


Presurgical evaluation and Epilepsy Surgery

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Goal of therapy in epilepsy

- No seizures
- No adverse events
- Improvement of quality of life




Indication

Intractable to medical treatment

- Acceptable seizure control cannot be achieved, despite adequate trials with potentially effective drugs, at dose or levels that are associated with no side effects or with acceptable side effects only
- At least 2 first-line drugs

Goal of epilepsy surgery evaluation

- Confirm the diagnosis of focal epilepsy
- Identify an epileptogenic lesion
- Localize the ictal onset zone
- Determine the functional status of the epileptogenic zone and its surrounding



Presurgical evaluations

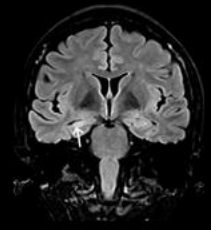
- H&P
- Routine EEG, 24-hour video EEG, MRI
- Neuropsychological test
- Neuropsychiatric evaluation
- Ictal SPECT, PET, fMRI (MEG, source localization,...)



Irritative zone
Ictal onset zone



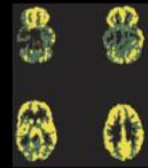
Presurgical evaluation



Epileptogenic lesion

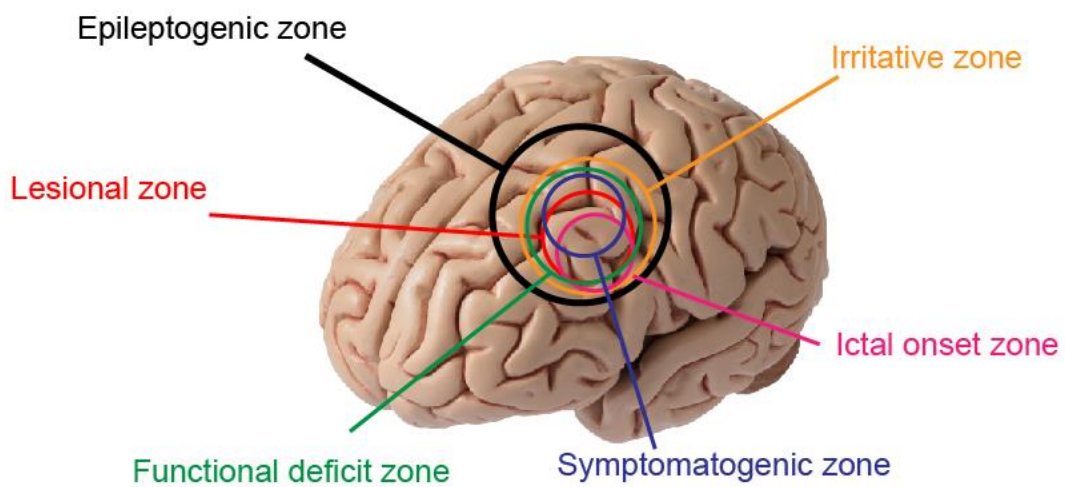


Symptomatogenic zone



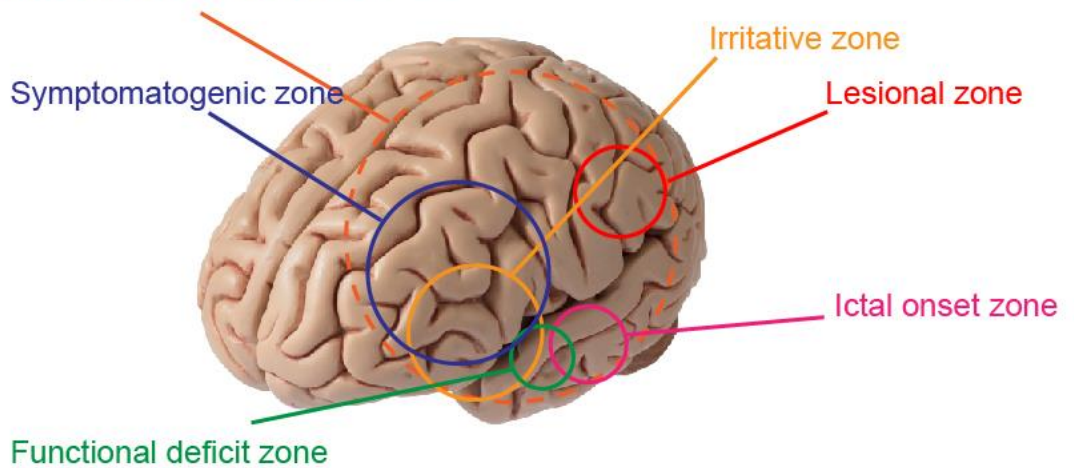
Functional deficit zone





Concordant data

Epileptogenic zone???



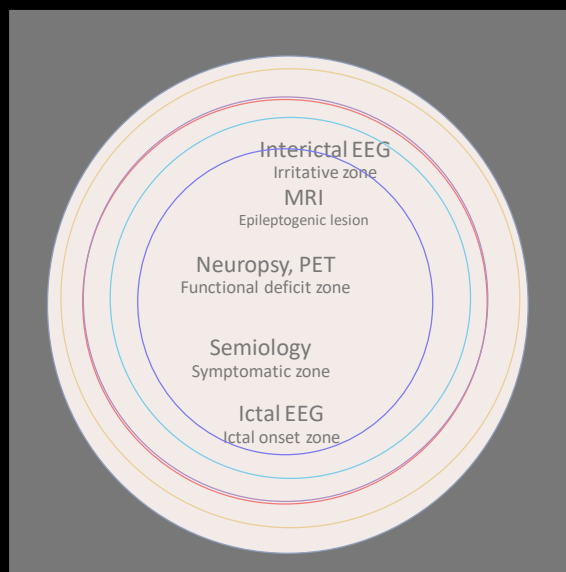
Discordant data

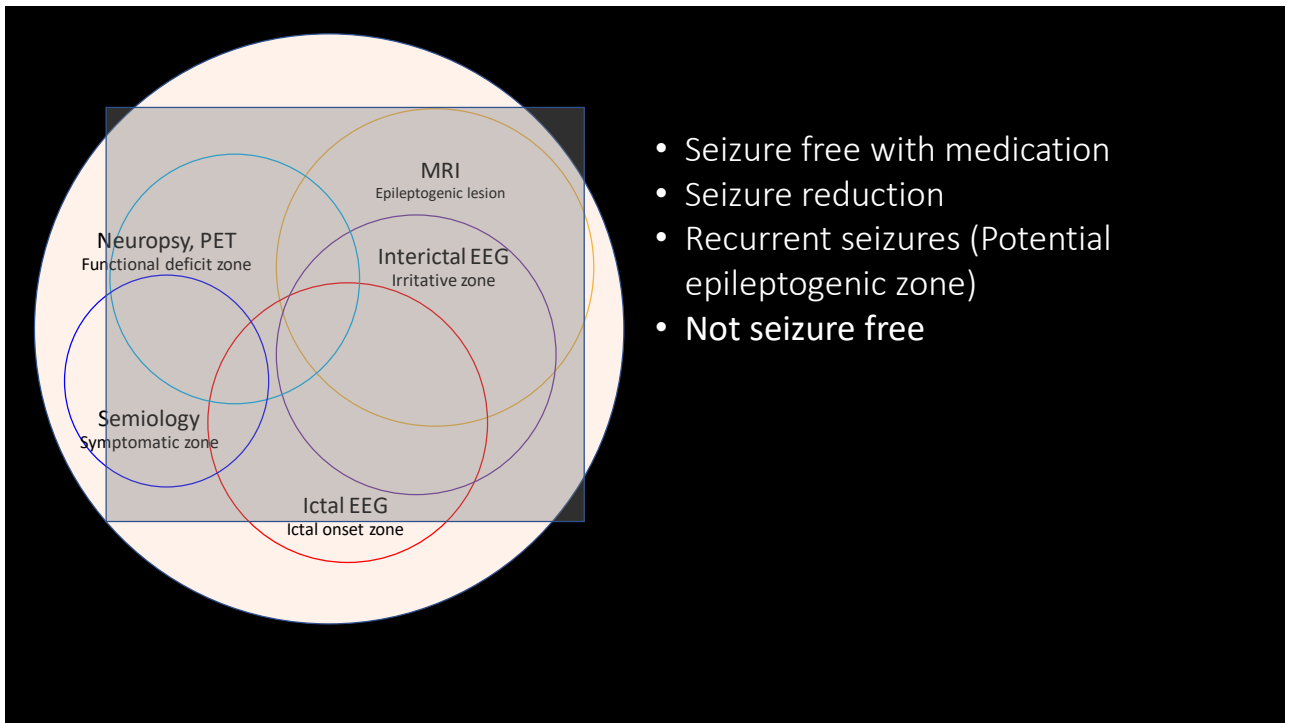
“Complete Resection or disconnection of the cortical areas or networks responsible for generation of seizures (epileptogenic zone)”

