non-nTMS patients ($p = 0.0058$). Median inpatient stay was 12 days for the nTMS and 14 days for the non-nTMS group (nTMS: CI 10.5–13.5 days; non-nTMS: CI 11.6–16.4 days; $p = 0.0446$). 60.0% of patients of the nTMS group and 54.3% of patients of the non-nTMS group were eligible for postoperative chemotherapy (OR 1.2630, CI 0.6458–2.4710, $p = 0.4945$), while 67.1% of nTMS patients and 48.6% of non-nTMS patients received radiotherapy (OR 2.1640, CI 1.0910–4.2910, $p = 0.0261$). There was a trend toward higher survival in the nTMS group (nTMS: 15.7 ± 10.9 months; non-nTMS: 11.9 ± 10.3 months; $p = 0.1310$). Moreover, 3, 6, and 9 month survival was significantly better in the nTMS group ($p = 0.0298$, $p = 0.0015$, and $p = 0.0167$), while there was a trend in 12 month survival ($p = 0.0544$).

**Conclusion:** The data illustrate that HGG patients benefit from preoperative nTMS motor mapping with regard to craniotomy size, duration of inpatient stay, and eligibility for adjuvant therapy. Even more important, a trend towards higher survival rates for the nTMS group compared to the non-nTMS group was revealed.


**P63. Cortical time course of object naming investigated by repetitive navigated transcranial magnetic stimulation—N. Sollmann, S. Ille, C. Negwer, B. Meyer, S.M. Krieg (Klinikum rechts der Isar, TU München, Neurochirurgische Klinik und Poliklinik, München, Germany)**

**Objective:** Various studies already explored cortical language function. However, language organization models and time course patterns are still derived from meta-analyses of numerous single publications, which only investigated scattered cortical regions. Yet, there is no systematic investigation on the distinct role and time course of the perisylvian cortex in language processing.

**Methods:** Ten right-handed volunteers (7 females & 3 males, mean age 27.2 ± 2.3 years) underwent rTMS language mapping of 12 predefined, left-hemispheric cortical regions known to be involved in language function. During investigation of each subject, rTMS pulses were applied with different picture-to-trigger intervals (PTIs) (0 ms, 100 ms, 200 ms, 300 ms, 400 ms, and 500 ms) in combination with an object naming task. Naming errors elicited by rTMS were categorized into six different error types (no-response error, performance error, hesitation, neologism, semantic error, and phonological error), and error rates (= number of errors/number of stimulations) and ratios (= number of errors of one category/total number of errors) for each category were calculated. Then, a predominant error type was defined, which represents the category with the highest error ratio per cortical region.

**Results:** The data illustrate that HGG patients benefit from preoperative nTMS motor mapping with regard to craniotomy size, duration of inpatient stay, and eligibility for adjuvant therapy.

**Conclusion:** In general, we were able to provide a time course of language processing by rTMS. Furthermore, the present study showed that the occurrence of different naming errors is significantly linked to the onset time of rTMS, and the time points of language subfunctions could be demonstrated.


**P64. Intrinsic network properties govern the network response to repetitive transcranial magnetic stimulation (rTMS) in a neuronal network model simulating the effects of rTMS—A. Bey, C. Wienbruch (Universität Konstanz, Konstanz, Germany)**

Since the underlying principles of the complex neuronal interaction in the brain are still far from being understood, network models are widely used to simulate neural activity. Classic neural network models based on binary neurons have limited dynamics and are not suitable to explain the highly chaotic behavior observed in...
measurement data. Yet, by adding the capability of summatung the synaptic input over time, they offer chaotic dynamics in combination with computational efficiency (Bressloff, 1992). Models of spiking neurons consider the number of spikes and their timing and range from detailed biophysical representations of neuronal activity (Hodgkin and Huxley, 1952) based on differential equations (Izhikevich, 2003) to integrate and Fire (IF) models. These networks exhibit rich dynamical properties (Brunel, 2000) and account for results in the field of neuroscience.

In spite of the vast number of models, there is still a gap between the theoretical findings and their mapping to neuropsychiatric and neurological disorders which are often characterized by an impaired resting state activity due to an altered connectivity. There is a need for models that account for the relation between local synaptic organization and transitions from normal to impaired neural activity.

In order to investigate the responsiveness of the resting state activity to external influences, such as medication or repetitive transcranial magnetic stimulation (rTMS), we use a time-summating binary network model for simulating the effect of synaptic layout and external influences, i.e. rTMS stimulation, on network activity with the following results:

(I) We observe two types of dynamics: a chaotic activity, and a seizure-like periodic activity (Radhakrishnan and Gangadhar, 1998) with large groups of neurons alternately firing together (Fig. 1). (II) A perturbation can convert periodic into chaotic activity or vice versa depending on the synaptic layout. (III) We define a lower and upper parameter regime of the synaptic layout for which the chaotic activity is altered by perturbation but not zero or periodic. (IV) We calculate the mean band power of the EEG frequency bands using the network output and state a rising band power in the alpha and gamma band after perturbation in the lower regime, whereas in the upper regime, the band power is stable (see Fig. 2).

In combination with our previous findings (Bey et al., 2012) it is further substantiated that the synaptic connectivity not only forms and maintains resting state activity but also affects the influence of rTMS application on resting state activity.

References


P65. Memory rehabilitation in temporal lobe epilepsy: Slow-oscillatory transcranial direct current stimulation modulates memory by altering sleep spindle generators—A. Del Felice *, A. Magalini B, S. Masiero C, P. Manganotti C,D (A University of Padova, Department of Neuroscience, Section of Neurology, Padova, Italy, B AOUI Verona, USO for Alzheimer Disease and Cognitive Impairment, Verona, Germany, C University of Verona, Department of Neurological and Movement Sciences, Section of Neurology, Verona, Italy, D Foundation IRCCS San Camillo Hospital, Department of Neurophysiology, Venezia-Lido, Italy)

Background: Temporal lobe epilepsy (TLE) is often associated with memory deficits. Given the putative role for sleep spindles in learning and encoding, the distribution of spindle generators skewed toward the affected lobe in TLE subjects may be a neurophysiological marker of defective memory. Slow-oscillatory transcranial direct current stimulation (sotDCS) has been shown to improve memory possibly by increasing slow-wave sleep and modulating sleep spindles.