FROM SNORE TO SILENCE: VENTRAL-ONLY ABLATION FOR OBSTRUCTIVE SLEEP APNEA

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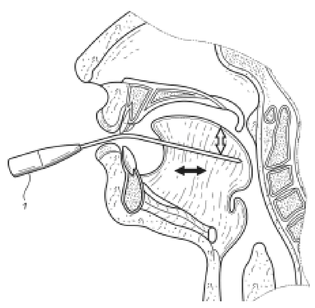
INTRODUCTION

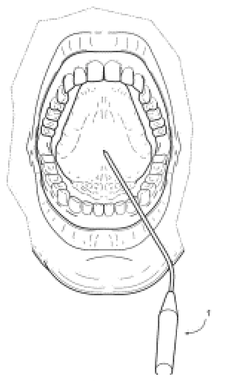
Obstructive Sleep Apnea Hypopnea Syndrome (OSAHS) is a chronic condition characterized by repeated upper airway obstruction during sleep, leading to fragmented rest, daytime fatigue, and increased cardiovascular risk. Although continuous positive airway pressure (CPAP) therapy remains the gold standard for treatment, many patients are unable to tolerate long-term use due to discomfort or inconvenience.

This growing population of CPAP-intolerant individuals has created a clinical need for alternative, minimally invasive interventions. Ventral-only ablation of the tongue (VOAT), a novel application of radiofrequency ablation (RFA), targets obstructive tissue along the ventral tongue base and offers a potential adjunctive solution.

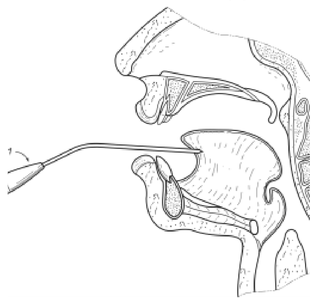
This study evaluates the short-term safety and efficacy of VOAT in improving objective sleep metrics among patients with moderate to severe OSAHS who are unable to adhere to CPAP therapy.



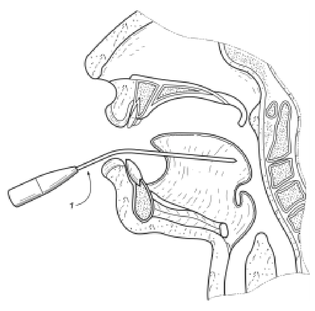
Schematic lateral view of a patient undergoing RFA where the coblation wand is shown inserted into the tongue through an insertion point on the ventral surface of the tongue. The black arrow indicates the anterior-posterior direction of lesion formation in the VOAT technique in contrast to traditional RFA methods that create lesions in the superior-inferior plane (white arrow).



The front view of a patient undergoing RFA treatment using the VOAT technique shows the ablation wand entering at an insertion point on the ventral surface of the tongue.



After a retractor device is used to push the tongue back, the tip of the coblation wand is inserted into the ventral surface of the tongue.



The tip of the electrosurgical device was fully inserted 5-8mm from the terminal point on the dorsal surface of the base of the tongue. Once 5-8mm from the dorsal surface of the base of the tongue, energy was applied by the probe to adjacent tissue. The probe tip on the electrosurgical device was then moved in the anterior direction away from the dorsal surface of the tongue.

METHODOLOGY

- ❑ **Study Design:** Retrospective case series
- ❑ **Patient Population:**
  - ❑ 55 patients (19 female, 36 male)
    - ■ Time period: March 2011-September 2012
  - ❑ All patients had moderate/severe OSAHS and were CPAP-intolerant
  - ❑ Single facility was used for all surgeries
- ❑ **Analysis:** Pre- and post-operative AHI values analyzed for all patients
  - ❑ Subgrouped into two groups:
    - ■ Group 1: AHI improvement >1.0 (n = 39)
    - ■ Group 2: AHI no improvement or worsening (n = 16)
  - ❑ Mean number of VOAT procedures per patient: 4.44 (range: 2–7)
  - ❑ Statistical significance assessed with paired t-tests ($p < 0.05$ threshold)
- ❑ **Software & Metrics:**
  - ❑ Apnea-Hypopnea Index was used as primary outcome
  - ❑ Pearson correlation coefficient used for relationship analysis

