was the imperative stimulus in a RT paradigm evoked the brainstem frequency-following response (FFR). Horizontal and vertical montage FFRs were recorded to evaluate neural responses with putative origins in auditory nerve and central brainstem, respectively. The main question concerned the possible relationship between trial-to-trial variations in RT speed and FFR response properties. The results showed a reliable pattern in which fast RT trials yielded larger amplitudes (relative to slow trials) in earlier milliseconds of the FFR, and slow RT trials yielded relatively larger amplitudes in later milliseconds of the response. These results support the conclusion that early processing in the auditory brainstem is not automatic and invariant. Rather, short-latency evoked potentials appear to reflect trial-to-trial variations related to events far removed from the first synapse of sensory coding, perhaps depending upon cortically mediated influences such as cognition or attention.
- Schlagwörter Acoustic Stimulation; Adolescent; Adult; Brain Stemphysiology; Female; Fourier Analysis; Humans; Male; Motor Activityphysiology; Reaction Timephysiology
- Galbraith, G. C.; Threadgill, M. R.; Hemsley, J.; Salour, K.; Songdej, N.; Ton, J.; Cheung, L. (2000): Putative measure of peripheral and brainstem frequency-following in humans. In: *Neuroscience letters*, Jg. 292, H. 2, S. 123–127.
- Abstract The human brainstem frequency-following response (FFR) registers phase-locked neural activity to periodic auditory stimuli. FFR waveforms were extracted from the electroencephalogram by averaging responses to repeated auditory stimulation. Two channels of data were simultaneously recorded from horizontally (electrodes placed in ear canals) and vertically (vertex scalp referenced to midline) oriented electrode configurations. Eight participants each received a total of 2000 tone repetitions for each of ten stimulus frequencies ranging from 133 to 950 Hz. FFRs were quantified by fast-Fourier spectral analysis. The largest spectral intensities at the stimulus frequency were recorded in the horizontal FFR, which also followed

- higher frequencies and showed better signal-to-noise ratios than did the vertical FFR. The horizontal FFR pattern suggests an acoustic nerve origin, while the vertical FFR pattern suggests a central brainstem origin.
- Schlagwörter Acoustic Stimulation; Adult; Cochlear Nervephysiology; Ear Canal; Electrodes; Electroencephalography; Evoked Potentials, Auditory, Brain Stemphysiology; Female; Fourier Analysis; Humans; Male; Pitch Perceptionphysiology; Scalp
- Galbraith, Gary C.; Olfman, Darlene M.; Huffman, Todd M. (2003): Selective attention affects human brain stem frequency-following response. In: *Neuroreport*, Jg. 14, H. 5, S. 735–738. Online verfügbar unter doi:10.1097/01.wnr.0000064983.96259.49.
- Abstract Selective attention modifies long-latency cortical event-related potentials. Amplitudes are typically enhanced and/or latencies reduced when evoking stimuli are attended. However, there is controversy concerning the effects of selective attention on short-latency brain stem evoked potentials. The objective of the present study was to assess possible attention effects on the brain stem auditory frequency-following response (FFR) elicited by a periodic tone. Young adult subjects heard a repetitive auditory stimulus while detecting infrequent target stimuli in either an auditory or visual detection task. Five channels of high frequency electroencephalographic (EEG) activity were recorded along the scalp midline with the center electrode positioned at the vertex. The FFR was elicited by the repetitive tone during both tasks. There were significant individual differences in the electrode sites yielding maximum response amplitudes, but overall FFR amplitudes were significantly larger during the auditory attention task. These results suggest that selective attention in humans can modify signal processing in sensory (afferent) pathways at the level of the brain stem. This may reflect top-down perceptual preprocessing mediated by extensive descending (efferent) pathways that originate in the cortex. Overall, the FFR appears to be a robust indicator of early auditory neural processing and shows effects not seen in brain stem auditory evoked response studies employing transient (click) acoustic stimuli.
- Schlagwörter Acoustic Stimulationmethods; Adolescent; Adult; Afferent Pathwaysphysiology; Analysis of Variance; Attentionphysiology; Auditory Thresholdphysiology; Brain Stemphysiology; Discrimination (Psychology)physiology; Electroencephalography; Female; Humans; Male; Photic Stimulation; Reaction Timephysiology; Reference Values; Signal Processing, Computer-Assisted
- Gerken, G. M.; Moushegian, G.; Stillman, R. D.; Rupert, A. L. (1975): Human frequency-following responses to monaural and binaural stimuli. In: *Electroencephalography and clinical neurophysiology*, Jg. 38, H. 4, S. 379–386.
- Abstract Frequency-following responses, with latencies circa 6 msec, were recorded from five normal-hearing human subjects to brief 500 c/sec tone bursts presented monaurally. The frequency-following responses appear as peaks occurring at 2 msec intervals superimposed on a slow wave (pedestal-like) component. Comparisons were made between the frequency-following responses evoked by binaural and monaural stimuli. The results show that the binaural responses may be interpreted as the sum of two monaural responses. It is concluded, therefore, that there are two independent populations of neurons, each capable of generating a frequency-following response is not a microphonic-like response but rather that the individual waves in the frequency-following response are evoked by the collective activity of phase-locked single units. Finally, on the basis of the distinctness of the individual waves in the frequency-following response, it is concluded that the neural generators of the response must be spatially compact.
- Schlagwörter Acoustic Stimulationmethods; Adult; Auditory Perceptionphysiology; Brainphysiology; Evoked Potentials; Female; Humans; Male; Models, Neurological; Neuronsphysiology; Reaction Time
- Gregory, N. G.; Wotton, S. B. (1991): Effect of a 350 Hz DC stunning current on evoked responses in the

## CES - Citavi

chicken's brain. In: Research in veterinary science, Jg. 50, H. 2, S. 250–251.

**Abstract** Somatosensory evoked responses in the chicken's brain were examined before and after stunning with a 350 Hz pulsed DC. When the current was greater than 120 mA, 93 per cent of the birds lost their evoked responses for at least 60 seconds. On this basis 120 mA per bird is recommended as an acceptable current for commercial use.

**Schlagwörter** Animals; Brainphysiology; Chickensphysiology; Electronarcosisinstrumentationveterinary; Evoked Potentials, Somatosensoryphysiology

Grof, Stanislav (2001): Das Abenteuer der Selbstentdeckung. Heilung durch veränderte Bewusstseinszustände. Ein Leitfaden: Rowohlt Taschenbuch.

