



**BC Epilepsy
Society**

What to do IF Medications Fail?

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Outline and Objectives

- What is intractable epilepsy?
- Discuss why medications may fail
- Learn more about alternate treatments to medications
 - Epilepsy Surgery
 - Vagal Nerve Stimulator
 - Ketogenic Diet
- Discuss future potential therapies

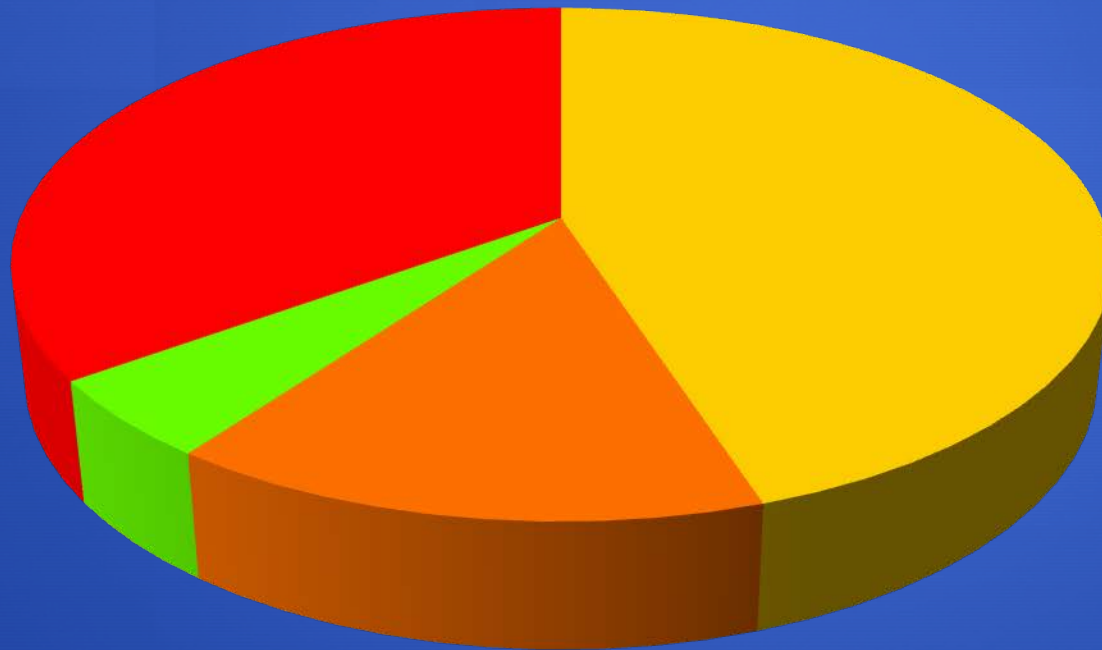


Intractable Epilepsy

- 47% seizure free on first medication
- 13% seizure free on second medication
- <5% seizure free on third medication
- 30% of patients have difficult to control epilepsy

Intractable Epilepsy

Individuals with Epilepsy



- First Medication
- Second Medication
- Third or More
- Uncontrolled

Why may anticonvulsants fail?

- Incorrect diagnosis
- Incorrect anticonvulsant
- Intolerable side effects or noncompliance
- Drug-resistant epilepsy



Goals of Epilepsy Surgery

- Seizure-freedom
- Improvement of quality of life
- Do no harm (minimize deficits)
- Decrease anticonvulsants



Aims of Epilepsy Surgery Workup

- Find where seizures are coming from
- To spare important brain functions

Evaluation for Epilepsy Surgery

- History and Physical Examination

Evaluation for Epilepsy Surgery

- History and Physical Examination
- Video EEG monitoring

Evaluation for Epilepsy Surgery

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Evaluation for Epilepsy Surgery

- History and Physical Examination
- Video EEG monitoring
- Neuropsychological assessment

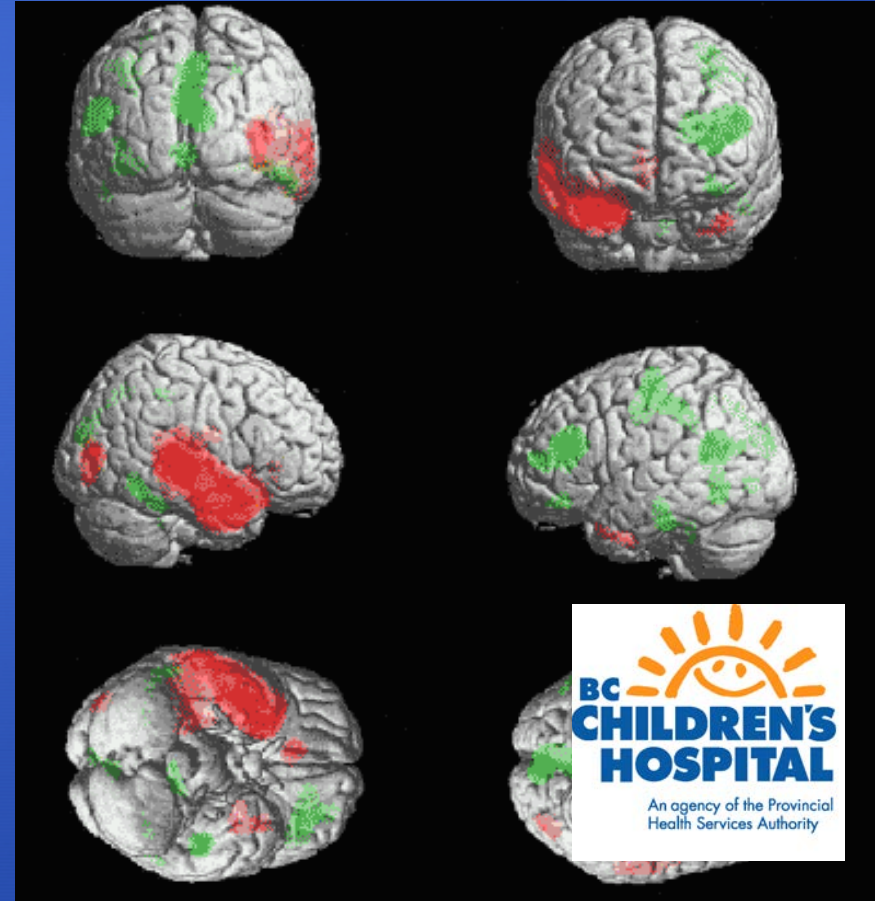
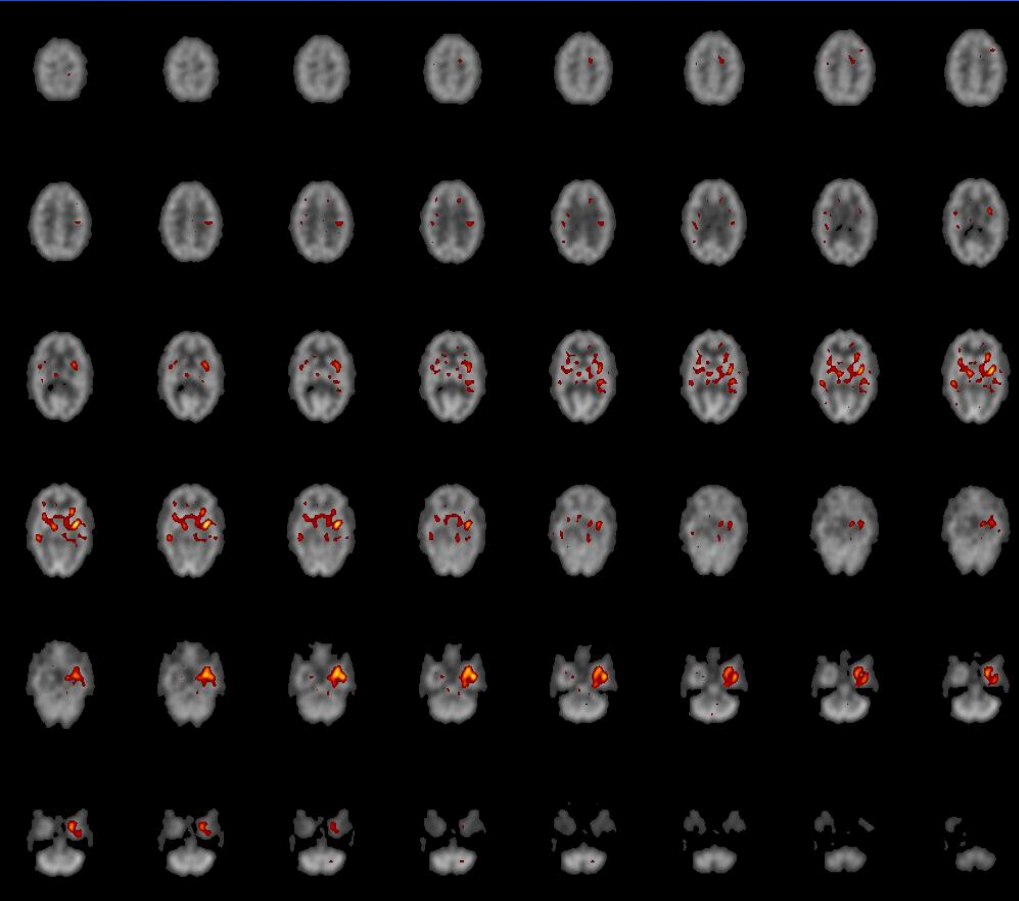
- MRI – 1.5 or 3T

