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OBJECTIVES

- ✓ To compare proportions of individual change in spatial, abstract design and facial memory after unilateral anterior temporal lobe resection (ATR).
- ✓ To evaluate what factors predict individual change after ATR.

BACKGROUND

- ✓ Visual memory is a generic term that refers to neuropsychological tasks created to measure nonverbal memory of information presented through the visual modality. Different visual memory tasks have been created to quantify deficits associated with right hemisphere dysfunction. fMRI demonstrates that visual memory tested using abstract designs, faces and spatial locations primarily elicit right temporal lobe activation.
- ✓ There are reports of visual memory impairment after ATR compared to left-ATR for the processing of faces, abstract designs and spatial locations, but there are also studies showing no between group differences. One potential reason for the conflicting results is the use of group mean changes, which mask individual differences. Table 1 summarizes the literature studying individual change in visual memory after ATR.

| Author | Side of Surgery | WRMTF | Design Memory | Spatial Memory |
|---------------------------|-----------------|-------|---------------|----------------|
| Phillips & McGlone (1995) | R | 20% | 68% | 12% |
| | L | 0% | 85% | 15% |
| Walton et al. (1999) | R | — | — | — |
| | L | 19% | — | — |
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| Walton et al. (1999) | R | — | — | — |
| | L | 19% | — | — |
| Walton et al. (1999) | R | 11% | 78% | 11% |
| | L | — | — | — |
| Burden Maze Test | R | 8% | 84% | 8% |
| | L | — | — | — |

METHODS

The sample consisted of 83 individuals who underwent a standard ATR. Only patients who were left-hemisphere language-dominant, based on the intracarotid amobarbital procedure testing (Loring et al., 1994), were included in the study. Visual memory tests included the Nonverbal Selective Reminding Test (spatial memory), Benton Visual Retention Test (simple design memory), Rey-Osterrieth Complex Figure Test (complex design memory) and Warrington's Recognition Memory Test for Faces (face memory). All patients completed at least two of the four tests. Sample characteristics are presented in Table 2.

| Characteristic | After surgery | Before surgery |
|-----------------------|---------------|----------------|
| Gender (female) | 66.0% | 61.0% |
| Ammons Horn Sclerosis | 59.6% | 55.5% |

ATR = anterior temporal lobe resection; There were no significant differences between groups for any of the characteristics

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RESULTS: Proportions of change on 4 tests (Table 3)

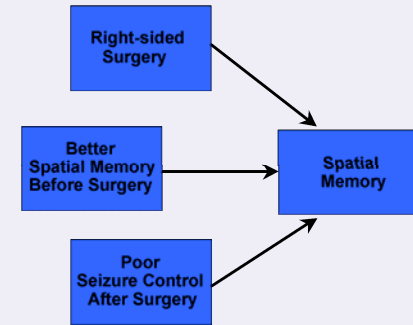
The majority of patients showed no change or improvement. For spatial and face memory, significantly more individuals declined after right-ATR compared to left-ATR. (in red).

Table 3.

| Visual Memory Domain | Side of Surgery | N | % declined | % no change | % improved |
|-----------------------|-----------------|----|------------|-------------|------------|
| Spatial Memory | right | 44 | 27.3% | 68.2% | 4.5% |
| | left | 34 | 5.9% | 88.2% | 5.9% |
| Simple Design Memory | right | 37 | 32.4% | 59.5% | 8.1% |
| | left | 24 | 29.2% | 58.3% | 12.5% |
| Complex Design Memory | right | 18 | 5.6% | 77.8% | 16.7% |
| | left | 17 | 0.0% | 100.0% | 0.0% |
| Face Memory | right | 15 | 20.0% | 80.0% | 0.0% |
| | left | 15 | 0.0% | 100.0% | 0.0% |

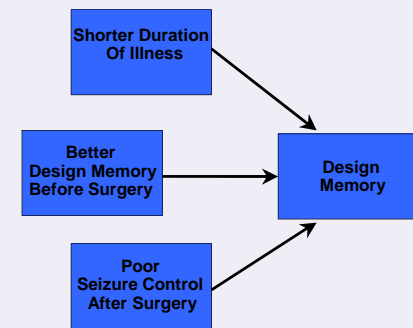
RESULTS (Figure 1)

Shows the predictors of individual decline in memory for spatial locations after surgery, logistic regression $\chi^2(7, N=76)=19.6, p=0.006$.



RESULTS (Figure 2)

Shows the predictors of individual decline in abstract design memory after surgery, logistic regression $\chi^2(3, N=61)=15.0, p=0.002$.



Bottom Line

- ✓ Even though the majority of patients showed either no change or significant improvements in visual memory following right-ATR, the risk for impairment is greater than following left-ATR and not negligible (Table 3).
- ✓ The reasons for decline in visual memory after surgery are multifactorial and specific to the type of visual memory ability tested (Figures 1 & 2).
- ✓ Results provide proportions of meaningful change to help clinicians and patients make better informed decisions about risks associated with undergoing right-ATR.
- ✓ Understanding what factors predict meaningful decline in visual memory can help to prepare patients at increased risk to understand the impairments that may occur after surgery.