**Abstract** Lehmanns Fachbuchhandlung: 19640

Hegewald, M.; Heitman, R.; Wiederhold, M. L.; Cooper, J. C.; Gates, G. A. (1989): High-frequency electrostimulation hearing after mastoidectomy. In: Otolaryngology--head and neck surgery : official journal of American Academy of Otolaryngology-Head and Neck Surgery, Jg. 100, H. 1, S. 49–56.

**Abstract** This study was undertaken to measure the degree of high-frequency sensorineural hearing loss following mastoid surgery. Twenty-five patients undergoing mastoidectomy procedures were tested preoperatively, less than 2 days postoperatively, and at 30 days postoperatively using the Tonndorf Audimax 500 high-frequency audiometer. Electrostimulation thresholds in 1-kHz intervals, from 1 to 20 kHz, were measured, and the highest detectable frequency was determined to within 0.1 kHz. Surgical drilling time was recorded. Average drilling time was 51 minutes. A significant temporary threshold shift was observed, measurable at multiple frequencies, less than 48 hours after mastoidectomy. There was no clinically significant change in electrostimulation thresholds (measured in 1-kHz increments, from 1 to 16 kHz) preoperatively to 30 days postoperatively. A statistically significant average loss of 0.89 kHz in the highest frequency producing a measurable response was noted ( $p$  less than 0.05). Determinations of the highest measurable frequency may be the most sensitive measure of surgically-induced, high-frequency sensorineural hearing changes.

**Schlagwörter** Adolescent; Adult; Aged; Audiometry; Child; Evoked Potentials, Auditory; Female; Hearing Loss, High-Frequencyetiology; Hearing Loss, Noise-Inducedetiology; Hearing Loss, Sensorineuraletiology; Humans; Male; Mastoidsurgery; Middle Aged; Time Factors

Hildebrandt, Gunther (1997): Biologische Rhythmen im Menschen und ihre Entsprechungen in der Musik. In: Berger, Lutz (Hg.): Musik, Magie und Medizin. Neue Wege zu Harmonie und Heilung: Junfermann, S. 64–77.

Hoormann, J.; Falkenstein, M.; Hohnsbein, J. (2000): Early attention effects in human auditory-evoked potentials. In: Psychophysiology, Jg. 37, H. 1, S. 29–42.

**Abstract** A fundamental question in attention theory concerns the earliest processing stages that can be modulated by selective attention. A series of experiments is reported in which very early attention effects are found under specific conditions in the frequency-following potential (FFP), a brain stem response to low-frequency tone stimuli. In two experiments, stimuli of two different modalities were applied, and attention directed to one of the modalities. In two further experiments, only auditory stimuli were presented. In the first of these last two experiments, a dichotic paradigm with sustained attention to one ear was used, in the second a monotic paired-stimuli paradigm was used, in which the first stimulus served as reference for the second one. Only in the last experiment significant attention effects were found in the latency, but not in the amplitude of the FFP. The results show that a very early attention effect on the latency of the FFP can be demonstrated, but only under highly specific conditions. The size and preconditions of the attention effect suggest that it reflects subtle intramodal tuning mechanisms in the cochlea or in the lower

- brain stem.
- Schlagwörter Acoustic Stimulation; Adolescent; Adult; Attentionphysiology; Electroencephalography; Evoked Potentials, Auditoryphysiology; Female; Functional Lateralityphysiology; Humans; Male
- Kelly, E. F.; Trulsson, M.; Folger, S. E. (1997): Periodic microstimulation of single mechanoreceptive afferents produces frequency-following responses in human EEG. In: Journal of neurophysiology, Jg. 77, H. 1, S. 137–144.
- Abstract Dense multichannel recordings of scalp electroencephalogram were obtained in the vicinity of primary somatosensory cortex, time-locked to repetitive train microstimulation of single, physiologically characterized skin mechanoreceptive afferents in the median nerve of a single human subject. Frequency-domain analysis of cross-trial averages for fast-adapting type one and slowly adapting type one afferents revealed prominent, topographically organized "driving" responses in the electroencephalogram at the frequency of stimulation, which vanished under various statistical and experimental control conditions. The responses also exhibited systematic declines in amplitude both across and within trials, and orderly changes in scalp topography as a function of the location of afferents' receptive fields on the hand. The observed response properties are tentatively explained in terms of characteristics of the pattern of afferent drive impressed on the cortex by microstimulation.
- Schlagwörter Electric Stimulation; Electroencephalography; Electrophysiology; Fourier Analysis; Humans; Mechanoreceptorsphysiology; Microelectrodes; Neurons, Afferentphysiology; Skininnervation; Somatosensory Cortexphysiology
- Kharchenko, E. P.; Shesternin, S. L. (2000): [Psychotropic effect of targeted transcranial electrostimulation in opiate abstinence syndrome]. In: Doklady Akademii nauk / [Rossiiskaia akademii nauk], Jg. 368, H. 5, S. 714–716.
- Schlagwörter Adolescent; Adult; Brainphysiopathology; Electric Stimulation; Female; Humans; Male; Psychotic Disordersetiologiophysiologytherapy; Skull; Substance Withdrawal Syndromecomplicationsphysiologytherapy
- Khi'lko, V. A.; Gaïdar, B. V.; Lyskov, E. B.; Kondra'teva, M. I.; Niko'lskaia, I. M. (1989): [Restorative electric stimulation of the optic nerve in patients with diseases of the chiasmatal-sellar area]. In: Zhurnal nevropatologii i psikhiiatrii imeni S.S. Korsakova (Moscow, Russia : 1952), Jg. 89, H. 5, S. 51–54.
- Abstract Presented is the clinical experience with vision restitution by direct electrostimulation (ES) of lesioned visual nerves in 128 operated patients with chiasmatal-sellar diseases (chiasmatal-sellar tumors and optico-chiasmatal arachnoiditis). Comparative analysis of ES-treated and control group was performed. Indications for this technique were determined in different forms of the disease depending on its severity and duration. ES showed positive results increasing the reliability and speed of vision restitution in operated patients.
- Schlagwörter Arachnoiditiscomplications; Cranial Nerve Neoplasmscomplications; Electric Stimulation Therapy; Humans; Optic Atrophyetiologiotherapy; Optic Chiasm; Pituitary Neoplasmscomplications; Sella Turcica; Visual Acuity
- Kirsch, Daniel L.; Smith, Ray B. (2000): The use of cranial electrotherapy stimulation in the management of chronic pain: A review. In: NeuroRehabilitation, Jg. 14, H. 2, S. 85–94.
- Abstract Cranial Electrotherapy Stimulation (CES) has a growing history of applications in rehabilitation medicine in the United States dating back to early 1970. As a recognized non-drug treatment of anxiety, depression and insomnia, CES gained its first major application in the field of addiction treatment and rehabilitation. By the mid 1980s research was showing additional important uses of CES in the treatment of closed head injured patients, and in paraplegic and quadriplegic patients. The most recent research is showing CES to be highly effective in the management of chronic pain patients. It may be elevating the pain threshold due to its stress

reducing effects when anxiety and depression are reduced below clinical levels. Modern theorists of a pain neuromatrix in the cerebral cortex may provide an additional basis for understanding CES mechanisms in the control of pain related disorders.