Evaluation for Epilepsy Surgery

- Ictal SPECT, PET
- MEG
- fMRI
- Wada test
- EcoG (electrocorticography)
- Subdural/Depth electrodes +/- mapping

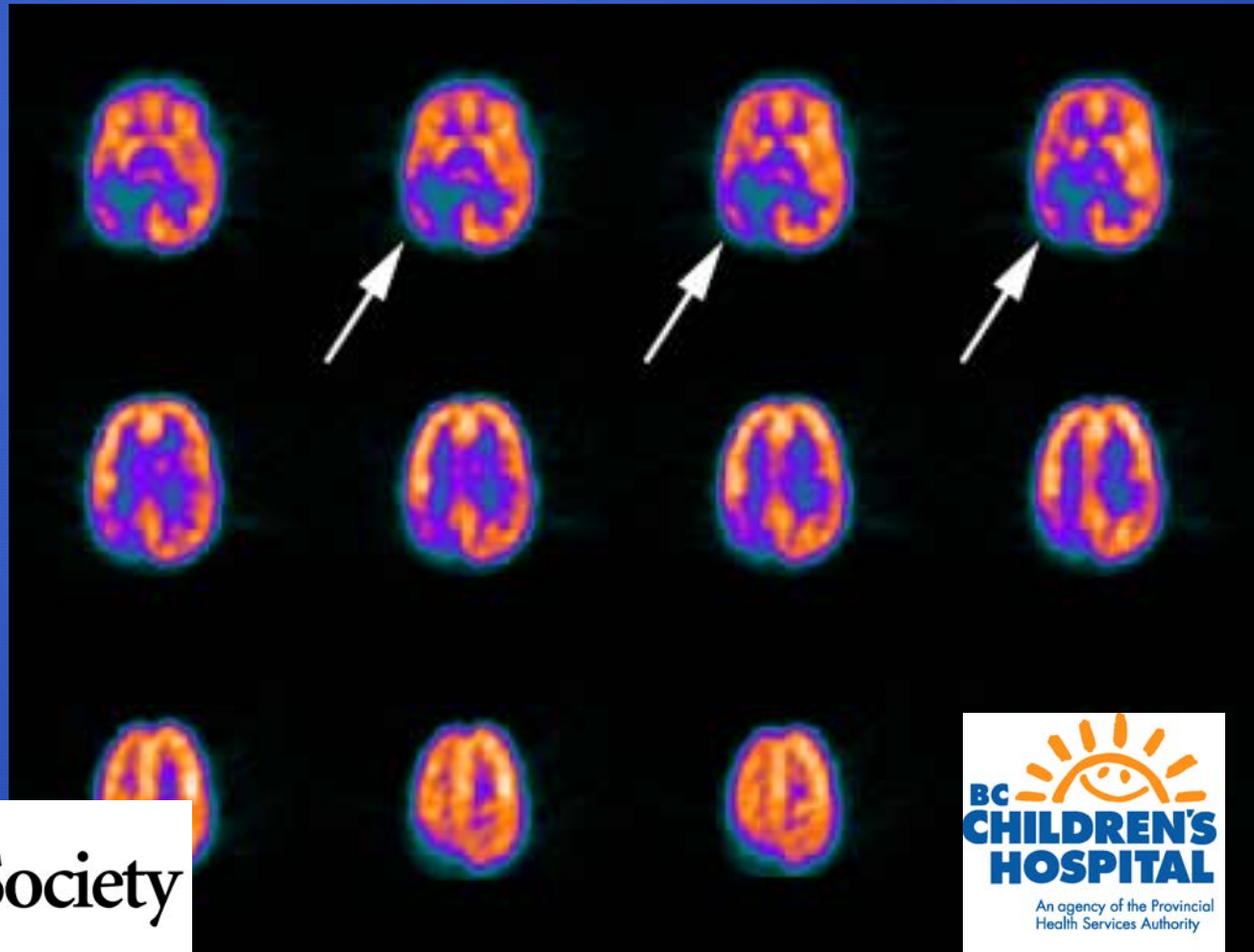
Ictal SPECT

