Focal Cortical Dysplasia Surgery

- Stereoelectroencephalography-guided radiofrequency thermocoagulation for drug-resistant epilepsy: A meta-analysis
- The "chapeau de gendarme" sign in focal epilepsy: A systematic review
- Effect of stereo-EEG versus subdural EEG on functional and seizure outcome in pediatric and adult epilepsy surgery: A 21-year single-center experience
- Anatomical-electroclinical phenotypes and SEEG-defined network patterns in pure insular lobe epilepsy: A study of 20 cases
- Critical contributions of neuronal subtypes to pediatric drug-resistant focal dysplasia
- Patterns of phosphorylated tau accumulation in a spectrum of acquired and developmental brain lesions associated with refractory epilepsy
- Computational modeling of frequency-dependent neocortical response to thalamic neurostimulation in epilepsy
- Converting "nonlesional" imaging occult epilepsy into a focal lesional entity using advanced imaging techniques: illustrative case

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Surgery is considered in selected cases to achieve seizure control.

Indications

- Medically refractory epilepsy (failure of ≥2 anti-seizure medications)
- Well-localized epileptogenic zone
- MRI-visible lesion (especially FCD Type II)
- Concordant findings between MRI, EEG, and functional imaging
- Lesion not involving eloquent cortex or amenable to functional mapping

Preoperative Evaluation

- High-resolution 3T MRI (epilepsy protocol)
- Video-EEG monitoring to define seizure onset zone
- Functional imaging:
  - PET (interictal hypometabolism)
  - SPECT (ictal/interictal perfusion mismatch)
- Neuropsychological assessment
- MEG or SEEG in MRI-negative or complex cases

Surgical Techniques

- **Lesionectomy**: Removal of visible lesion
- **Extended resection**: Includes epileptogenic cortex surrounding the lesion
- **Lobectomy / multilobar resection**: If larger epileptogenic network

- **LITT (Laser interstitial thermal therapy)**: Minimally invasive alternative for deep or eloquent areas
- **Palliative options**: Vagus nerve stimulation, corpus callosotomy if non-resectable

Outcomes

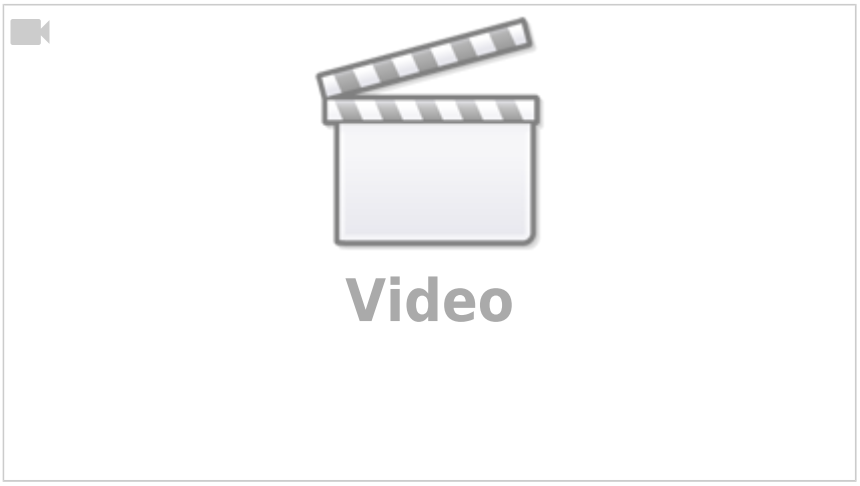
- Seizure freedom (Engel Class I):
  - 70–80% in well-selected patients
  - Higher success in FCD Type IIb and MRI-positive cases
- Predictors of good outcome:
  - Complete resection
  - Histology: FCD IIb
  - Concordant EEG/MRI
- Possible complications:
  - Neurological deficits (depending on location)
  - Transient or permanent cognitive impairment

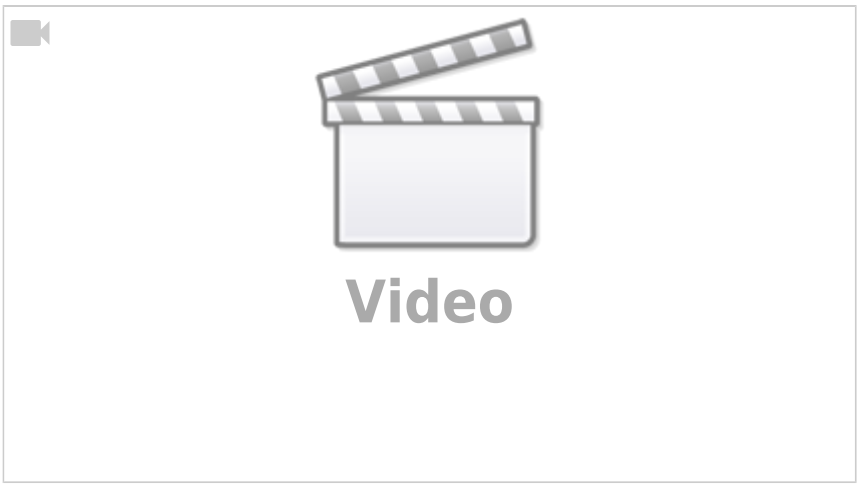
Histopathological Classification (ILAE)

- **Type I**: Isolated cortical dyslamination
- **Type IIa**: Dysmorphic neurons without balloon cells
- **Type IIb**: Dysmorphic neurons with balloon cells (best surgical outcomes)
- **Type III**: FCD associated with another lesion (e.g., tumor, hippocampal sclerosis)

Postoperative Follow-up

- Post-op MRI to assess completeness of resection
- EEG monitoring
- Gradual withdrawal of antiepileptic drugs after ≥1–2 years seizure freedom
- Neuropsychological reassessment





Resection for focal cortical dysplasia treatment

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