Klawansky, S.; Yeung, A.; Berkey, C.; Shah, N.; Phan, H.; Chalmers, T. C. (1995): Meta-analysis of randomized controlled trials of cranial electrostimulation. Efficacy in treating selected psychological and physiological conditions. In: *The Journal of nervous and mental disease*, Jg. 183, H. 7, S. 478–484.

Abstract

To clarify the diverse published results of cranial electrostimulation (CES) efficacy, we conducted an extensive literature review that identified 18 of the most carefully conducted randomized controlled trials of CES versus sham treatment. For the 14 trials that had sufficient data, we used the techniques of meta-analysis to pool the published results of treating each of four conditions: anxiety (eight trials), brain dysfunction (two trials), headache (two trials), and insomnia (two trials). Because studies utilized different outcome measures, we used an effect size method to normalize measures which we then pooled across studies within each condition. The meta-analysis of anxiety showed CES to be significantly more effective than sham treatment ( $p < .05$ ). Pooling did not affect results that were individually positive (headache and pain under anesthesia) or negative (brain dysfunction and insomnia). Most studies failed to report all data necessary for meta-analysis. Moreover, in all but two trials, the therapist was not blinded and knew which patients were receiving CES or sham treatment. We strongly recommend that future trials of CES report complete data and incorporate therapist blinding to avoid possible bias.

Schlagwörter

Anxiety Disorderstherapy; Brain Diseasesstherapy; Electronarcosis; Headachetherapy; Humans; Randomized Controlled Trials as Topic; Sleep Initiation and Maintenance Disorderstherapy

Klawansky, S.; Yeung, A.; Berkey, C.; Shah, N.; Phan, H.; Chalmers, T. C. (1995): Meta-analysis of randomized controlled trials of cranial electrostimulation. Efficacy in treating selected psychological and physiological conditions. In: *The Journal of nervous and mental disease*, Jg. 183, H. 7, S. 478–484.

Abstract

To clarify the diverse published results of cranial electrostimulation (CES) efficacy, we conducted an extensive literature review that identified 18 of the most carefully conducted randomized controlled trials of CES versus sham treatment. For the 14 trials that had sufficient data, we used the techniques of meta-analysis to pool the published results of treating each of four conditions: anxiety (eight trials), brain dysfunction (two trials), headache (two trials), and insomnia (two trials). Because studies utilized different outcome measures, we used an effect size method to normalize measures which we then pooled across studies within each condition. The meta-analysis of anxiety showed CES to be significantly more effective than sham treatment ( $p < .05$ ). Pooling did not affect results that were individually positive (headache and pain under anesthesia) or negative (brain dysfunction and insomnia). Most studies failed to report all data necessary for meta-analysis. Moreover, in all but two trials, the therapist was not blinded and knew which patients were receiving CES or sham treatment. We strongly recommend that future trials of CES report complete data and incorporate therapist blinding to avoid possible bias.

Schlagwörter

Anxiety Disorderstherapy; Brain Diseasesstherapy; Electronarcosis; Headachetherapy; Humans; Randomized Controlled Trials as Topic; Sleep Initiation and Maintenance Disorderstherapy

Krishnan, Ananthanarayan; Xu, Yisheng; Gandour, Jackson T.; Cariani, Peter A. (2004): Human frequency-following response: representation of pitch contours in Chinese tones. In: *Hearing research*, Jg. 189, H. 1-2, S. 1–12. Online verfügbar unter doi:10.1016/S0378-5955(03)00402-7.

Abstract

Auditory nerve single-unit population studies have demonstrated that phase-locking plays a dominant role in the neural encoding of both the spectrum and voice pitch of

speech sounds. Phase-locked neural activity underlying the scalp-recorded human frequency-following response (FFR) has also been shown to encode certain spectral features of steady-state and time-variant speech sounds as well as pitch of several complex sounds that produce time-invariant pitch percepts. By extension, it was hypothesized that the human FFR may preserve pitch-relevant information for speech sounds that elicit time-variant as well as steady-state pitch percepts. FFRs were elicited in response to the four lexical tones of Mandarin Chinese as well as to a complex auditory stimulus which was spectrally different but equivalent in fundamental frequency ( $f_0$ ) contour to one of the Chinese tones. Autocorrelation-based pitch extraction measures revealed that the FFR does indeed preserve pitch-relevant information for all stimuli. Phase-locked interpeak intervals closely followed  $f_0$ . Spectrally different stimuli that were equivalent in  $F_0$  similarly showed robust interpeak intervals that followed  $f_0$ . These FFR findings support the viability of early, population-based 'predominant interval' representations of pitch in the auditory brainstem that are based on temporal patterns of phase-locked neural activity.

Schlagwörter

Acoustic Stimulationmethods; Adult; Asian Continental Ancestry Group; Cochlear Nervephysiology; Electrodes; Electroencephalography; Electrophysiology; Humans; Language; Phonetics; Pitch Perceptionphysiology; Scalp; Time Perceptionphysiology; Voice

Krogh, H. J.; Blegvad, B.; Stephens, S. D. (1982): Different patterns of harmonics in frequency-following responses. In: British journal of audiology, Jg. 16, H. 1, S. 17–25.

Abstract

Preliminary studies (Krogh et al., 1977) indicated pronounced intersubject differences with respect to harmonic distortion in the frequency-following responses (FFRs) elicited by high intensity, low frequency stimuli and recorded by means of surface electrodes from man. In the present investigation it was confirmed that the responses from 10 test subjects could be divided into three significantly different patterns on the basis of the relative amplitudes of the fundamental (first harmonic) and the second harmonic response component as measured by spectral analyses. In three of the subjects the ratio of the fundamental to the second harmonic was greater than 10 dB (which were termed a type I response). In five, the ratio was between 0 and 10 dB (type II response) and in two the second harmonic was equal to or greater than the fundamental (type III response). The possible causes of harmonic distortion if FFRs are discussed, but not definite explanation of the interindividual differences can be given. A psychoacoustical evaluation of the second harmonic distortion using a tone-on-tone octave masking technique (TOM) showed no correlation between TOM results and FFR type in 10 subjects.