- Increased blood flow

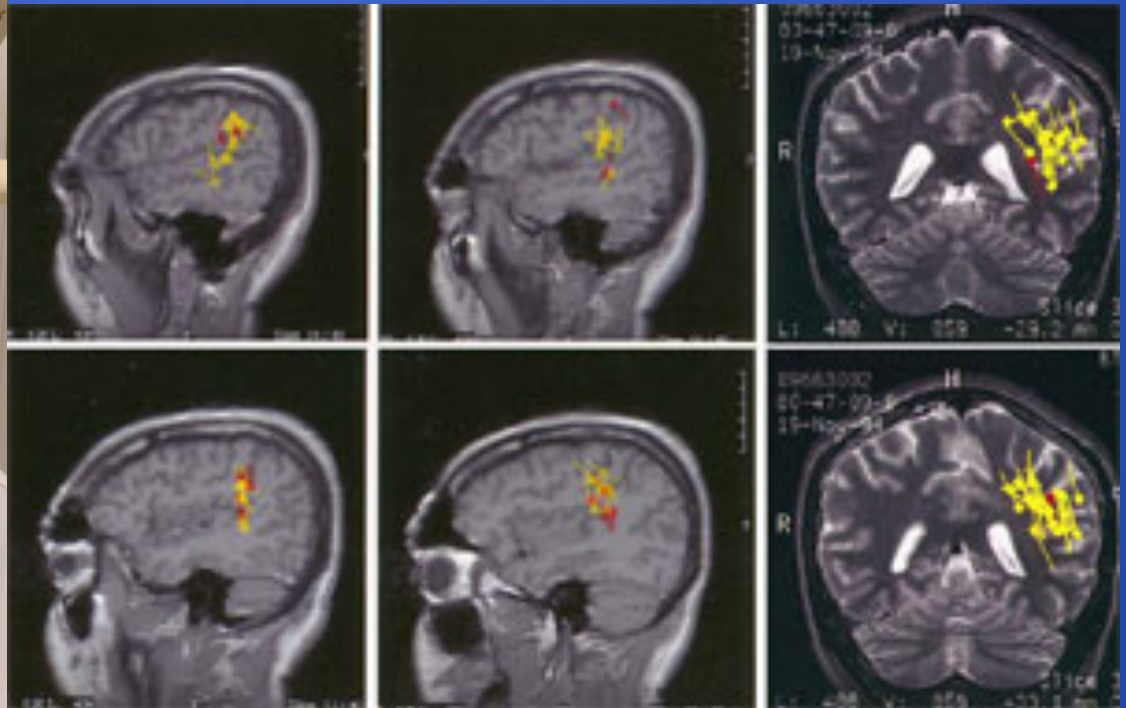


PET

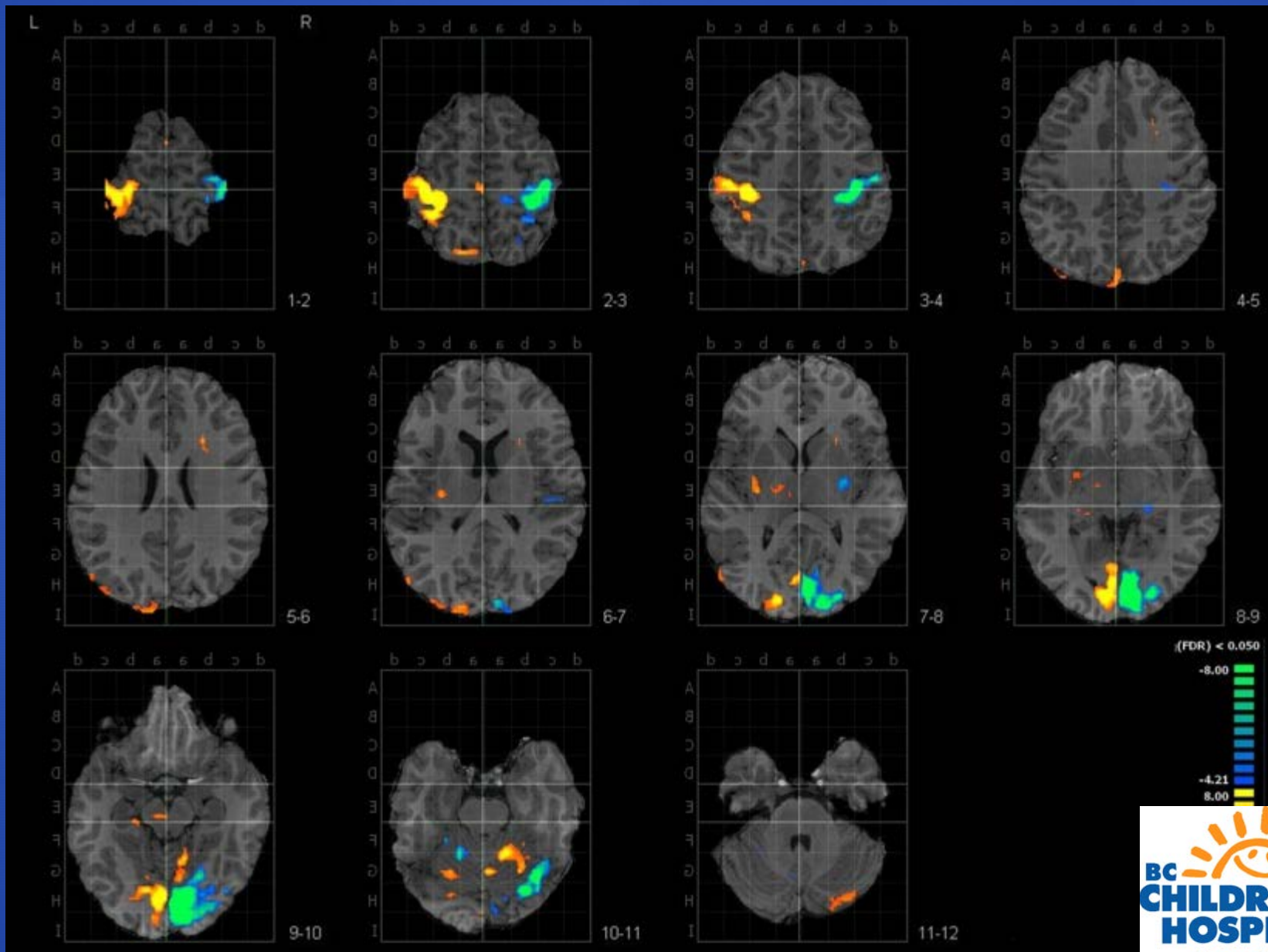
- Decreased metabolism



Magnetoencephalogram



Finger Tapping- Right vs. Left

