**Background**

- Epilepsy Surgery is a procedure aimed to remove the area of the brain where seizures originate from.
- Two types of procedures: Functional and Resective
  - Functional procedures are performed for palliative reasons (reduce seizures)
  - Resective procedures can entirely cure a patient’s epilepsy
- Best Candidates: To be considered for epilepsy surgery a patient must have tried at least two anti-seizure drugs with no success. If that approach has failed it is likely that no other drugs will help, therefore surgery presents itself as the last viable option.
- The success of epilepsy surgeries are closely related to the identification and resection of MRI lesion (Jeha 2007, Tellez-Zenteno 2010)
  - Lack of MRI lesion has consistently been shown as predictor for surgical failure
  - MRI+ patients have seizure-free rate two times > than MRI- patients
- Approximately 20-30% of the patients undergoing surgery are MRI negative (“nonlesional”)
- In this project we aim to test the effectiveness of a voxel-based MRI morphometric Analysis Program (MAP) to identify subtle brain lesions.

**Hypothesis**

- MAP can detect subtle cortical dysplastic lesions that escape conventional MRI visual analysis with a low false positive rate

**Primary Question**

- In MRI-negative focal epilepsy patients:
  - Can MAP detect relevant lesions that conventional MRIs cannot reveal?

**Methodology**

- MAP is a specific voxel based morphometric program optimized to be applied on an individual level
- MAP is designed to detect subtle abnormalities associated with blurring in the gray-white matter junction
- Such areas may be associated with an underlying cortical dysplasia which is a known cause of epilepsy

**Methodology Cont.**

**Data**

- Selected Patients (Total=153)
  - 36 Frontal Lobectomies (24%)
  - 14 Multilobar Resections (5%)
  - 94 Temporal Lobectomies (62%)
  - 7 Parietal Lobectomies (9%)
  - 2 Occipital Lobectomies (< 1%)
- For the procedures from the years 2002 to 2011, multilobar resections was the only type that had a significant percentage increase over that time period. Percentages of the other types remained relatively steady.

**References**


**Conclusions/Future Work**

- For successful epilepsy surgery, identification of MRI lesion is vital
- As new technology emerges we can expect more surgeries done on more complicated patients (see Multilobar table)
- Using Morphometric Analysis of MRI is a promising tool to assist epileptologists and neuroradiologists in identifying lesions
- Future participation in this ongoing long-term project involves familiarization of interpretation of images together with clinical data.