Piriform Cortex Atrophy is Discordant with Seizure Lateralization in Temporal Lobe Epilepsy

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Background

- Piriform Cortex (PC) – Primary Olfactory Cortex; implicated as seizure focus in TLE

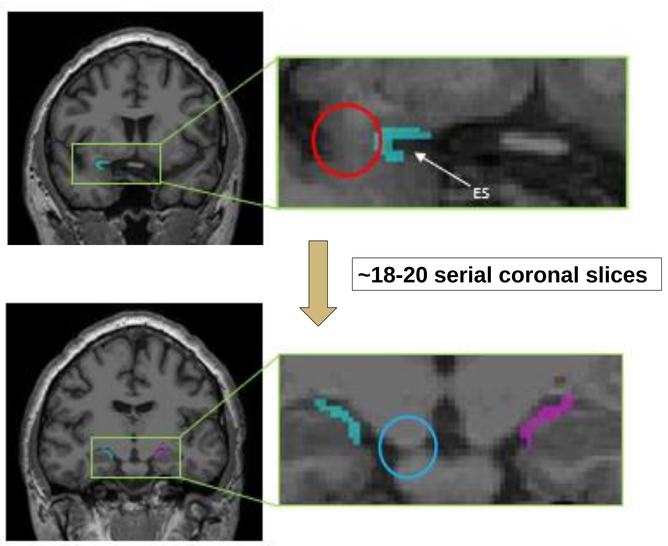
- >50% resection correlated with 16-times greater chance of achieving seizure freedom
- Unique architecture & no primary regulation of signals by thalamus
- Volumetric MRI/EEG-fMRI analyses have shown abnormalities in regions such as PC, hippocampus, amygdala, entorhinal cortex in TLE patients
- Amygdala/Hippocampal atrophy occurs ipsilateral to seizure focus
- **Hypothesis**: PC atrophy is a unique phenomenon in TLE and will primarily lateralize to the side of pre-determined seizure focus