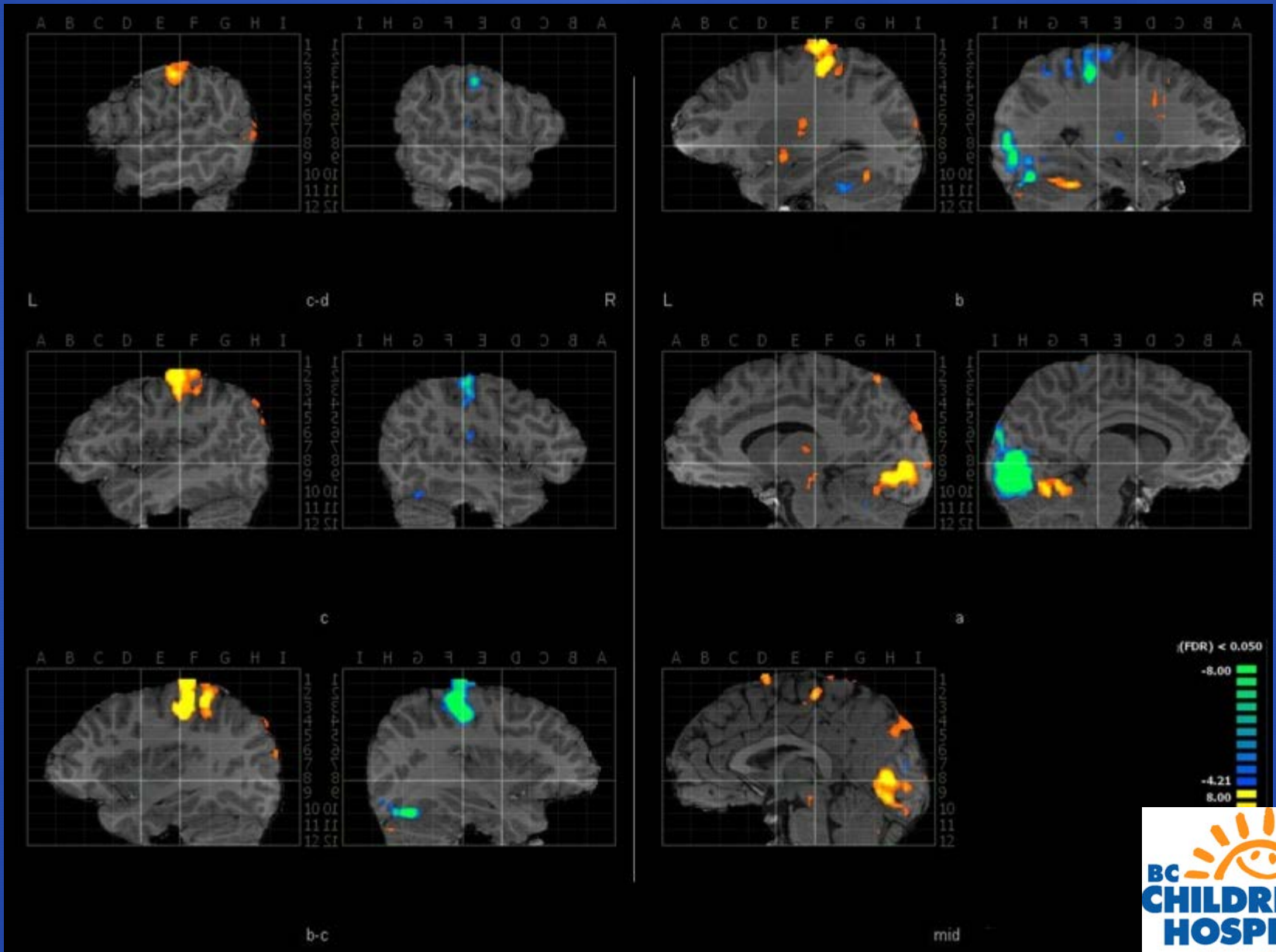


■ Left Finger Tapping
■ Right Finger Tapping

$q = 0.01$



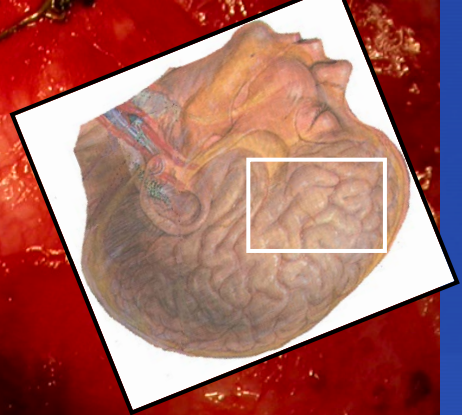
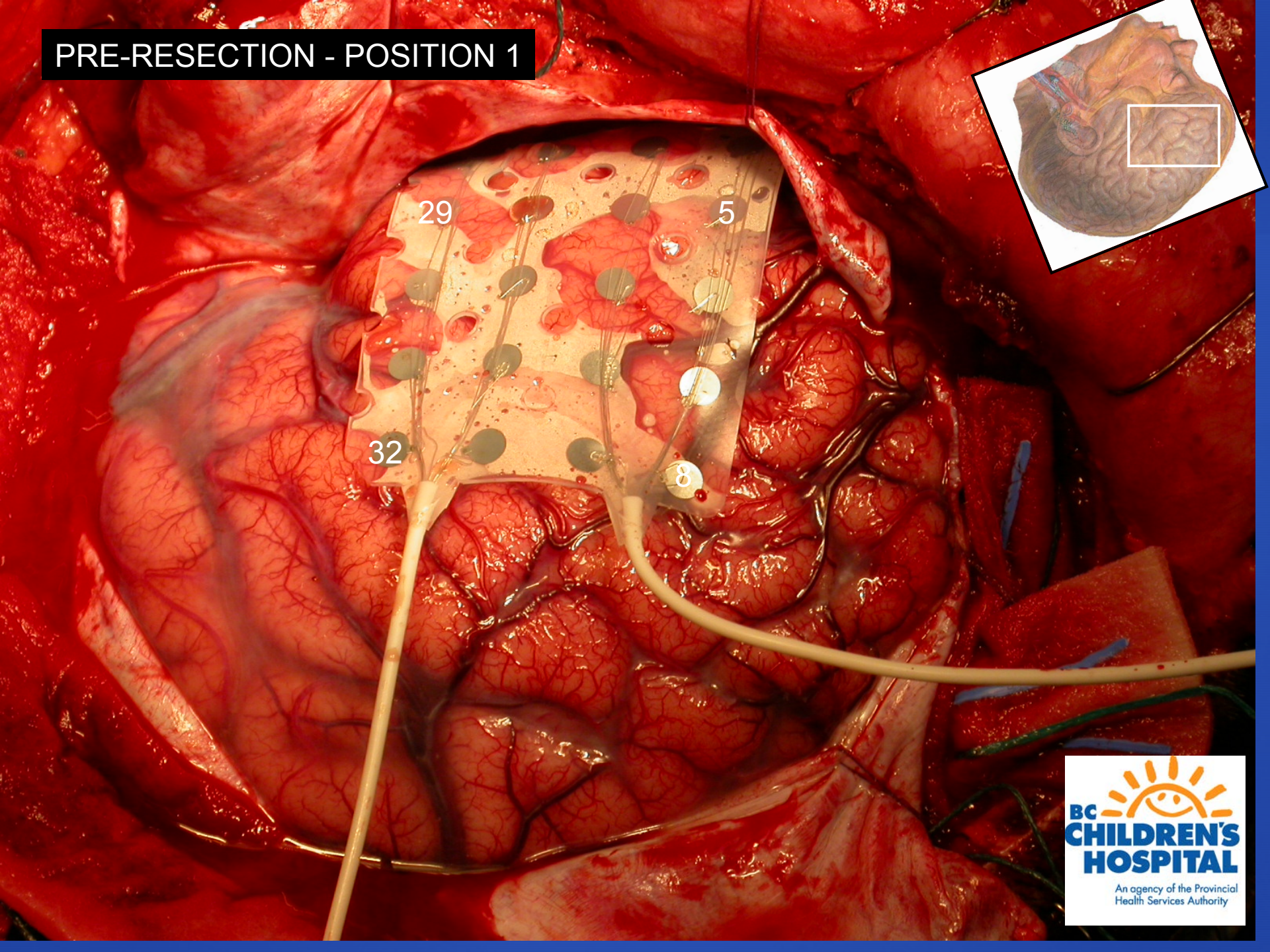
Finger Tapping- Right vs. Left