Schlagwörter

Acoustic Stimulation; Adult; Auditory Perception; Auditory Threshold; Cochleaphysiology; Ear, Middlephysiology; Electrodes; Female; Humans; Male; Middle Aged; Perceptual Distortionphysiology; Perceptual Masking; Psychoacoustics

Makolkin, V. I.; Podzolkov, V. I.; Bol'shakova, T. D. (1997): [The characteristics of catecholamine metabolism in patients in the initial stage of hypertension]. In: Terapevticheskii arkhiv, Jg. 69, H. 9, S. 23–27.

Abstract

Catecholamines metabolism (24-h excretion, circadian rhythm of DOPA, dopamine, homovanillic acid, adrenaline, noradrenaline, vanilmandelic acid) was investigated in 124 young males with stage I essential hypertension treated by cranial electrostimulation. Relative activity of this metabolism stages was assessed. Patients with early stages of essential hypertension seem to have enhanced secretory and metabolic activity of the sympathetic link of the sympathoadrenal system with associated dopamine dysbolism; relative deficiency of dopaminergic system with activation of dopamine conversion to homovanillic acid in its intact conjugation. It is suggested that a marked increase of the ratio noradrenaline/dopamine may serve a biochemical marker of essential hypertension and risk of the disease progression.

Schlagwörter

Adult; Catecholaminesurine; Circadian Rhythm; Combined Modality Therapy; Diet,

Sodium-Restricted; Disease Progression; Electric Stimulation Therapy; Humans; Hypertensiontherapyurine; Male; Risk Factors

McCrary, D. C. (1998): Cranial electrostimulation for headache: meta-analysis. In: The Journal of nervous and mental disease, Jg. 185, H. 12, S. 766–767.

Schlagwörter Electric Stimulation Therapy; Headachetherapy; Humans; Meta-Analysis as Topic; Migraine Disorderstherapy; Research Designstandards; Tension-Type Headachetherapy

Michelson, R. P.; Vincent, W. R. (1975): Auditory evoked frequency following responses in man. In: Archives of otolaryngology (Chicago, Ill. : 1960), Jg. 101, H. 1, S. 6–10.

Abstract A sound-evoked sinusoidal response was recorded from the temporal scalp area in six humans. This evoked signal is similar in its characteristics to (and may correspond with) the "frequency-following response" of Worden and Marsh recorded on the scalp in man by Moushegian and colleagues. The site of origin of the response recorded in these subjects is not known, but it is of interest that the aspect of the scalp, and that the influence of arousal state on response amplitude paralleled the described effects of changes in arousal state on the primary auditory cortical evoked response. This technique may allow for the direct measurement of auditory thresholds across the frequency domain. This is possible because measured responses can be obtained at sound levels of the order of 15 to 20 dB across the frequency range from 300 to 2,500 Hz.

Schlagwörter Acoustic Stimulation; Arousal; Audiometryinstrumentation; Auditory Cortexphysiology; Auditory Threshold; Electroencephalography; Evoked Potentials; Hearing Disordersphysiopathology; Humans; Male; Sleep; Spectrum Analysis

Mignon, A.; Laudénbach, V.; Guischard, F.; Limoge, A.; Desmonts, J. M.; Mantz, J. (1996): Transcutaneous cranial electrical stimulation (Limoge's currents) decreases early buprenorphine analgesic requirements after abdominal surgery. In: Anesthesia and analgesia, Jg. 83, H. 4, S. 771–775.

Abstract Transcutaneous cranial electrical stimulation with Limoge's currents (TCES) consists of high frequency, low intensity currents which decreased anesthetic requirements during elective surgery. This action is likely to be mediated by the release of central endogenous opioids. In the present study, we hypothesized that TCES applied intraoperatively may decrease early postoperative narcotic requirements. Thirty-nine ASA physical status I and II patients undergoing elective abdominal surgery were enrolled in this prospective, randomized, double-blind, placebo-controlled study. Just before induction of anesthesia, patients were connected to the electrical stimulator and randomly allocated to be either stimulated (TCES group, n = 20) or not (control group, n = 19) during surgery. The managing anesthesiologist was unaware of which group the patient was assigned. Postoperatively, patients were given a patient-controlled analgesia (PCA) device delivering buprenorphine for the first four postoperative hours. The recorded variables included postoperative buprenorphine requirements, pain scores (0-10 visual analog scale [VAS]), sedation (0-4 scale), and intraoperative isoflurane requirements. Patients were comparable with respect to age, sex ratio, weight, duration of surgery, intraoperative hemodynamics, fentanyl requirements, and time from skin closure to tracheal extubation. Buprenorphine requirements were significantly reduced in the TCES group versus the control group (2.36 vs 3.43 micrograms.kg-1.h-1; P = 0.002). Intraoperative isoflurane anesthetic requirements, as well as hourly postoperative scores for pain and sedation, were the same for the two groups. These data indicate that TCES reduces narcotic requirements for early postoperative analgesia. This technique might have potential to facilitate early postoperative analgesia in patients undergoing elective abdominal surgery.

Schlagwörter Abdomensurgery; Analgesia, Patient-Controlled; Analgesics, Opioidadministration & dosagetherapeutic use; Anesthetics, Inhalationadministration & dosage; Anesthetics, Intravenousadministration & dosage; Buprenorphineadministration &

dosagetherapeutic use; Conscious Sedation; Double-Blind Method; Electronarcosis; Female; Fentanyladministration & dosage; Humans; Infusion Pumps; Intraoperative Care; Intubation, Intratracheal; Isofluraneadministration & dosage; Middle Aged; Pain Measurement; Pain, Postoperativeprevention & control; Placebos; Prospective Studies; Surgical Procedures, Elective

Naveau, S.; Barritault, L.; Zourabichvili, O.; Champagne, C.; Prieur, G.; Limoge, A. et al. (1992): [Analgesic effect of transcutaneous cranial electrostimulation in patients treated by Nd:YAG laser for cancer of the rectum. A double-blind randomized trial]. In: Gastroentérologie clinique et biologique, Jg. 16, H. 1, S. 8–11.

