# Improvements in Cognition After Surgical Management of Obstructive Sleep Apnea

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## Introduction

- *Obstructive sleep apnea (OSA):* repetitive collapse of the pharyngeal airway during sleep leading to airway obstruction[1]
- Continuous Positive Airway Pressure (CPAP) is the current mainstay of treatment
  - Demonstrated to improve cognition, particularly in attention, episodic memory, and executive function[2,3]
  - Adherence to CPAP treatment >4h per night is required to see benefit
- Surgical treatment of CPAP-intolerant patients largely eliminates adherence issues

*Objective:* To understand how surgical treatment of OSA impacts cognition

## Methods

*Inclusion Criteria:*

- Patients diagnosed with OSA who failed CPAP therapy
- Patients undergoing upper airway stimulator implantation (UAS) or expansion sphincter pharyngoplasty (ESP)

*Study Design:*

- Cognition was assessed once preoperatively and once postoperatively with three NIH Toolbox assessments
- Assessments evaluated components of cognition including:
  - Processing speed
  - Attention
  - Executive function
  - Working memory

## Results

- At the time of poster presentation, 26 patients completed both preoperative and postoperative cognition testing
  - UAS: tested 6 months and 1 year after surgery
  - ESP: tested 2 months after surgery

*Table 1: Cohort Characteristics*

| | UAS | ESP |
|---|---|---|
| N (%) | 10 (38.5%) | 16 (61.5%) |
| Average age | 67.6±8.3 | 49.2±10.5 |
| Female gender | 5 (50%) | 3 (18.8%) |
| Average BMI | 28.1±3.5 | 31±4.0 |
| Average AHI % change | 33.2±50.3 | 24.9±39.5 |

*Table 2: Cognition Assessment Performance*

| | UAS | ESP |
|---|---|---|
| All Cognition categories: | 144.0% | 250.9%* |
| Processing speed | 139.8% | 95.1%* |
| Attention/Executive function | 61.3% | 56.9%* |
| Working memory | 231.0% | 25.4% |
| Pre vs. Post (UAS and ESP) | 209.8%* | |

Values are reported as percent improvement pre- compared to post-op. *Indicates $p<0.05$.

## Discussion

- Patients who were treated with UAS or ESP for obstructive sleep apnea showed improvement in their cognitive abilities:
  - Entire cohort: significant improvement in overall cognition
  - Entire cohort: significant improvement in each individual cognitive assessment category
  - ESP: significant improvement in processing speed and attention/executive function
- *Future Directions:*
  - Increase study power through continued enrollment
  - Comparison of surgery to CPAP-adherent and non-OSA patient groups

## Conclusion

- Patients treated with expansion sphincter pharyngoplasty demonstrated significant improvements in cognition
  - Upper airway stimulation patients also had improved cognition scores, however these did not reach statistical significance at N = 10

## References

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