Left Finger Tapping
Right Finger Tapping

$q = 0.01$

PRE-RESECTION - POSITION 1

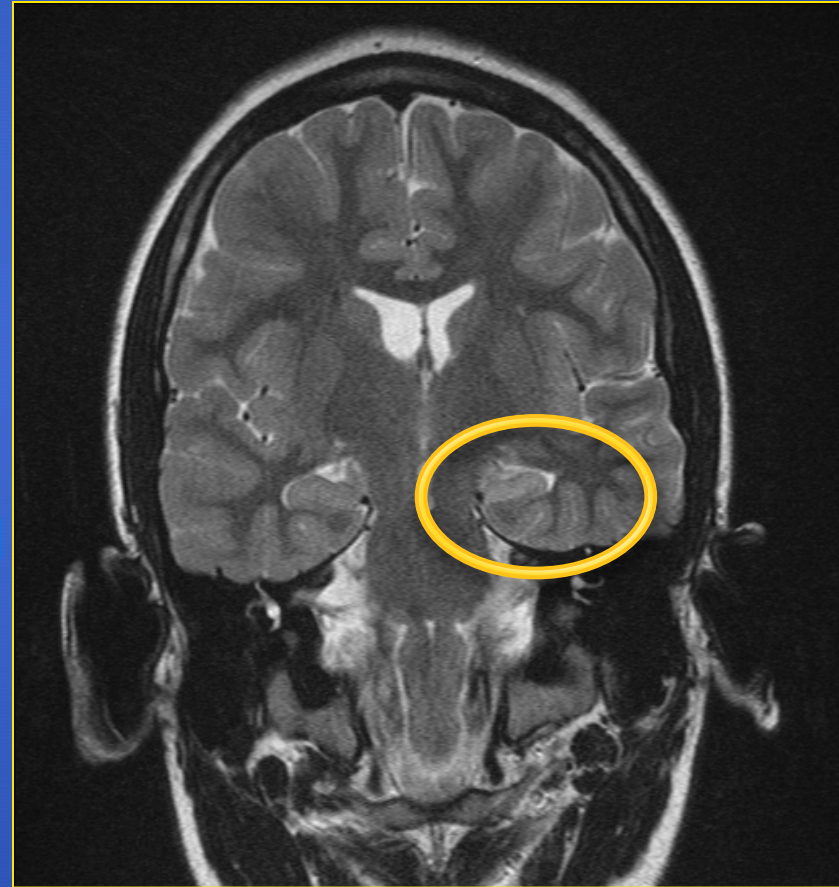


What to do?

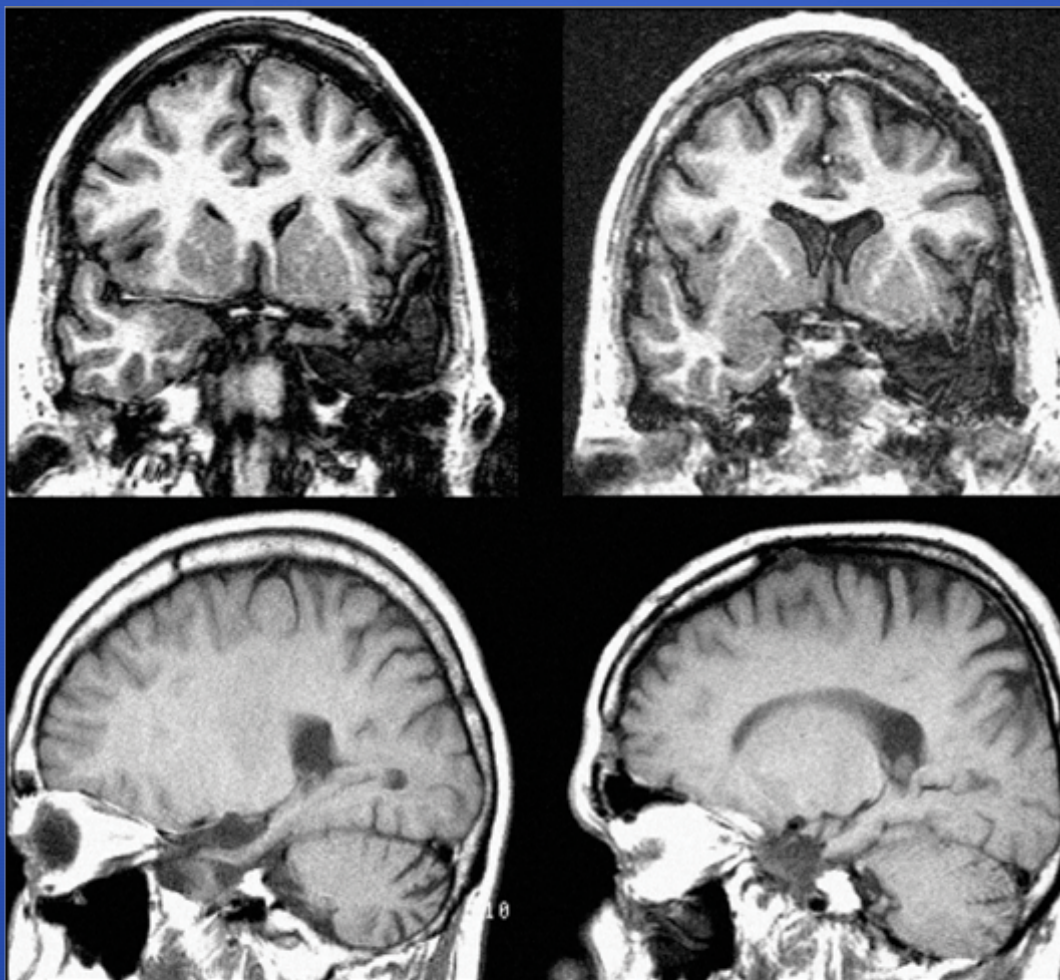
- Resective surgery
 - Focal neocortical resection
 - Anteromedial temporal lobectomy
 - Hemispherectomy
- Palliative surgery
 - Corpus callosotomy
 - Multiple subpial transections
 - Vagal nerve stimulation