Abstract

The aim of this double blind cross-over randomized trial was to assess if transcutaneous cranial electrical stimulation by Limoge current could decrease the dose of fentanyl required in patients with rectal cancer treated by Nd:YAG laser. Fifty patients, 29 women, 21 men, 78 +/- 10 years old (range: 53-96 years), were treated by 2 laser sessions with an interval of 48 hours between each session. Active and sham electrostimulation were given in random order for the 2 laser sessions. The major end point was the quantity of fentanyl injected when the score of pain was greater than or equal to 5 according to a visual analgesic scale. Age, sex, body weight, tumor location and length, tumor circumferential extent and luminal patency, duration of laser session, amount of energy delivered per session (watt-seconds), and number of patients with deep sedation did not differ between the 2 groups. There was no interaction between the order of treatments and the treatments. The mean quantity of fentanyl was 29 micrograms and 42 micrograms when sham electrostimulation was given. There was a decrease of 31 percent in the quantity of fentanyl with active electrostimulation (P less than 0.05). Results were not affected either by the treatment order nor by tumor location. There were no side effects in either group.

Schlagwörter

Aged; Aged, 80 and over; Double-Blind Method; Electronarcosismethods; Female; Fentanyladministration & dosagetherapeutic use; Humans; Intraoperative Care; Laser Therapyadverse effects; Male; Middle Aged; Painetiologytherapy; Rectal Neoplasmssurgery

Oatman, L. C.; Anderson, B. W. (1980): Suppression of the auditory frequency following response during visual attention. In: Electroencephalography and clinical neurophysiology, Jg. 49, H. 3-4, S. 314–322.

Abstract

Frequency-following responses (FFRs) were recorded from unanesthetized cats with electrodes chronically implanted in the cochlear nucleus and on the round window. Tone bursts of different frequencies (irrelevant stimuli) were presented repetitively (85 dB SPL, 1/sec) as background before, during, and after the presentation of a visual discrimination task (relevant stimuli) which attempted to alter the attentive state of the animals. The mean peak-to-peak amplitudes of the FFRs from the cochlear nucleus were significantly reduced in amplitude during attention to the visual discrimination stimuli when compared with the amplitudes of the pretest- and posttest-control periods. However, at the round window (cochlear microphonic) no significant differences in amplitude were observed for the same periods. Although the amplitudes of the FFRs were reduced in amplitude at all frequencies during visual attention, much greater suppression occurred at the middle frequencies (700-2000 Hz) than at higher or lower frequencies. These data suggest that during visual attention the FFRs are attenuated by a central inhibitory mechanism.

Schlagwörter

Animals; Attentionphysiology; Auditory Perceptionphysiology; Brain Stemphysiology; Cats; Cochlear Microphonic Potentials; Cochlear Nervephysiology; Discrimination Learningphysiology; Electroencephalographymethods; Female; Neural Inhibition; Round Window, Earinnervation; Visual Perceptionphysiology

Philip, P.; Demotes-Mainard, J.; Bourgeois, M.; Vincent, J. D. (1991): Efficiency of transcranial electrostimulation on anxiety and insomnia symptoms during a washout period in depressed patients. A double-blind study. In: Biological psychiatry, Jg. 29, H. 5, S. 451–456.

## CES - Citavi

Abstract

In order to test the efficacy of cerebral electrostimulation (electrosleep) as an alternative to drug therapy for the treatment of anxiety and insomnia, we conducted a double-blind study in a sample of 21 depressed inpatients submitted to a 5-day period of drug washout on admission to the psychiatric department. During this withdrawal period, anxiety and insomnia were exacerbated in the placebo group, whereas anxiety decreased and sleep duration improved in the active treatment group, with a divergent evolution during the 5-day washout period. The depressive criteria did not respond differentially to treatment, however. Thus, the effects of this drug washout period are markedly attenuated by cerebral electrostimulation, which is of possible interest in the management of psychotropic drug withdrawal.

Schlagwörter

Adult; Anxiety Disordersetiologytherapy; Depressive Disorderdrug therapypsychology; Double-Blind Method; Electric Stimulation Therapy; Hospitalization; Humans; Male; Placebos; Psychotropic Drugsadministration & dosageadverse effects; Sleepphysiology; Sleep Initiation and Maintenance Disordersetiologytherapy; Substance Withdrawal Syndromeetiologytherapy

Pickworth, W. B.; Fant, R. V.; Butschky, M. F.; Goffman, A. L.; Henningfield, J. E. (1997): Evaluation of cranial electrostimulation therapy on short-term smoking cessation. In: *Biological psychiatry*, Jg. 42, H. 2, S. 116–121. Online verfügbar unter doi:10.1016/S0006-3223(96)00294-6.

Abstract

The effects of cranial electrical stimulation (CES) on short-term smoking cessation were evaluated in a double-blind study of cigarette smokers who wished to stop smoking. Subjects were randomly assigned to a CES- (n = 51) or a sham-treated group (n = 50). On 5 consecutive days subjects received CES treatments (30-microA, 2-msec, 10-Hz pulsed signal) or no electrical current (sham). There were no significant differences between groups on daily cigarettes smoked, exhaled carbon monoxide, urinary cotinine levels, treatment retention, smoking urges, or total tobacco withdrawal scores, although subjects in the CES group had less cigarette craving and anxiety during the first 2 experimental days. The ineffectiveness of CES to reduce withdrawal symptoms and facilitate smoking cessation are similar to results of other clinical studies of CES in drug dependence, although positive effects of CES in animal studies have been reported.

Schlagwörter

Adult; Brainphysiopathology; Carbon Monoxidepharmacokinetics; Double-Blind Method; Electric Stimulation Therapyinstrumentation; Female; Humans; Male; Middle Aged; Neurologic Examination; Nicotineadverse effects; Smoking Cessationmethods; Substance Withdrawal Syndromeidiagnosisphysiopathologytherapy; Treatment Outcome

Podzolkov, V. I.; Mel'nikova, T. S.; Suvorova, I. A.; Churganova, L. Iu; Starovoitova, S. P. (1992): [Cranial electrostimulation--a new nondrug method of treating the initial stage of hypertension]. In: *Terapevticheskiĭ arkhiv*, Jg. 64, H. 1, S. 24–27.

Abstract

The authors relate the data on the hypotensive effect and procedure of cranial electric stimulation (CES). The method was applied to the treatment of 66 patients aged 20-40 years suffering from stage I essential hypertension (EH) (WHO classification). To provide clinical and physiological evidence for CES, the EEG and ECG were recorded. In addition, computer was employed to average out and to design the histograms of the R-R intervals as was echocardiography to examine central hemodynamics. Before the treatment of SAP (179.2 +/- 4.3 mm Hg), DAP (104.2 +/- 2.6 mm Hg) the patients manifested cephalgia, cardialgia, pronounced vegetative dysfunction. The EEG showed phenomena of irritation in the upper stem structures of the brain. The histograms of R-R intervals distribution demonstrated the signs of a decrease of the tonic influence of the parasympathetic nervous system. The hyperkinetic type of hemodynamics was revealed. After CES the patients manifested an improvement of subjective symptomatology: headache attacks ceased in 85% of the patients, heart pains in 76%; AP got stabilized within normal, which correlated with normalization of central hemodynamics. The histograms of R-R intervals distribution demonstrated an increase of the model

value, a decline of the mode, and a rise of the variation range, attesting to the changes in vegetative regulation of heart activity, with a reduction of sympathetic regulation and a simultaneous increment of parasympathetic effects. The authors hold that CES is an effective and prospective method of the treatment of the initial stage of EH.