- Resection
- Disconnection
- Laser ablation
- Focused ultrasound
- Thermocoagulation
- Radiosurgery



Seizure Free

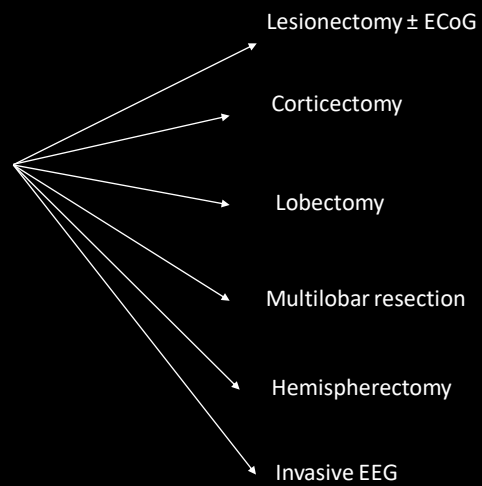




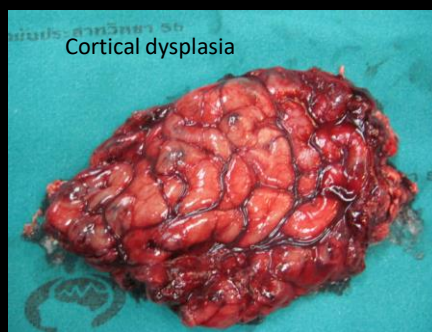
- Seizure free with medication
- Seizure reduction
- Recurrent seizures (Potential epileptogenic zone)
- **Not seizure free**

Lesions

- Hippocampal sclerosis
- Cortical dysplasia
- Tumors
- Cavernoma
- AVM
- Misc



Lesions



Adults

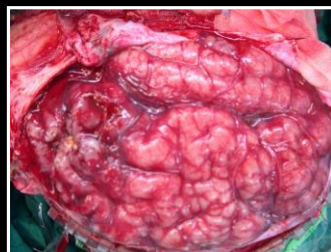
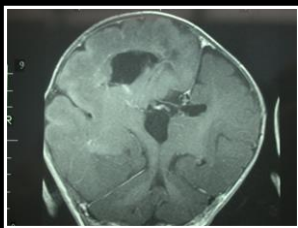
- Temporal lobe surgery (Most common surgery)
- Hippocampal sclerosis (Most common pathology)

