Conclusions: The new phantom will allow in depth experimental investigation of the dependence of the NIRS-signal on various optical tissue properties (scattering and absorption) of their changes in time and space and of the source/detector configuration thus providing a basis for advanced signal interpretation.

P17.21
Infant head model including the fontanelle for reconstruction of sources of electrical activity of the brain

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Introduction: Reconstruction of sources of electrical activity in the brain becomes a common tool in neurological research and clinic. For this method an inverse problem has to be solved which results depend highly on the accuracy of the model of the head. Such available models are mostly created based on adults images and thus neglect properties and structures typical for infants. For source reconstruction this leads to unsatisfactory results. Here most intriguing is the presence of fontanelles not yet ossified parts of the skull. Source reconstruction in infants, which neglects these fontanelles, can provide seriously faulty results. So, source reconstruction in infants has to be based on adequate head models including fontanelles. To create such models regularly magnetic resonance images (MRI) T1- or T2-images are used which unfortunately not allow to identify the fontanelles. On the other hand this is possible in computer tomography (CT) images.
Objective: To create a realistic head model for newborns including the fontanelles for source reconstruction.
Methods: MRI- and CT-data of a female subject at 40 weeks gestational age has been used for coregistration of the T1- and T2-MRI data sets and stereotaxic normalization of MRI- and CT-data. Intracranial tissue has been segmented from the MR images and bone from the CT.
Results: A newborn's head model has been created consisting of white and grey matter, cerebro-spinal fluid, cranial bone, fontanelle and scalp.
Conclusions: Numerical head models containing all structures important for source reconstruction in the infant's brain can be created by combining information from the two imaging modalities MRI and CT. Such models may be further useful for morphological studies of development of cranial and intracranial structures.

P17.22
Wireless, battery operated, ultra compact near infrared spectrometer

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Introduction: Near infrared spectroscopie (NIRS) is an upcoming method to asses information concerning local hemodynamics for neurological clinical diagnostics. Until now most commercially available NIRS instruments are relatively big, heavy and inflexible in application, which is mainly due to the use of glass fibers for light transfer and photomultipliers for photon detection.
Objectives: Creation of a portable, wireless, ultra compact, battery operated continuous wave (CW) NIRS system for continuous hemodynamic monitoring.
Methods: We have designed and prototyped a compact NIRS system using LEDs as light sources and avalanche photo-detectors with a field-programmable gate array (FPGA) as central control unit. Advantages of using a FPGA are the following:
- flexibility regarding the required LED/detector configuration, to adapt the system to such hardware changes simple upgrading of the FPGA structure by software is sufficient
- parallel high speed structure of FPGA permits implementation of arbitrary online signal processing as might be necessary for clinical application
- programmable gain amplification on detector side is possible, thus entire dynamic range of 16bit ADC can be used
- implementation of an auto calibrating mode is possible.

A MATLAB GUI user interface enables simple (re)configuring of the NIRS system through wireless bluetooth module as well as data acquisition.
Results: The system has been evaluated by tests with an optical phantom and first orienting experiments on muscle and brain. Comparison with a ISS NIRS machine showed the potential of the system as a reliable NIRS tool.
Conclusions: Our wireless flexible portable autonomic CW NIRS system provides effective, high accuracy and safe NIRS signal acquisition with the central unit smaller than a cigarette box.

P17.23
Amygdalo-hippocampal deep brain stimulation in temporal lobe epilepsy

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Introduction: Amygdalo-hippocampal deep brain stimulation (AH-DBS) in temporal lobe epilepsy (TLE) has been showed encouraging with a reduction in the frequency of seizures or even a suppression of seizures.
Objectives: To evaluate the effects of parameters of stimulation (amplitude and configuration; localization of the epileptogenic zone and of the electrode).
Methods: Eight pharmacoresistant TLE patients, not candidates for ablative surgery, received chronic, DBS (130 Hz, follow-up 12–74 months): two patients with hippocampal sclerosis (HS) and six patients with non lesional TLE (NLES). The effects of intensity (stepwise increases from 0 [Off] to 2 V) and of stimulus configuration (quadripolar, bipolar), on seizure frequency and neuropsychological performance were studied. The long-term outcomes were analysed in comparison to the localizations of the epileptogenic zones and of the electrodes.
Results: The two HS patients obtained a significant reduction (65–75%) of seizure frequency with high voltage bipolar DBS (at least 1 V) or with quadripolar stimulation. Two of the six NLES patients became seizure-free, one of them without stimulation. Two NLES patients experienced a reduction of seizure frequency (65–70%); in one of both, the primary epileptogenic zone was later localized in the anterior pole of the temporal lobe. The remaining two NLES patients obtained no significant seizure reduction: in one of them, the mesial epileptogenic zone was identified as a secondary focus, in the other, the electrode was not located exactly in the mesial structures. Neuropsychological evaluation showed reversible memory impairment in two patients under strong stimulation only.
Conclusions: AH-DBS is a valuable treatment option for patients who suffer from drug-resistant TLE and who are not candidates for ablative surgery. A large zone of stimulation (high amplitude or quadripolar configuration) was needed in both HS patients. A weak stimulation and the microlesional effect were beneficial in two NLES patients. The proximity of the electrode to the primary epileptogenic zone, and the localization of this epileptogenic zone within the mesial structures, seem mandatory to the success of AH-DBS.

Poster session 18. Neurophysiology of immune-mediated diseases

P18.1
Rituximab for treatment of Neuro-Sjögren's. Case report

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Introduction: Sjögren's syndrome is a multisystemic rheumatological disorder that can affect the nervous system. Sjögren's syndrome can cause a chronic progressive dorsal root ganglionopathy, trigeminal sensory neuropathy, and cervical myelopathy. We present a case of refractory Sjögren's syndrome manifesting as all three that responded to rituximab.
Objectives: To demonstrate the value of using Rituximab as a treatment method for Neuro-Sjögren's.
Methods: Case Report. A 44 year-old female reported developing numbness and tingling in her distal extremities after contracting chicken