Schlagwörter

Adult; Electric Stimulation Therapymethods; Electrocardiography; Electrodes; Electroencephalography; Evaluation Studies as Topic; Head; Headachephysiopathologytherapy; Hemodynamicsphysiology; Humans; Hypertensionphysiopathologytherapy; Male

Prevec, T. S.; Ribarić-Jankes, K. (1996): Can somatosensory system generate frequency following response. In: Pflügers Archiv : European journal of physiology, Jg. 431, H. 6 Suppl 2, S. R301-2.

Abstract

The aim of this study was to establish whether functional characteristics of the somatosensory system structures in man comply with the frequency following response (FFR) generators. Somatosensory cerebral evoked potentials (SsCEP) were recorded by skin electrodes, and spinal somatosensory evoked potentials (SpEP) both by epidural and skin electrodes. In SpEP and SsCEP to trains of electrical or mechanical stimuli, a decrease of the amplitude to subsequent stimuli was found. SpEP were also attenuated by higher stimulation rates. It is highly improbable, therefore, that somatosensory system can contribute to the FFR-like response recorded in profoundly deaf people.

Schlagwörter

Brachial Plexusphysiology; Electric Stimulation; Epidural Spacephysiology; Evoked Potentials, Somatosensoryphysiology; Humans; Median Nervephysiology; Physical Stimulation; Somatosensory Cortexphysiology; Spinal Cord Injuriesphysiopathology

Rychkova, S. V.; Aleksandrova, V. A. (1995): [Transcranial electrostimulation (the mechanism of its action and its analgesic and associated effects)]. In: Voprosy kurortologii, fizioterapii, i lechebnoī fizicheskoi kulturey, H. 6, S. 23–27.

Abstract

As seen from various publications, the adjuvant use of transcranial electrostimulation (TCE) stimulates ulcer healing (the defect healed 2-3.5 times faster), promotes normalization of serum gastrin levels both in its high and low values produces analgetic, membrane stabilizing, reparative, sedative, immunomodulating and antitumor effects. The method is easy to perform, convenient, has no contraindications and serious complications.

Schlagwörter

Analgesiamethods; Animals; Brainphysiology; Electronarcosisinstrumentationmethods; Endorphinsphysiology; Enkephalinsphysiology; Humans

Scherder, E. J. A.; Deijen, J. B.; Vreeswijk, S. H.; Sergeant, J. A.; Swaab, D. F. (2002): Cranial electrostimulation (CES) in patients with probable Alzheimer's disease. In: Behavioural brain research, Jg. 128, H. 2, S. 215–217.

Abstract

In one study, behavioral disorders of patients with vascular dementia reacted positively to cranial electrostimulation (CES). In the present study, it was examined whether CES could improve cognition and (affective) behavior in patients with probable Alzheimer's disease (AD). Eighteen AD patients, divided into an experimental and a placebo group, were treated for 30 min per day, 5 days a week, for 6 weeks. No improvements in cognition and (affective) behavior were found after CES.

Schlagwörter

Aged; Aged, 80 and over; Alzheimer Diseasepsychologytherapy; Cognitionphysiology; Electric Stimulation Therapy; Female; Humans; Male; Neuropsychological Tests; Psychiatric Status Rating Scales

Scherder, Erik; Knol, Dirk; van Someren, Eus; Deijen, Jan-Berend; Binnekade, Rob; Tilders, Fred; Sergeant, Joseph (2003): Effects of low-frequency cranial electrostimulation on the rest-activity rhythm and salivary cortisol in Alzheimer's disease. In: Neurorehabilitation and neural repair, Jg. 17, H. 2, S. 101–108.

Abstract

OBJECTIVE: In previous studies, cranial electrostimulation (CES) had positive

effects on sleep in depressed patients and in patients with vascular dementia. The present study examined the effects of low-frequency CES on the rest-activity rhythm and cortisol levels of patients with probable Alzheimer's disease (AD).  
 METHOD: It was hypothesised that a decreased level of cortisol would parallel a positive effect of low-frequency CES on nocturnal restlessness. Sixteen AD patients were randomly assigned to an experimental group (n = 8) or a control group (n = 8). The experimental group was treated with CES, whereas the control group received sham stimulation, for 30 minutes a day, during 6 weeks. The rest-activity rhythm was assessed by actigraphy. Cortisol was measured repeatedly in the saliva throughout the day by means of salivette tubes. RESULTS: Low-frequency CES did not improve the rest-activity rhythm in AD patients. Moreover, both groups showed an increase instead of a decrease in the level of cortisol. CONCLUSIONS: These preliminary results suggest that low-frequency CES has no positive effect on the rest-activity rhythm in AD patients. An alternative research design with high-frequency CES in AD is discussed.

Schlagwörter

Activity Cycles; Aged; Aged, 80 and over; Alzheimer Disease; Metabolism; Physiopathology; Therapy; Brain; Physiopathology; Electric Stimulation Therapy; Female; Humans; Hydrocortisone; Metabolism; Male; Salivary Metabolism; Treatment Outcome

Scherder, Erik; Knol, Dirk; van Tol, Marie-Jose; van Someren, Eus; Deijen, Jan-Berend; Swaab, Dick; Scheltens, Philip (2006): Effects of high-frequency cranial electrostimulation on the rest-activity rhythm and salivary cortisol in Alzheimer's disease: a pilot study. In: *Dementia and geriatric cognitive disorders*, Jg. 22, H. 4, S. 267–272. Online verfügbar unter doi:10.1159/000095108.

Abstract

OBJECTIVE: In a previous study, low-frequency (0.5 Hz) cranial electrostimulation (CES) neither improved the rest-activity rhythm nor reduced the level of salivary cortisol in patients with probable Alzheimer's disease (AD). To investigate whether the frequency of CES was responsible for these negative findings, we set out to examine the effects of high-frequency CES on the rest-activity rhythm and salivary cortisol of patients with probable AD. We hypothesized that a decreased level of cortisol would parallel a positive effect of high-frequency CES on nocturnal restlessness in AD patients. METHODS: Twenty AD patients were randomly assigned to an experimental group (n = 10) and a control group (n = 10). The experimental group was treated with high-frequency CES, the control group received sham stimulation, for 30 min a day, during 6 weeks. The rest-activity rhythm was assessed by actigraphy. Level of cortisol was measured by means of salivette tubes. RESULTS: The rest-activity rhythm and the level of salivary cortisol did not react positively to high-frequency CES. In contrast, both groups showed an increase in the level of cortisol after the 6-week treatment period. CONCLUSIONS: High-frequency CES appeared to be ineffective in AD patients.