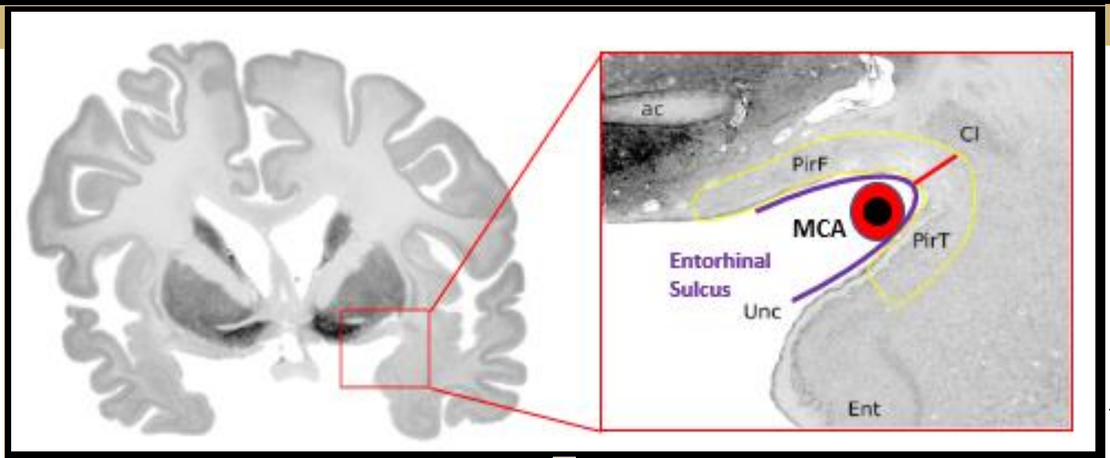
Objective

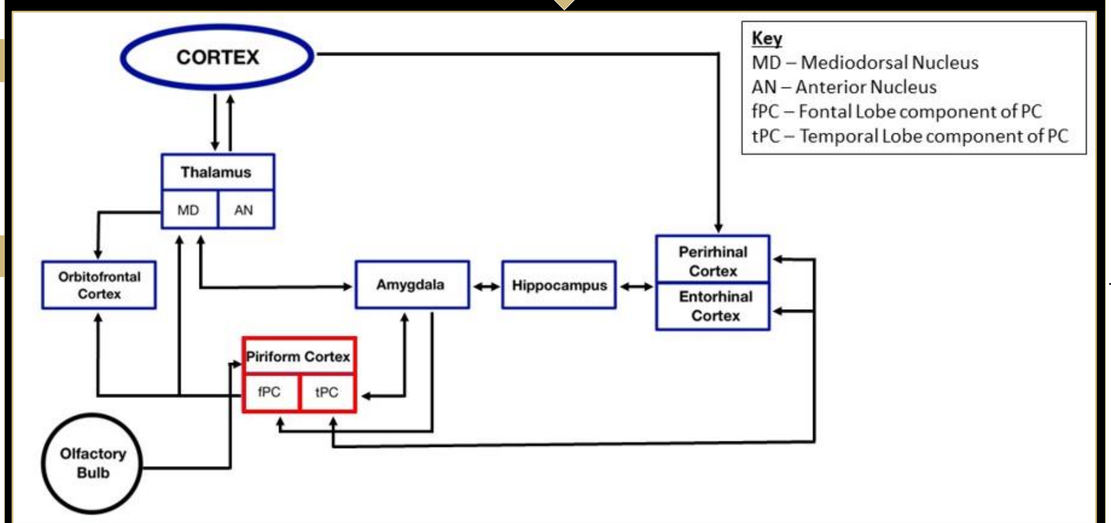
Utilize a robust volumetric analysis to determine whether PC atrophy occurs strictly in TLE vs. non-TLE, as well as determine whether PC atrophy localizes to the side of seizure focus.

Methods

- Medically Refractory Epilepsy Patients
  - Control: 20
  - TLE: 35 (16 L; 19 R)
  - non-TLE: 13 (10 L; 3 R)
- All patients underwent Phase II sEEG to confirm seizure focus
- PC Volumetric Analysis
- Statistical Analysis – **T-test** ($p < .05$)







CONCLUSION

PC atrophy occurs in all forms of epilepsy and does not consistently lateralize to the side of seizure focus. Non-specific PC atrophy is likely attributed to a lack of primary regulation by the thalamus, as well as a complex set of connections to many cortical regions throughout the cortex.

Department of Neurosurgery
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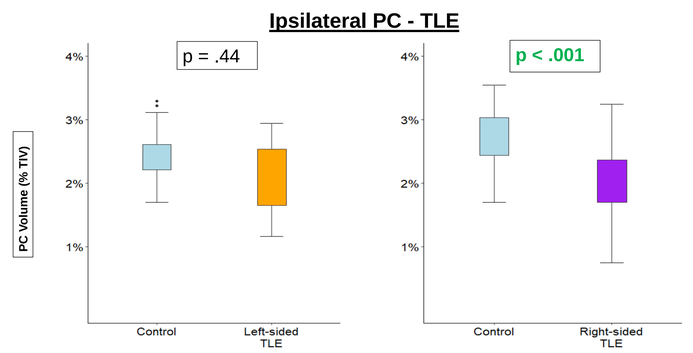
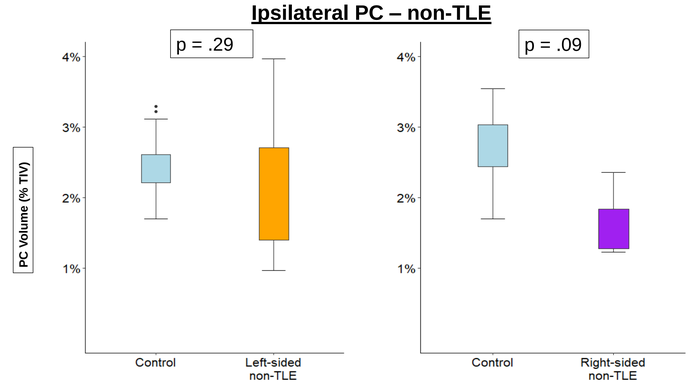
Results

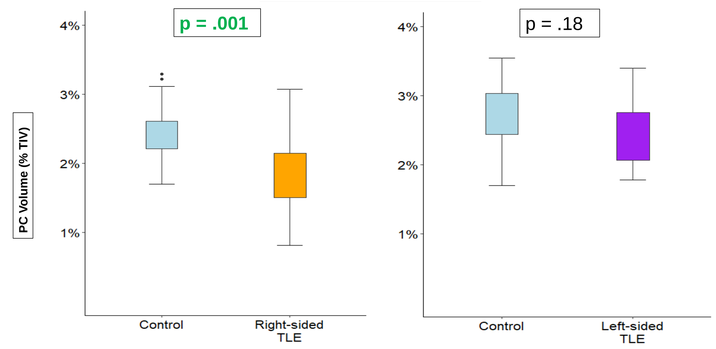
Ipsilateral PC - TLE



Ipsilateral PC – non-TLE



Contralateral PC - TLE



Contralateral PC – non-TLE