Julie

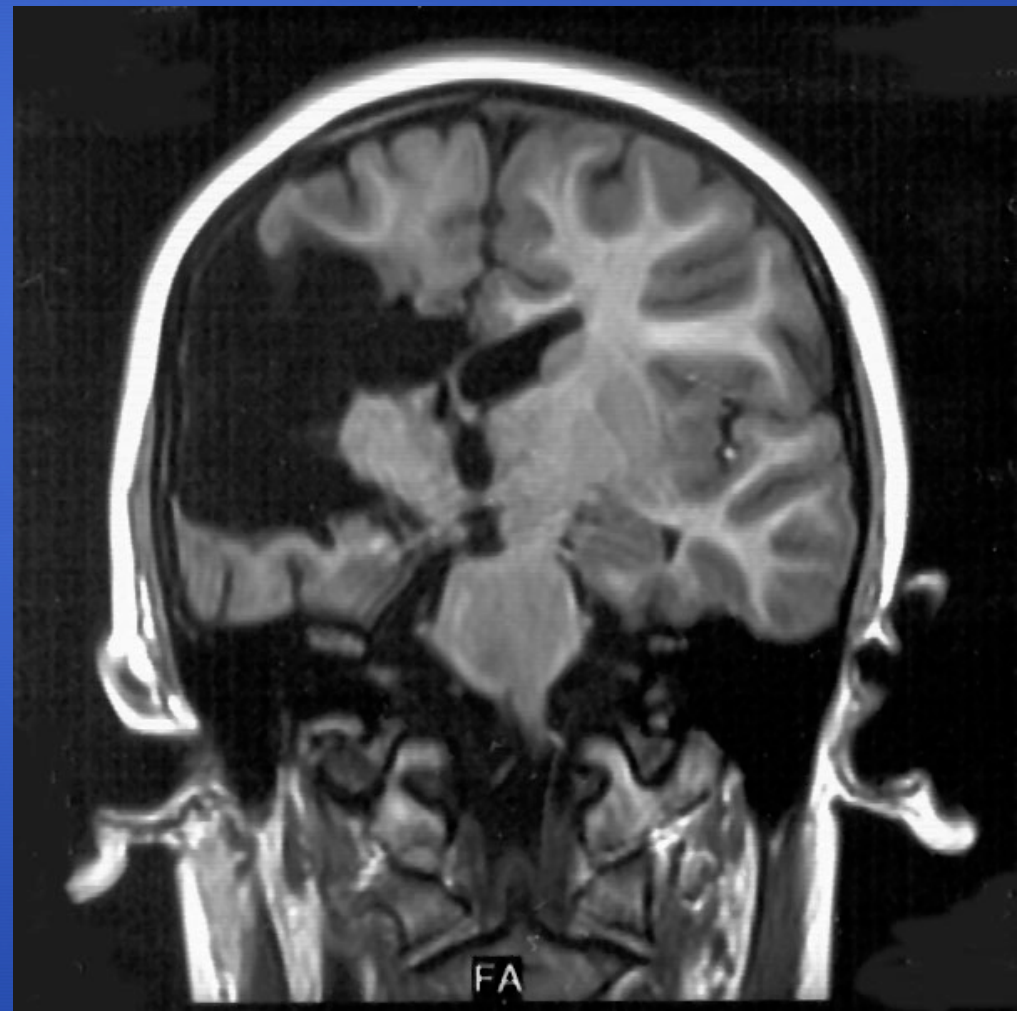
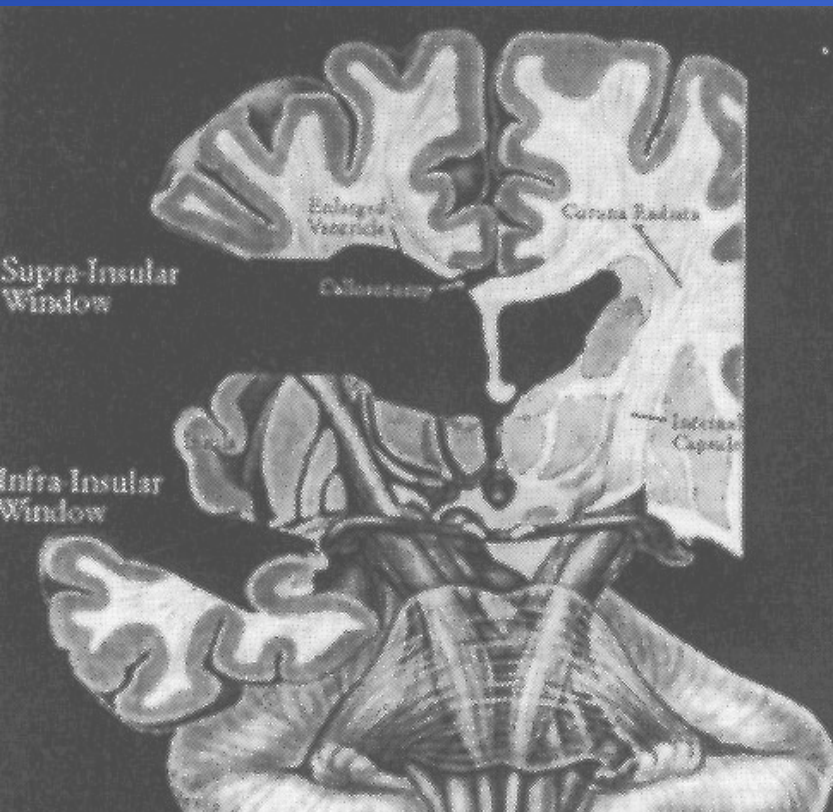
- Prolonged febrile seizures
- Developed partial seizures age 9
- Tried 5 medications
- Video EEG showed left temporal
- MRI