Pediatrics

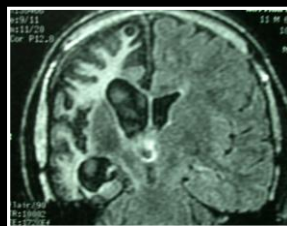
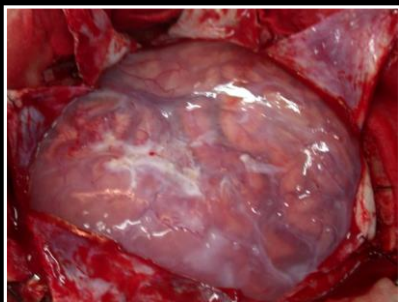
- Extratemporal (Most common surgery)
- Cortical dysplasia (Most common pathology)

Pediatrics

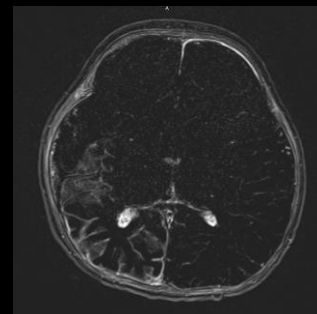
- Hemispheric epilepsies
 - Hemimegalencephaly
 - Rasmussen's encephalitis
 - Congenital infarction
 - Sturge Weber syndrome