Schlagwörter

Aged; Alzheimer Disease; Metabolism; Physiopathology; Therapy; Circadian Rhythm; Physiology; Electric Stimulation Therapy; Female; Humans; Hydrocortisone; Metabolism; Male; Motor Activity; Salivary Metabolism

Scherder, Erik J. A.; van Tol, M. J.; Swaab, D. F. (2006): High-frequency cranial electrostimulation (CES) in patients with probable Alzheimer's disease. In: *American journal of physical medicine & rehabilitation / Association of Academic Physiatrists*, Jg. 85, H. 7, S. 614–618. Online verfügbar unter doi:10.1097/01.phm.0000223221.17301.50.

Abstract

In a previous study, low-frequency cranial electrostimulation did not improve cognition and (affective) behavior in patients with probable Alzheimer's disease. In the present study, 21 Alzheimer's disease patients, divided into an experimental (n = 11) and a control group (n = 10), were treated for 30 mins/day, 5 days/wk, for 6 wks with high-frequency cranial electrostimulation. Similar to the previous study, no improvements on cognition and (affective) behavior were found.

Schlagwörter

Aged, 80 and over; Alzheimer Disease; Psychology; Therapy; Cognition Disorders; Etiology; Therapy; Electric Stimulation Therapy; Female; Humans; Male;

Mood Disorders etiology/therapy; Neuropsychological Tests; Psychiatric Status Rating Scales; Skull; Treatment Failure

Schiel, K. A. (1999): A proposed psychosomatic etiologic model for rheumatoid arthritis. In: Medical hypotheses, Jg. 53, H. 4, S. 305–314. Online verfügbar unter doi:10.1054/mehy.1998.0770.

Abstract

This model attributes rheumatoid arthritis to reduction or loss of muscle tone. It is hypothesized that tone is maintained via a neurological feedback loop consisting of a spontaneous (fusimotor) signal from the central nervous system (CNS), a return signal from the sensors and a toning signal from the CNS to the muscles. Frequency of return and toning signals are thought to be identical. Arthritis patients believed to react to psychological stress with increased fusimotor frequency (i.e. muscle tension) which over-stretches the sensing tissue. Because of this damage, the lower fusimotor frequency following the stress episode cannot elicit an adequate frequency response from the sensors and this leads to a matching decline in toning pulse frequency and hence muscle tone. Reduced vascular/cardiac tone lowers blood pressure triggering a compensatory hypervolemia. The resulting hypoxia increases vascular leakage causing tissue/lymph edema and pleural/pericardial/joint effusions. Regular ingestion of ephedrine is thought to increase fusimotor frequency and this reactivates the sensors re-establishing muscle tone.

Schlagwörter

Arthritis, Rheumatoid; chemically induced; Ephedrine; adverse effects; Epinephrine; adverse effects; physiology; Female; Humans; Models, Psychological; Muscle Tonus; physiology; Psychophysiology; Disorders; complications; Stress, Psychological; physiopathology

Skille, Olav (1997): Vibroakustik. In: Berger, Lutz (Hg.): Musik, Magie und Medizin. Neue Wege zu Harmonie und Heilung: Junfermann, S. 39–43.

Spintge, Ralph; Droh, Roland (1992): Musik-Medizin. Physiologische Grundlagen und praktische Anwendungen: Urban & Fischer.

Stephen, Julia M.; Ranken, Doug F.; Aine, Cheryl J. (2006): Frequency-following and connectivity of different visual areas in response to contrast-reversal stimulation. In: Brain topography, Jg. 18, H. 4, S. 257–272. Online verfügbar unter doi:10.1007/s10548-006-0004-z.

Abstract

The sensitivity of visual areas to different temporal frequencies, as well as the functional connections between these areas, was examined using magnetoencephalography (MEG). Alternating circular sinusoids (0, 3.1, 8.7 and 14 Hz) were presented to foveal and peripheral locations in the visual field to target ventral and dorsal stream structures, respectively. It was hypothesized that higher temporal frequencies would preferentially activate dorsal stream structures. To determine the effect of frequency on the cortical response we analyzed the late time interval (220–770 ms) using a multi-dipole spatio-temporal analysis approach to provide source locations and timecourses for each condition. As an exploratory aspect, we performed cross-correlation analysis on the source timecourses to determine which sources responded similarly within conditions. Contrary to predictions, dorsal stream areas were not activated more frequently during high temporal frequency stimulation. However, across cortical sources the frequency-following response showed a difference, with significantly higher power at the second harmonic for the 3.1 and 8.7 Hz stimulation and at the first and second harmonics for the 14 Hz stimulation with this pattern seen robustly in area V1. Cross-correlations of the source timecourses showed that both low- and high-order visual areas, including dorsal and ventral stream areas, were significantly correlated in the late time interval. The results imply that frequency information is transferred to higher-order visual areas without translation. Despite the less complex waveforms seen in the late interval of time, the cross-correlation results show that visual, temporal and parietal cortical areas are intricately involved in late-interval