Anterior Medial Temporal Lobectomy

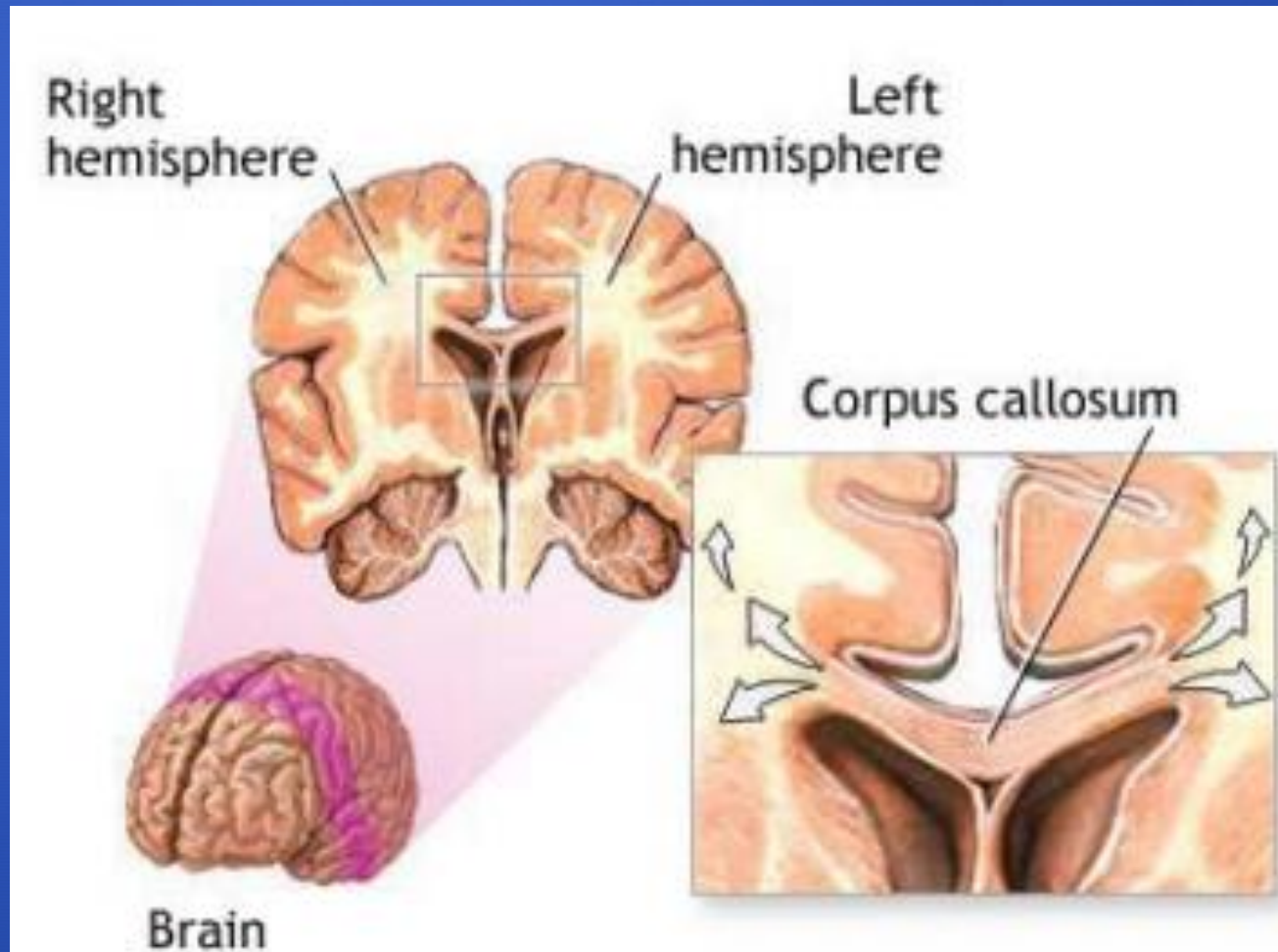


Hemispherectomy

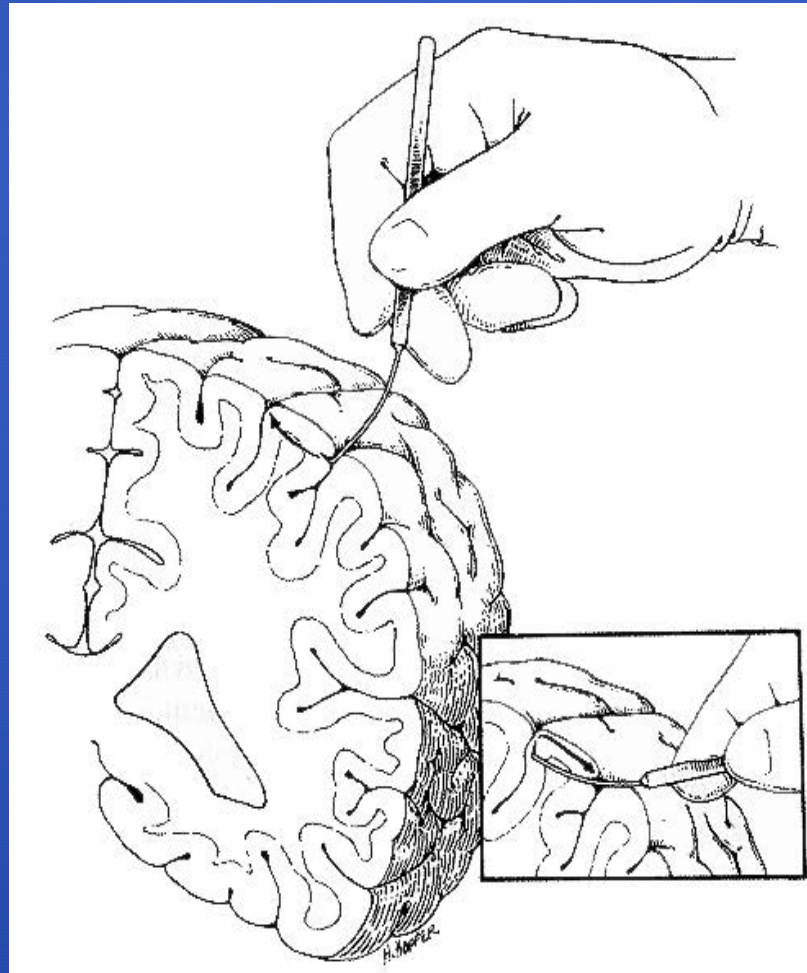


Corpus Callosotomy

- Anterior 2/3
- Full



Multiple Subpial Transections



Outcome

- Seizure Freedom or reduction
- Decrease in medications
- Improvement in Cognition and behaviour
- Improvement in Quality of Life

Vagus Nerve Stimulation

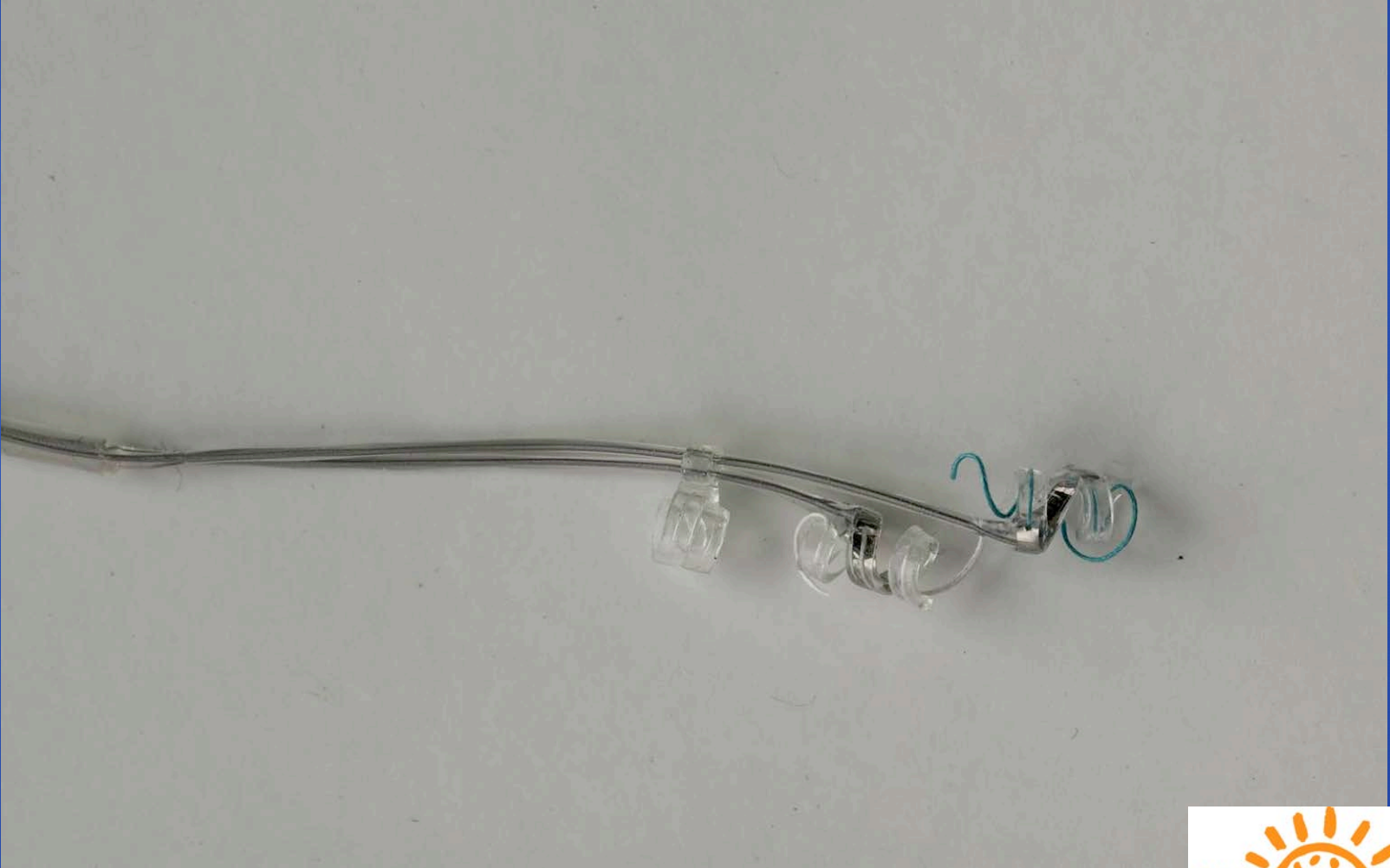


Vagal Nerve Stimulator

- 1997: approved by FDA (US) as adjunctive treatment of medically refractory epilepsy in adolescents and adults
- 1998: approved by HPB (Canada)
- > 40,000 patients world-wide have been implanted

Indications

- No correlation with type of epilepsy
- Intractable epilepsy with no better surgical option