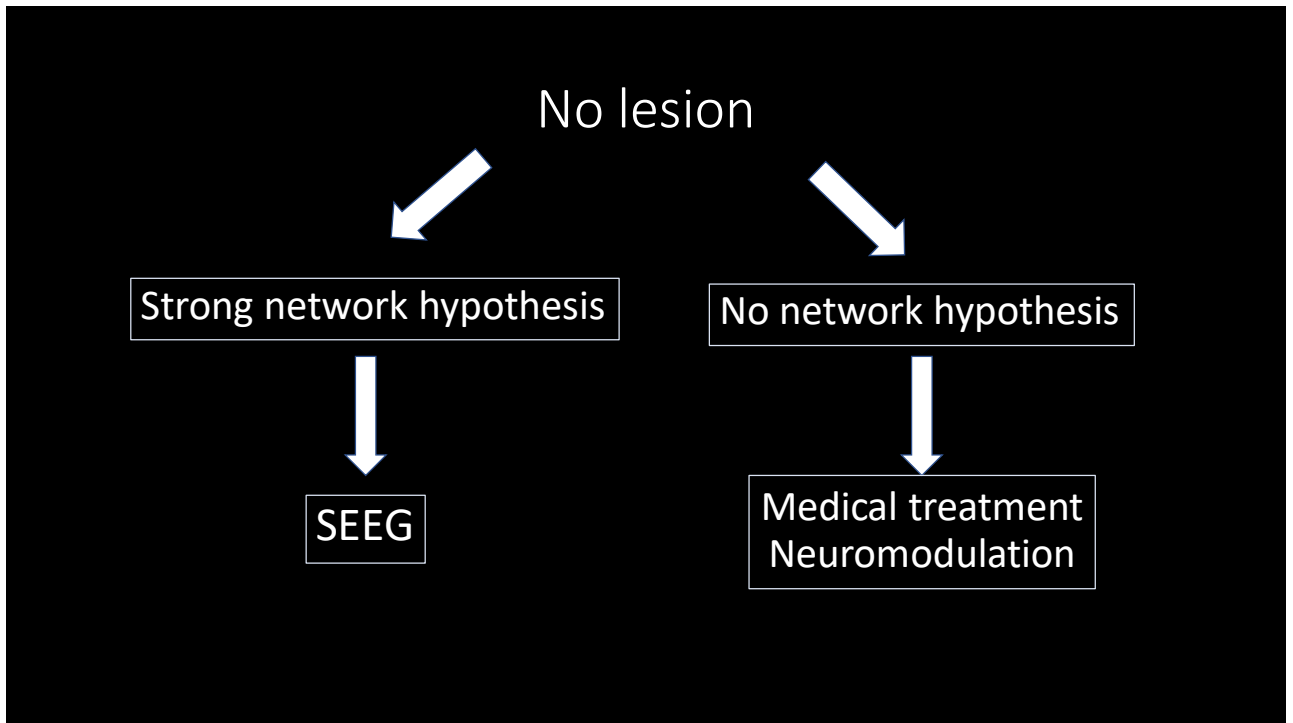
Hemimegalencephaly



Rasmussen's encephalitis



Sturge Weber Syndrome



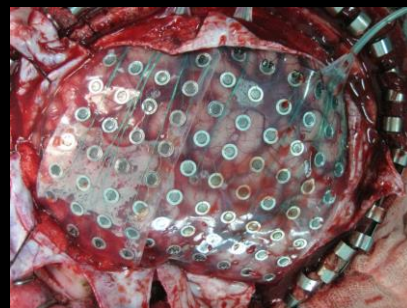
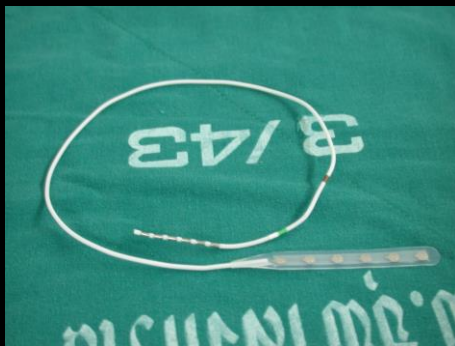
Invasive surgery

Strong anatomic-electro-clinical hypothesis

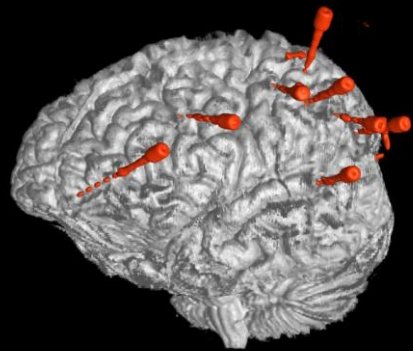
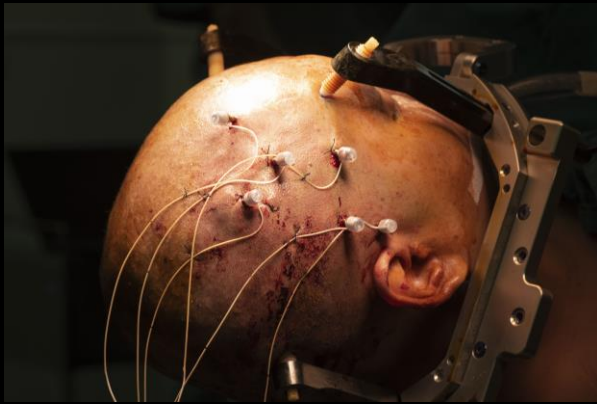
MRI +ve	Invasive	MRI-ve	Invasive
Noneloquent	None	No lesion identified	SEEG
Eloquent	SDE/depth +/- SEEG		
Depth of sulcus	SDE/depth or EcoG/depth		
More than 1 lesions	SEEG		
Deep lesion (insula/cingulate)	SEEG		

