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## **The treatment with repetitive transcranial magnetic stimulation on non-lesional focal epilepsy**

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### **Purpose**

Repetitive transcranial magnetic stimulation (rTMS) is a non-invasive technique that changes excitability of different cortical areas. Our aim is to evaluate the number and duration of seizures in patients with focal epilepsy during and after 0.5 Hz-rTMS.

### **Methods**

**Patient population** Three patients with focal epilepsy were studied whose electrical sources of paroxysmal activity in neocortical regions were determined. They received standard pharmacological treatment without modification from at least 1 month before the study started. **Study design** rTMS was carried out at baseline, intervention and follow-up periods. The baseline period duration was 4 weeks and intervention with rTMS for 2 weeks, and follow-up period for 8 weeks. **EEG analysis** A high-resolution 120 channels-EEG was used. The epileptic focus was determined with current source analysis of paroxysmal activity by sLORETA. Current sources are restricted to brain parenchyma by the use of a mask that prohibits solutions where the mask is zero, i.e., in the CSF (Figure 1). **Repetitive transcranial magnetic stimulation** rTMS session at 0.5 Hz was carried out on the epileptogenic zone with total of 900 pulses delivered at 100% intensity of the resting motor threshold (RMT) during 2-weeks. Using neuronavigation system improved the targeting of the epileptic foci (Figure 1).

### **Results**

During the baseline, three patients had seizures, 7.25, 3.25, 4 times per week. In patient number 2 and 3, this frequency decreased during the intervention period to 1, 0.5 times respectively, which means 69%, and 87% reduction. During the follow-up period, this decreased to 2.13 and 1.13 times per week, corresponding to 34% and 72% decrease. (Figure 2)

### **Conclusion**

We think that 0.5Hz rTMS over epileptic focus decrease the number of seizures in patients with focal epilepsy. rTMS for non-lesional focal epilepsy may be an alternative treatment for pharmoco-resistant patients.

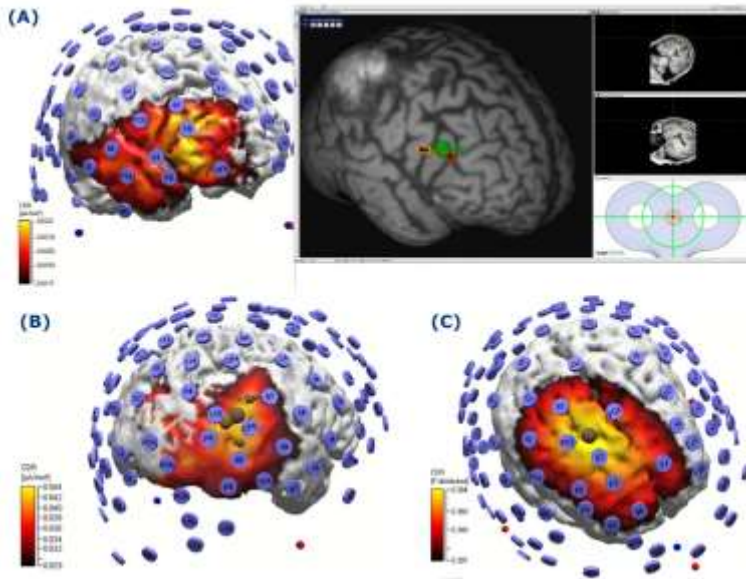


Fig 1. Localization of the epileptic focus, using electrical source analysis with sLORETA. (A) In the right inferior frontal region of patient number 1. A precise localization of the epileptic focus combined with neuronavigation systems to place the coil over the head improved the targeting of the epileptic foci. (B) Right parietal region of patient number 2. (C) Right superior frontal region of patient number 3.

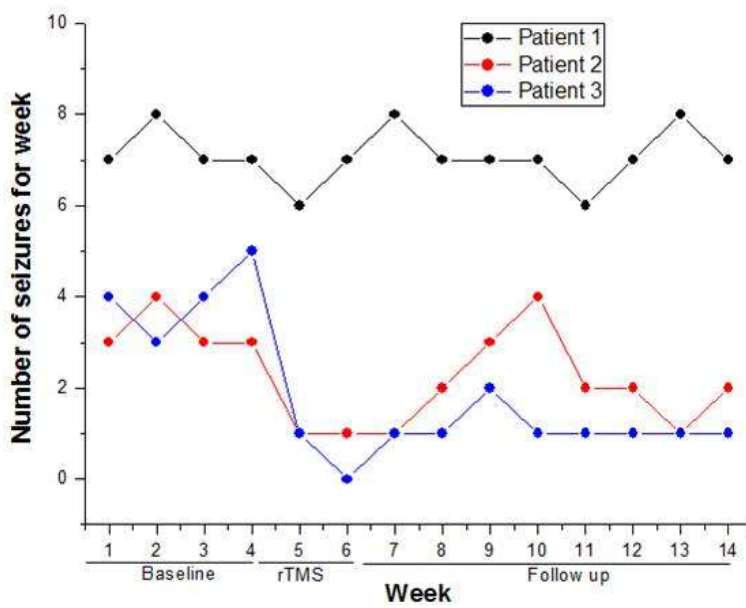


Fig 2. Mean number of seizures per week during, baseline, rTMS and follow-up period