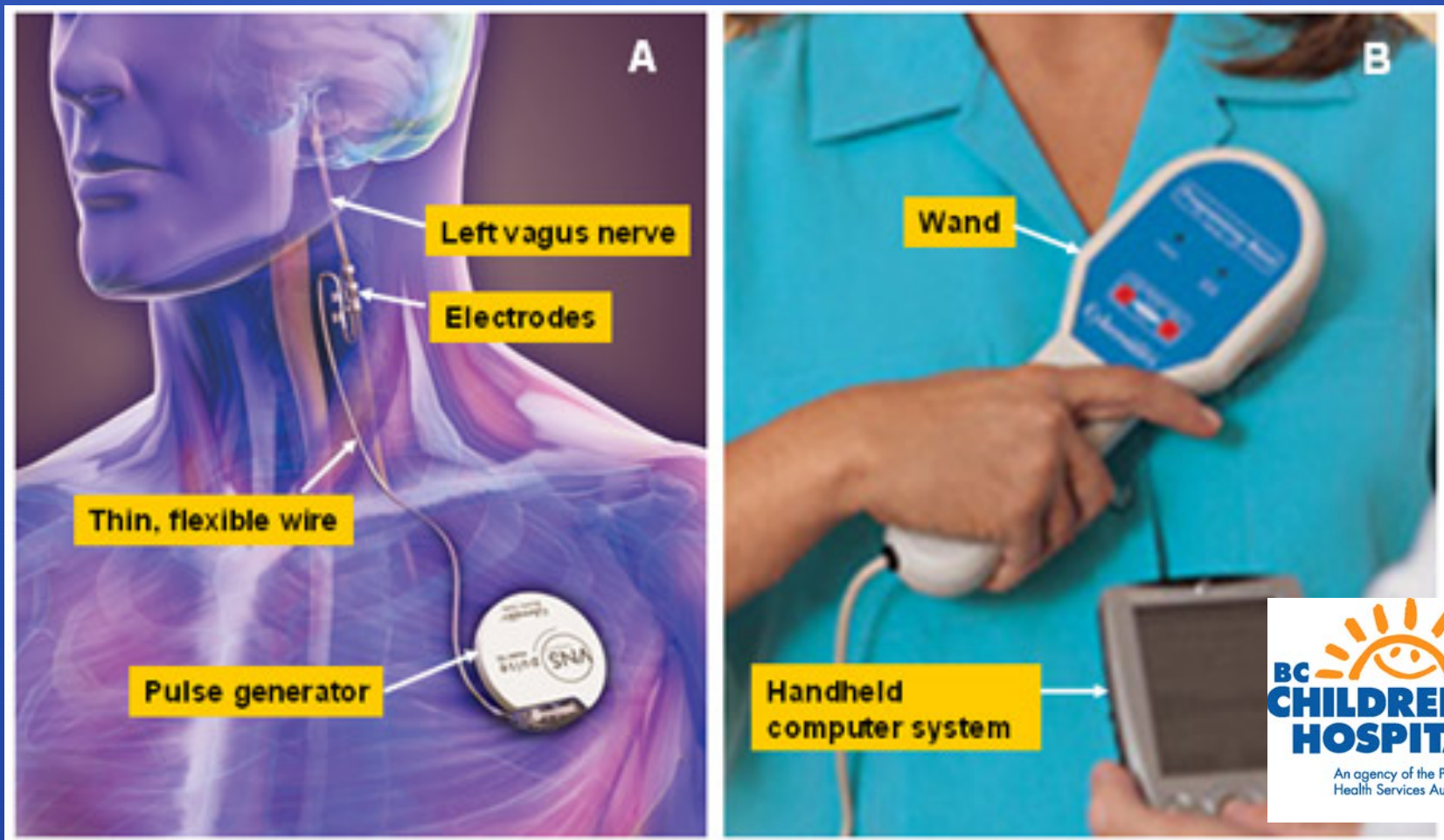


Magnet Use

- To shorten a seizure
- To stop a seizure
- To decrease severity
- To shorten post-ictal phase



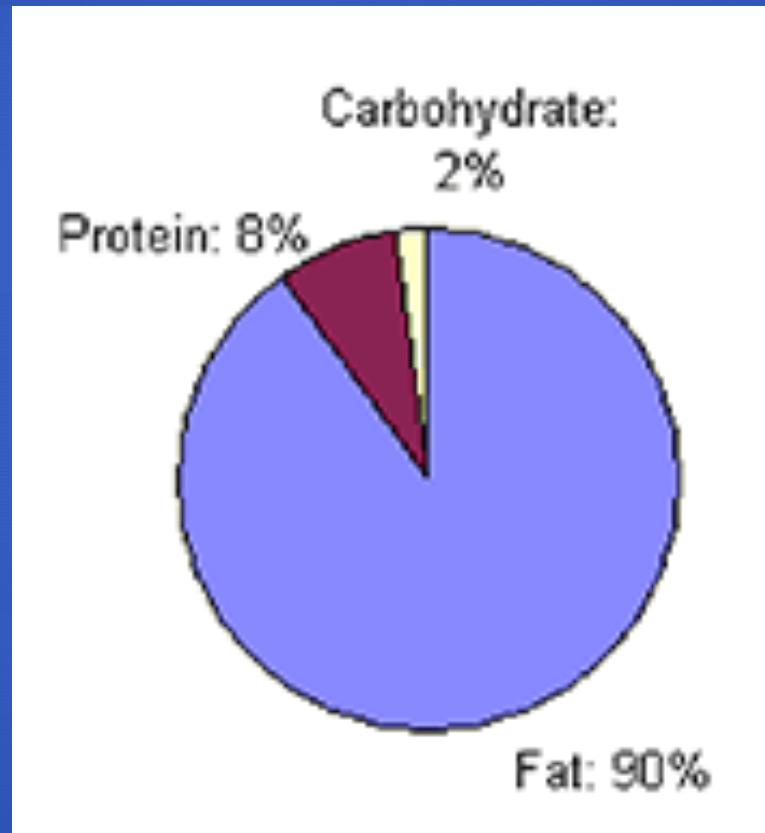
Vagal Nerve Stimulator



VNS for Intractable Epilepsy

- 50% of patients have >50% reduction in seizures
- May allow reduction in dosage of antiepileptic medications
- Majority have improved quality of life
- Magnet use can abort seizures

Ketogenic Diet



Ketogenic Diet

- 15-35% seizure-free
- 30-50% with >90% reduction in seizures
- 50-75% with >50% reduction in seizures

- Improved alertness and development

Ketogenic Diet

- Modified Atkins Diet
- Low Glycemic Diet

Ketogenic Diet

- Prescribed therapy by Ketogenic Diet Team
- Side effects

Ketogenic Diet



Ketogenic Diet

- Hundreds of seizures/day
- Plateauing of development
- > 6 medications in 6 months

- Seizure free on the Ketogenic Diet with improvement of development

Future therapies to look to...

- New Anticonvulsants
- Seizure prediction
- Neurostimulation
 - Neuropace (Responsive Neuronal Stimulation)
 - Deep brain stimulation
- Magnetic Stimulation and Cooling
- Gene and biological agent therapy

What can WE do when medications fail?

- Optimize quality of life
- Look for comorbidities and treat as needed
- Maintain good relationships – family and friends
- Optimize school and employment
- Maintain a healthy lifestyle
 - Exercise
 - Diet
 - Bone health

Thank you for your attention