	visual processing.
Schlagwörter	Adult; Biological Clocksphysiology; Contrast Sensitivityphysiology; Evoked Potentials, Visualphysiology; Female; Humans; Magnetoencephalography; Male; Middle Aged; Photic Stimulationmethods; Reaction Timephysiology; Time Perceptionphysiology; Visual Cortexphysiology; Visual Pathwaysphysiology
	Warner, R.; Hudson-Howard, L.; Johnston, C.; Skolnick, M. (1990): Serotonin involvement in analgesia induced by transcranial electrostimulation. In: Life sciences, Jg. 46, H. 16, S. 1131–1138.
Abstract	The experiments described here were intended to investigate whether serotonin (5HT) may be involved in analgesia induced by low current transcranial electrostimulation (TE). The TE stimulus is a 10 mu-ampere, 10 Hz, pulsed current transmitted via electrodes in the pinnae. Combinations of the following were given as intraperitoneal injections: 300 mg/kg p-chlorophenylalanine (pCPA) 48 hours before testing, 100 mg/kg 5-hydroxytryptophan (5HTP) 30 min before testing and the saline vehicle for these drugs. Rats were tested prior to and 30 minutes after TE or sham TE. Testing for analgesia consisted of putting progressively increasing pressure on the rat tail 1/4 inch from the tip with a pneumatically driven, right angle wedge. The amount of pressure at which the rat moved its tail was measured both before and after TE, or sham TE, and recorded as the difference in tolerated peak pressure (DTPP). TE produced analgesia as manifested by a 613 percent increase in DTPP compared with sham TE treatment values. Among TE treated rats, pretreatment with pCPA decreased DTPP 91.5 percent compared with saline control values, indicating 5HT involvement. 5HTP restored TE induced analgesia in pCPA treated rats to the level of saline treated control animals, confirming 5HT involvement.
Schlagwörter	5-Hydroxytryptophanpharmacology; Analgesia; Animals; Brainphysiology; Electric Stimulation; Fencloninepharmacology; Injections, Intraperitoneal; Male; Rats; Serotoninphysiology; Skull
	Warner, R. L.; Johnston, C.; Hamilton, R.; Skolnick, M. H.; Wilson, O. B. (1994): Transcranial electrostimulation effects on rat opioid and neurotransmitter levels. In: Life sciences, Jg. 54, H. 7, S. 481–490.
Abstract	A specific form of Transcranial Electrostimulation Treatment (TCET) has been shown to induce analgesia, alleviate symptoms of opiate withdrawal and alter nociceptive responses in neurons in the midbrain and hypothalamus of rats. TCET consists of a 10Hz, charge balanced, 10 mu A current passed for 30 minutes between electrodes placed in the ears. Both serotonin (5HT) and endogenous opioids have been strongly implicated in TCET responses. This study directly measured brain levels of several neurotransmitters and their metabolites in anesthetized rats stimulated with either 10 mu A TCET or 0 mu A (Sham). Neurotransmitters measured in selected homogenized brain areas by high performance liquid chromatography were 5HT and its metabolite, 5-hydroxyindolacetic acid (5HIAA); norepinephrine (NE) and its metabolite, 3-methoxy-4-hydroxyphenethyleneglycol (MHPG); and dopamine (DA). Levels of NE and DA were significantly higher in the hypothalamic region of TCET rats than of control rats. The midbrains of TCET rats contained significantly elevated levels of DA, MHPG, 5HT and 5HIAA. In the hindbrain no significant differences were observed. Thus, TCET appears to cause an increase in the synthesis or release of 5HT, DA and NE in the midbrain and DA and 5HT in the hypothalamus. In a separate experiment, beta-endorphin-like immunoreactivity was measured in blood plasma taken from rats at intervals before, during and after a 30 minute TCET treatment, but no demonstrable TCET effect was observed. The lack of change in serum endorphin levels suggests that TCET-induced opioid activity may be confined to the central nervous system, a reasonable theory because the current passes only through the head.
Schlagwörter	Animals; Brainphysiology; Brain Chemistry; Dopamineanalysis; Electronarcosis; Male; Narcoticsanalysis; Neurotransmitter Agentsanalysis; Norepinephrineanalysis;

Rats; Rats, Sprague-Dawley; Serotoninanalysis; beta-Endorphinblood

Westermeyer, J. (1990): Rapid opioid detoxification with electrosleep and naloxone. In: The American journal of psychiatry, Jg. 147, H. 7, S. 952–953.

Schlagwörter Buprenorphintherapeutic use; Combined Modality Therapy; Electronarcosis; Humans; Naloxonetherapeutic use; Opioid-Related Disordersrehabilitationtherapy; Substance Withdrawal Syndrome prevention & control

Wilson, James R.; Krishnan, Ananthanarayan (2005): Human frequency-following responses to binaural masking level difference stimuli. In: Journal of the American Academy of Audiology, Jg. 16, H. 3, S. 184–195.

Abstract Binaural masking level difference is the behavioral threshold difference between a diotic condition (SoNo) and a dichotic condition with a 180 degrees interaural phase delay of either the signal (SpiNo) or the masker (SoNpi). Threshold disparity is partially related to coincidence-detecting units in the medial superior olive that are sensitive to low-frequency binaural stimuli with interaural phase differences. Previous surface evoked potential studies report significant latency and amplitude differences to SpiNo stimuli with respect to SoNo stimuli in the P1-N1 auditory event related potential, but no study has reported physiologic masking level differences in a brain stem evoked potential. The human frequency-following response (FFR) represents activity from low-frequency, phase locking neural units in the upper brainstem. Unmasked FFRs to 500 Hz tone bursts and masked FFRs using a 1.5 kHz low-pass masker were recorded from nine normal-hearing adult subjects. Significant reduction in FFR amplitude occurred in the SoNo condition, re the So condition, with masker intensities near the psychoacoustic SoNo masking level. Significant FFR amplitude recovery was observed for both the SoNpi and SpiNo conditions. These results support the role of phase-locked neural activity in brainstem mechanisms involved in perceptual masking release.

Schlagwörter Adolescent; Adult; Dichotic Listening Tests; Evoked Potentials, Auditoryphysiology; Evoked Potentials, Auditory, Brain Stemphysiology; Humans; Noiseadverse effects; Perceptual Maskingphysiology; Psychoacoustics

Zygierewicz, J.; Kelly, E. F.; Blinowska, K. J.; Durka, P. J.; Folger, S. E. (1998): Time-frequency analysis of vibrotactile driving responses by matching pursuit. In: Journal of neuroscience methods, Jg. 81, H. 1-2, S. 121–129.

Abstract A new method of time-frequency analysis, based on the Matching Pursuit (MP) algorithm, was used to extract and quantify EEG 'driving' or frequency-following responses produced in human primary somatosensory cortex (SI) by 33 Hz vibrotactile stimulation of the right index fingertip in a single subject. EEG signals were recorded from a 5 x 5 array of electrodes centered over the left hand area, time-locked to repeated presentations of four vibratory stimulus amplitudes. The MP algorithm was used to decompose the edited and filtered EEG signals into waveforms selected from a large and redundant dictionary. Statistical discrimination of the vibratory stimulus amplitudes was then readily achieved in terms of trial-by-trial measures of response amplitude constructed in automated fashion from the calculated MP parameters. The results were orderly and physiologically coherent, and potentially open the way to correlation of psychophysical magnitude estimates with measures of neurophysiological response on a trial-by-trial basis. The approach developed here appears well suited to detection and characterisation of time dependent or transient target signals embedded in a noisy background.

Schlagwörter Algorithms; Analysis of Variance; Electroencephalographymethods; Humans; Models, Neurological; Models, Theoretical; Physical Stimulation; Signal Processing, Computer-Assisted; Time Factors; Touchphysiology; Vibration