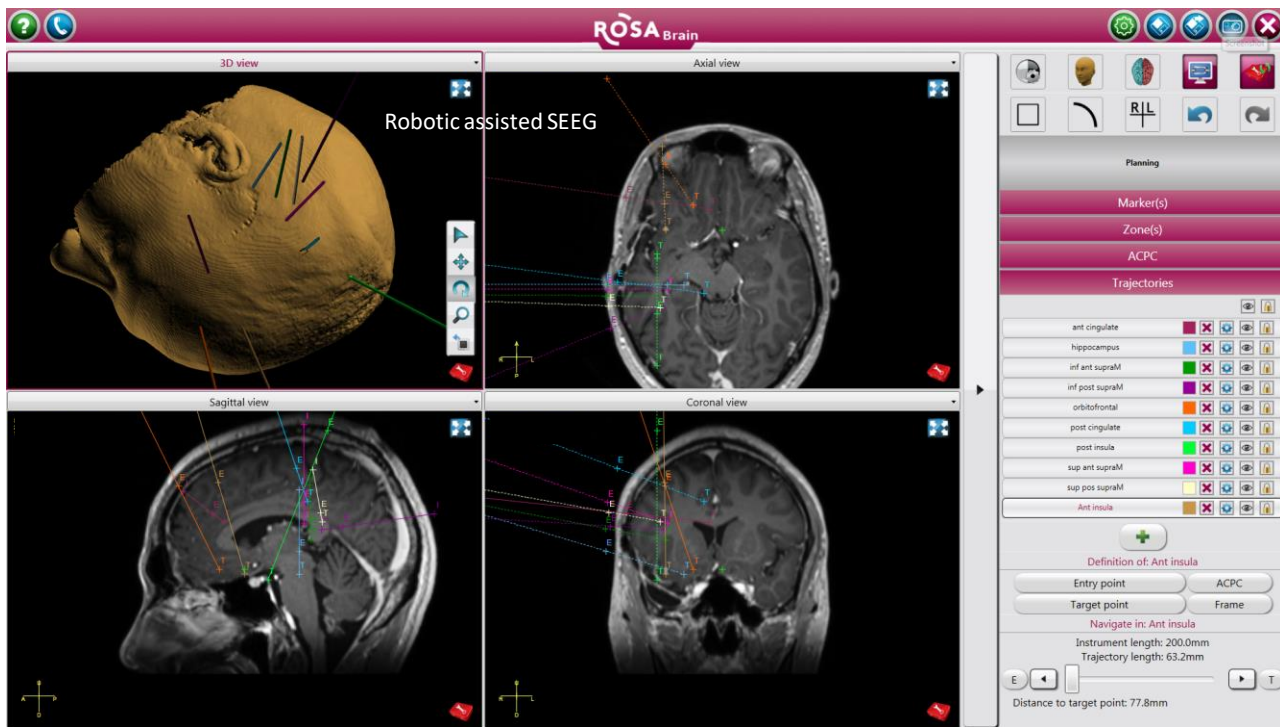
Adapted from Najm I , Youmans & Winn 7th eds Textbook of Neurosurgery

Depth & subdural electrodes



StereoEEG (SEEG)





Palliative surgery

- Multiple subpial transections
- Corpus callosotomy

Neurostimulation

- Vagal nerve stimulation
- Deep brain stimulation
- Responsive neurostimulation

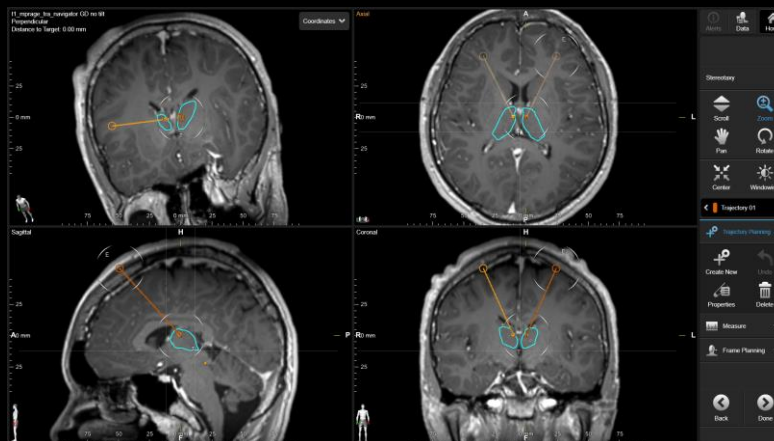
Corpus callosotomy



VNS



Anterior thalamic DBS



Outcomes of Epilepsy Surgery

Engel's Classification I-IV

Thank you