

Commission on Diagnostic Methods

Ingmar Blümcke, Chair

The Commission on Diagnostic Methods covers all major diagnostic modalities to characterize a patient's epilepsy, namely electro-neurophysiology, neuropsychology, imaging and neuropathology measures. Our objective is to provide standardized protocols, terminology use and guidelines for a cost-effective diagnosis of epilepsy and their related co-morbidities, as well as use of consensus classification systems for underlying etiologies. We have set up five Task Forces to achieve this goal. They include: Neuroimaging (Andrea Bernasconi, Chair), Neuropathology (Ingmar Blümcke, Chair), Neurophysiology (Philippe Kahane, Chair), Neuropsychology (Sarah Wilson, Chair), and Summer Schools in Diagnostic Methods (Ingmar Blümcke, Chair). These groups place particular emphasis on bridging any validation gap when using technologies for the diagnosis of epilepsy. Another important goal of the commission is to develop teaching courses that address the WHAT? WHY? and HOW? of diagnostic methods, accessible throughout the world. Our work very much depends on interaction with other ILAE commissions for dissemination and training.

The Neuropathology Task Force is addressing tumor-related epilepsies. Neuropathology agreement has shown poor inter-rater agreement in the classification of brain tumors associated with long-term epilepsies (LEAT). LEATs mostly encompass glio-neuronal tumors, i.e. gangliogliomas and DNT (approx. 60-80%), and their frequencies vary largely between regional case series. We have built a collaborative virtual microscopy platform, which allowed us to review large series of LEAT variants



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by a panel of international neuropathologists and to encourage discussion between WHO and the Intl. Society of Neuropathology to achieve consensus terminology use and acceptance of a revised tumor classification system. To ensure rapid dissemination of the efforts, the Task Force organized a main session on brain tumors and epilepsy at the International Epilepsy Congress in Istanbul and at our International Neuropathology Summer School in Campinas, Brazil. Courses in 2016 will be organized in China (West China Hospital, Chengdu) and Erlangen, Germany.

The Task Force for Neuropsychology is addressing the neuropsychology measures from presurgical evaluations so that they are understandable when interpreting different test domains. Particular topics include measures for assessment of development, effects of antiepileptic drug treatment, effects of single spikes and spikewaves. We are developing consensus protocols for assessment of hemispheric dominance, measures sensitive to surgical treatment, and measures and markers for assessing every day. An official report defining minimum standards for neuropsychology assessment in epilepsy was published in 2015 (Wilson et al. *Epilepsia*, 2015) and a second report on neuropsychological measures in epilepsy surgery is envisaged for 2016. The Task Force organized its first training course on neuropsychology and epilepsy in France. Thirty-six participants took part in lectures, case presentations, and discussions designed to illustrate principles of differential diagnosis and case formulation in epilepsy.

A major goal of the Neurophysiology Task Force is to provide international consensus recommendations on intracranial EEG (IEEG) investigations. The first manuscript is entitled: "Diagnostic Utility of Invasive EEG for Epilepsy Surgery: Indications, modalities and techniques," and it will be published in the near future. Two additional projects will further address 1) recording and stimulation methodologies, and 2) data interpretation and results.

These two papers will accompany similar work from the Translational Task Force of ILAE's Neurobiology Commission aiming to provide methodological standards and functional correlates of electrophysiological *in vivo* depth recordings in rodents. The Task Force also aims at promoting training for surface and intracranial EEG. The European and North American SEEG courses have been active since 2010, and have trained almost 400 neurologists, neuropediatricians and neurosurgeons. A third Asian SEEG training course, as well as two additional summer schools dedicated to EEG in neonates and advanced scalp EEG analysis, are in development.

The Task Force for Neuroimaging is building new standardized parameters for the use of an MRI in epilepsy in order to update current guidelines according to new clinical challenges and research findings. The group has made recommendations broad enough for clinicians working with children and adults. Specific topics include the role of MRI in new-onset epilepsy, the minimum requirements for an epilepsy imaging protocol and optimized imaging for pre-surgical evaluation. There is also the need for specialized evaluation and post-acquisition processing for difficult to identify lesions. The Task Force is also working on a systematic description of common epileptogenic lesions to create a much-needed definition of "MRI-negative" epilepsy. The Task Force is also developing ILAE Summer Schools on Neuroimaging that will migrate across the continents to put the new recommendations into international practice. Our projects will be supported by a web-based collaborative MRI reading and teaching platform. A prototype is available and will be implemented in 2016.

The Commission is working to create standardized approaches to diagnostic test acquisition and interpretation, and then developing educational programs that will facilitate the implementation of these standards internationally.