Results: For both left and right TLE, a significantly reduced connectivity structure ($p < 0.0001$) was observed after ATLR. Left TLE showed primarily impaired connectivity for the left and right inferior frontal cortex (IFC) and both temporal lobes, while right TLE showed alterations particularly for the right IFC. Left TLE showed increased fronto-temporal connectivity within left and right hemisphere and within the right IFC. Right TLE showed a widespread increase in connectivity especially for the right IFC to ipsi- and contralateral regions. In left TLE, greater posterior hippocampal connectivity was related to better naming ability, and a higher integration of contralateral language ROIs was significantly related to less postoperative decline in naming.
Conclusion: The critical role of the left hippocampus during language tasks is emphasized by widespread disruptions primarily observed in left TLE. Postoperative reorganization hints at multiple systems supporting language function.

593 | Brain morphometry from post-contrast MRI to analyze data from first-seizure patients acquired with clinical protocols

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Purpose: Brain morphometry is usually derived from high-resolution, native T1-weighted (T1w) MRI. However, such dedicated protocols are sometimes missing in imaging data from patients acquired in clinical routine, but instead, a T1w image with a contrast agent is available. Existing morphometry tools like FreeSurfer yield unreliable results when applied to post-contrast images or might even fail completely. Consequently, these acquisitions are often excluded from morphometry studies, which reduces the sample size. We hypothesize that deep learning-based morphometry methods can extract morphometric measures also from post-contrast images.
Methods: We have extended DL+DiReCT, an in-house developed morphometry tool using deep-learning (DL), to cope with post-contrast MRI. Training data were enriched with imaging data where both native and post-contrast images from the same session were available. Both images were coregistered and morphometry derived from the native image with FreeSurfer was used as ground truth for the post-contrast image. Global and regional cortical thickness derived from native and post-contrast images were contrasted to results from FreeSurfer. The method was trained on non-epileptic patients and subsequently applied to a single-center subgroup of first-seizure patients enrolled in a prospective study (The Swiss-First study).
Results: In the non-epileptic patients, correlation coefficients of global mean cortical thickness between native and post-contrast images were significantly higher with DL+DiReCT ($r = 0.91$) than with FreeSurfer ($r = 0.75$). On preliminary data from first-seizure patients, 76 had both a native and post-contrast MRI where the high correlation could be confirmed ($r = 0.90$). From additional 49 patients of the study only post-contrast MRI were available which would otherwise not be accessible for morphometric analysis. Using the proposed method, the study sample size could be increased by 56%.
Conclusion: Brain morphometry can be derived reliably from post-contrast images using DL-based morphometry tools, allowing the inclusion of routinely acquired incomplete datasets for analysis and potential future diagnostic morphometry tools.

631 | Anatomical and functional alterations in juvenile myoclonic epilepsy: voxel-based morphometry and resting-state fMRI study

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Purpose: We aimed to investigate the structural and functional brain abnormalities in juvenile myoclonic epilepsy (JME) patients with photosensitivity.
Methods: Thirty JME patients, 15 of (50%) who were photosensitive (JME-PS) and 32 healthy controls (HC) were involved in the study. The high-resolution T1-weighted MRI data were acquired for voxel-based morphometry (VBM) analysis, and resting-state functional MRI data were acquired for functional connectivity (FC) analysis. The regions that showed significant differences in VBM analyses, were used as regions of interest in FC analysis for the comparisons between the whole JME group, which consist of PS and non-photosensitive (NPS) JME

subgroups, and HCs. Cluster-level significance was set at family-wise error (FWE) corrected $p < 0.05$.

Results: The left postcentral gyrus showed decreased connectivity in the right dominant bilateral middle cingulate gyrus, the right dominant bilateral supplementary motor area, and right superior frontal gyrus whereas left cerebellum crus 1 showed decreased connectivity in right cerebellum lobule IX and dorsal pons in JME-PS compared to the HCs (*pFWE-corr* = *0.0014*, *pFWE-corr* = *0.0436*, respectively). The left middle temporal gyrus showed decreased connectivity with the left dominant bilateral superior frontal gyrus in JME-PS compared to JME-NPS (*pFWE-corr* = *0.0016*). Left precentral gyrus showed; i) increased connectivity with left superior frontal gyrus in JME-NPS compared to HCs (*pFWE-corr* = 0.0015), ii) decreased connectivity with right dominant bilateral calcarine fissure and occipital pole in JME-PS compared to JME-NPS (*pFWE-corr* = 0.0103).

Conclusion: This study revealed structural abnormalities of the cerebellum, temporal gyrus, and parietal lobe besides the frontal areas and abnormalities in the FC of these areas with key structures for the pathogenesis of photosensitivity. Our results reinforce the existence of functional-anatomic ictogenic networks in JME and the concept of 'system epilepsies'.

687 | Network characterization of the prefrontal cortex in children with intractable epilepsy

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Purpose: Children with intractable epilepsy often display executive dysfunction independent of their epileptic onset zone. In addition to poor performance on executive functioning (EF) assessments compared to healthy children, neuronal dysregulation has also been observed. These studies have revealed that children with epilepsy show non-typical patterns of neuronal activation relative to controls in areas involved with EF (Gutierrez-Colina AM. Brain Imaging Behav. 2021). Given the known importance of the prefrontal cortex (PFC) in EF, the current study aims to characterize the activation of various regions within the PFC in children with intractable epilepsy, compared to controls.

Methods: Pediatric patients with intractable epilepsy, and age/sex matched healthy controls, underwent structural and resting-state functional MRI. Functional connectivity of various brain regions in the PFC were characterized using graph analysis. Independent sample t-tests were performed to assess differences in network metrics between healthy controls and patients.

Results: Ten patients and ten controls completed the study (12 females, age $M = 9.93$ years, $SD = 3.64$ years). Participation of the left inferior frontal gyrus was reduced in patients with epilepsy compared to controls ($p = 0.0188$). Predominantly significant differences between patients and controls were found for the clustering coefficient where various bilateral regions including the precentral gyrus, inferior frontal gyrus (both $p < 0.01$) and superior frontal gyrus ($p < 0.05$), were significantly lower for patients with epilepsy compared to controls.

Conclusion: This study revealed a decreased clustering coefficient in prefrontal areas associated with EF for patients with epilepsy compared to controls. The impact of the clustering coefficient has met with varied interpretations in the literature, wherein individual differences in EF have been associated with both increased and decreased clustering coefficients (For a review, see Reineberg AE. Hum Brain Mapp. 2016). To fully elucidate the impact on patients, EF assessments should be considered as per the current analysis.

704 | Assessing and predicting visual outcomes after anterior temporal lobectomy and selective amygdohippocampectomy – a quantitative comparison of clinical and tractography data

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Purpose: Anterior temporal lobectomy (ATL) and selective amygdalohippocampectomy (SAHE) are effective treatment strategies for intractable temporal lobe epilepsy but may result in a contralateral superior visual field deficit (VFD). VFDs following epilepsy surgery are caused by intraoperative damage the optic radiation (OR). This imaging study aimed to predict and compare visual outcomes using diffusion based connectomes.

Methods: We studied 62 TLE patients who underwent ATL ($n = 32$) or SAHE ($n = 30$). Incidence rates of VFDs ($n = 44$) and quantitative perimetry outcomes ($n = 43$)