Good news for data sharing

Defacing of MR scans using SimNIBS 4.0

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included 542 iTBS-treated patients with unipolar or bipolar depression. Outcome was assessed with Clinical Global Impression Severity [AN1] and Improvement [AN2] scores in an intention to treat analysis.
Results: The response rate was 42.1% and 16.1% reached remission. The response rate was significantly larger in the oldest age group compared to the youngest (odds ratio 3.46, 95% confidence interval 1.65-7.22). Less severe level of depression (Montgomery-Åsberg depression rating scale self-assessment <36) at baseline predicted response and remission. Only less than 1% were much or very much worse after treatment. Drop-out rate was 10.9%. No serious adverse events were reported.
Limitations: Retrospective analysis of register data. No comparison group.
Conclusions: In a clinical setting, iTBS was shown to be safe and tolerable and the response rate was similar to that reported from clinical trials. Older age-group and less severe illness predicted response.
Research Category and Technology and Methods
Clinical Research: 10. Transcranial Magnetic Stimulation (TMS)
Keywords: Theta-burst stimulation, Depression, Bipolar Disorder

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Abstract key: PL- Plenary talks; S- Regular symposia oral; FS- Fast-Track symposia oral; OS- On-demand symposia oral; P- Posters

P3.117

ELECTRIC FIELD DOSING REQUIRES A HIGHER STIMULATION INTENSITY FOR MEDIAL PREFRONTAL TMS COMPARED WITH LATERAL PREFRONTAL TMS

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Abstract
Background: TMS has advanced markedly with the ability to determine, within an individual, the dose needed for moving the contralateral thumb (MT). However this method works well in motor system, but is imperfectly applied when stimulating non-motor regions like the prefrontal cortex. Historically, investigators have used a rule-based adjustment to overcome potential atrophy in the prefrontal cortex. Recent electric field (E-field) modeling has shown that these one size fits all approaches do not account for individual variability, and still likely under or overdose most individuals. In an ongoing clinical trial of prefrontal TMS for smoking cessation, we have begun using an E-field modeling to determine individualized TMS dosing. The purpose of this sub-study was to compare the stimulation intensity determined by E-field dosing to conventional motor threshold (MT) dosing.
Methods: To date, 25 smokers have had their MT determined and a structural MRI scan evaluated with E-field modeling. The dorsolateral prefrontal cortex (DLPFC) and the medial orbitofrontal cortex (mOFC) were calculated with E-field modeling. 23 paired data sets were included in the analysis.
Results: E-field modeling doses are significantly higher than 120% MT dose (64.00±9.25 vs., 54.17±10.59), $t = 3.85$, $p < 0.001$). Comparing to MT dose, E-field modeling dose for mOFC shows a tendency higher dose than that for DLPFC (128% MT vs. 116% MT, $t = -1.14$, $p = 0.26$). There were no dropouts or serious adverse events from E-field dosing.
Conclusions: E-field modeling determined prefrontal MT dose is feasible, and likely delivers a different E-field dose between lateral frontal and medial frontal cortices.
Research Category and Technology and Methods
Translational Research: 10. Transcranial Magnetic Stimulation (TMS)
Keywords: Motor Threshold, Electric field (E-field) modeling, Smoking, MRI

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GOOD NEWS FOR DATA SHARING: DEFACING OF MR SCANS USING SIMNIBS 4.0

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Abstract
Introduction: Transparency and reproducibility are important quality attributes in science. However, privacy and data security limit the public use of raw datasets in platforms like Open Science Framework. One possibility is to anonymize MRI data and make the facial profile (nose, eyes, mouth) unrecognizable using tools such as the Python package pydeface. For full anonymization all facial data is removed from the MRI scan. This reliably prevents facial reconstruction, which occurs when head-mesh files are generated by SimNIBS.
Therefore, we aimed to investigate whether defaced and full-faced scans result in different electric-fields (e-field) when using SimNIBS.
Methods: We simulated e-field distributions ($n = 17$) with SimNIBS (Version 4.0b0). Transcranial Magnet Stimulation was applied over the left DLPFC at an intensity of 80% of the resting-motor threshold. For each subject, the simulation was conducted with T1- and T1-T2-weighted scans (scan type) with i) defaced and ii) full-faced scans, respectively.
Results: The ANOVA revealed no significant differences between defaced and full-faced scans for all e-field percentiles (99.9%, 99.0%, 95.0%) and a main-effect of scan type for the 99.9% e-field percentile. Post-hoc analysis showed higher e-field values for T1-weighted than for T1-T2 weighted scans for the 99.9%-percentile.
Discussion: In summary, for e-field simulations with SimNIBS4.0 defaced scans do not result in different outcomes than full-faced scans. SimNIBS4.0 automatically substitutes the missing facial data by template data, which might contribute to the low differences. But different scan types might lead to diverging results in the highest e-field percentile. By ensuring the same e-field output, future studies with SimNIBS should be performed with defaced images, allowing the community to share scans and head-mesh files with the interested public in the spirit of the Open Science concept.
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Research Category and Technology and Methods
Basic Research: 10. Transcranial Magnetic Stimulation (TMS)
Keywords: SimNIBS, defacing, TMS-simulation, electric-field

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