

# MEMORY OUTCOME AFTER TEMPORAL LOBE RESECTION IN CHILDHOOD

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## BACKGROUND

Temporal lobectomy (TL) is a successful surgical treatment for patients with intractable temporal lobe epilepsy (TLE). So far, little is known about the long-term outcome of memory functions after TL in children.

## AIMS

- (1) **Memory outcome** at long-term follow up?
- (2) **Brain structure: correlation of volume of resection with memory outcome?**

## PARTICIPANTS

### TL-Surgery group:

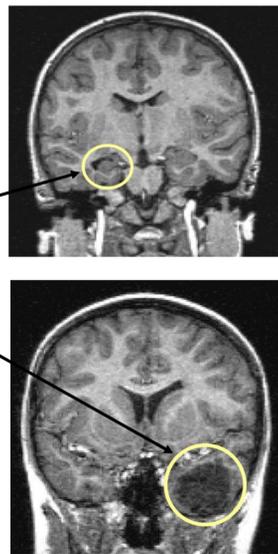
Left-TL (n=26), Right-TL (n=16)  
42 patients aged 16 yrs+  
Age at surgery 13.8 yrs  
5+ yrs since surgery (mean 9 yrs)

### Pathology:

Hippocampal sclerosis (HS, n=26)  
Dysembryoplastic neuroepithelial tumours (DNT, n=16)

### Non-TL control group:

11 focal epilepsy patients with temporal lobe lesions matched for IQ, age at surgery, gender



## RESULTS: 1) Memory outcome

### Pre- to post-op comparisons (WMS):

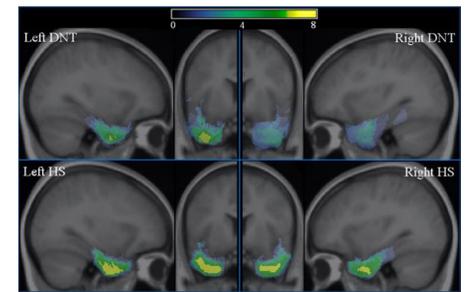
- 1) Verbal Memory gains (immediate and delayed scores) in R-TL group, while L-TL did not differ from non-TL controls.
- 2) Visual memory scores (immediate and delayed) improved in the L-TL, and remained unchanged in R-TL and non-TL controls.
- 3) Gains were independent of IQ changes in TL-groups (1).

### Post-op comparisons (Doors and People Test):

Interaction ( $p=0.030$ ) of side of surgery and task (verbal, visual): post-hoc differences in verbal memory were found between L-TL and non-TL controls, while visual memory did not differ between groups.

## RESULTS: (2) Volume of Resection and Memory outcome

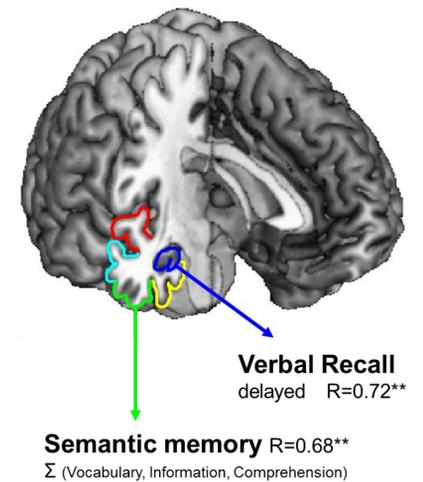
Overlap map of temporal lobe resections in DNT and HS groups



Partial correlation of post-operative memory scores and temporal lobe volumes (covariate IQ):

- In L-TL: anterior/inferior temporal lobe and semantic memory score ( $R=0.68, p<0.001$ )
- In L-TL: residual left hippocampus and delayed verbal recall ( $R=0.72, p<0.001$ )
- No significant correlations in R-TL group

### For Left-sided Surgery only



## METHODS

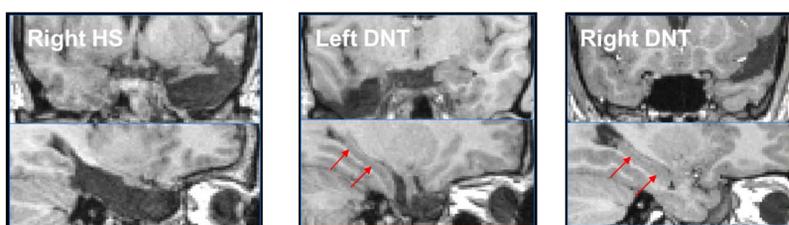
Memory function was assessed using the Wechsler Memory Scale Revised (WMS, pre- and post-op) and the Doors and People Test (DPT, post-op only),

Semantic memory was measured using a composite of vocabulary, information and comprehension scales on the Wechsler Adult Intelligence Scale (WAIS, post-op only).

Structural MRI data were used to determine the volumes of remaining temporal neocortex and hippocampus.



## Variability in Extent of Resection

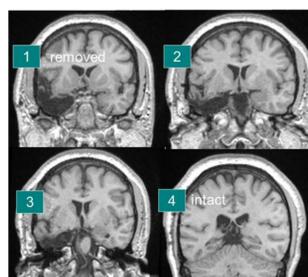


Measurement of Hippocampal volume

Resections were very variable, particularly in the DNET group

→ Does this impact on MEMORY outcome?

Rating of extent of resection



## CONCLUSIONS

At the group level, temporal lobectomy in childhood resulted in improved memory functions which are presumed to be subserved by the un-operated temporal lobe. Findings support those from a study with short-term follow-up (2).

At the individual level the extent of resection of the left anterior temporal lobe predicted verbal semantic memory scores at follow-up.

The volume of the residual left hippocampus predicted verbal episodic memory, similar to findings in adults (3).

### References:

- (1) Skirrow C, Cross JH, Cormack F, Harkness W, Vargha-Khadem F, Baldeweg T. Long-term intellectual outcome after temporal lobe surgery in childhood. *Neurology* 2011 Apr 12;76(15):1330-7
- (2) Gleissner U, Sassen R, Schramm J, Elger CE, Helmstaedter C. Greater functional recovery after temporal lobe epilepsy surgery in children. *Brain*. 2005 Dec;128(Pt 12):2822-9
- (3) Baxendale SA, Thompson PJ, Kitchen ND. Postoperative hippocampal remnant shrinkage and memory decline: a dynamic process. *Neurology*. 2000 July 25;55(2):243-9.