RESULTS & FINDINGS

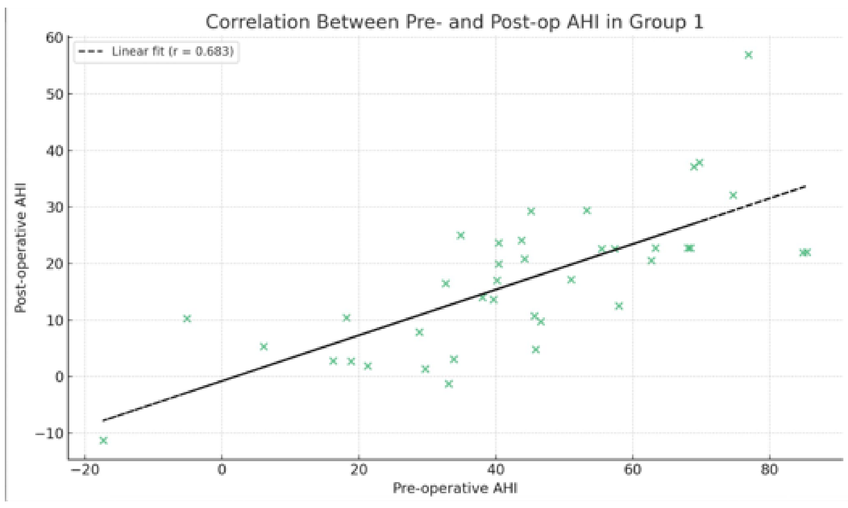


Figure I: Scatterplot of Pre- vs. Post-op AHI in Responders (Group 1):
Each point represents an individual patient. The moderate positive correlation (r = 0.683) reflects predictable and consistent AHI reductions after treatment.

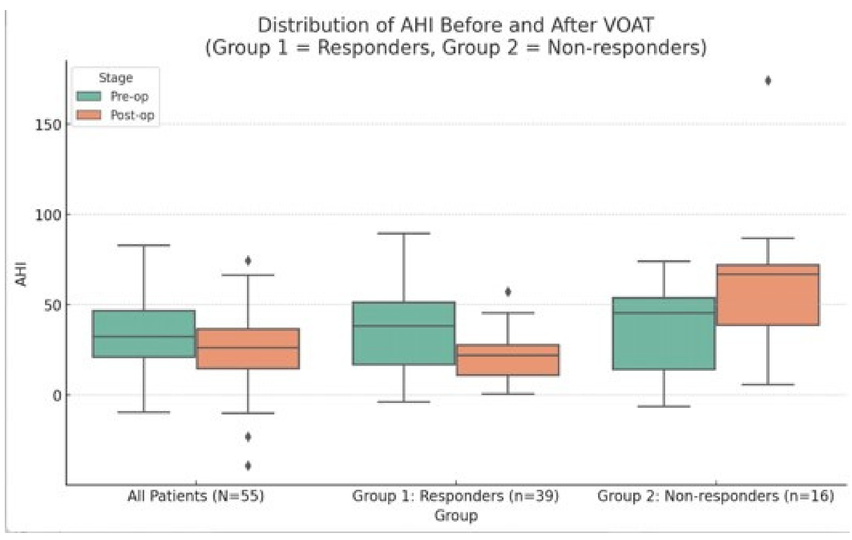


Figure II: Distribution of AHI Before and After VOAT by Response Group
Group 1 (Responders) experienced a significant post-operative decline in AHI, reflecting successful treatment. Group 2 (Non-responders) demonstrated increased AHI despite undergoing VOAT.

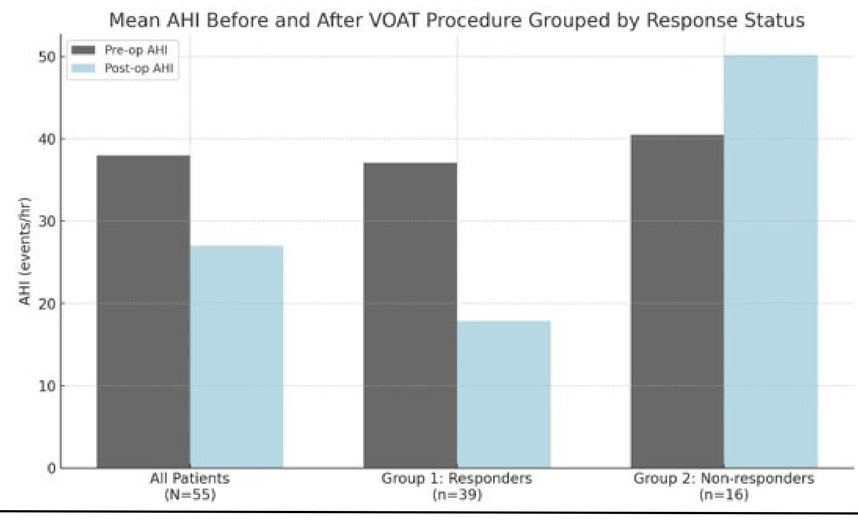


Figure III: Mean AHI Before and After VOAT Procedure Grouped by Response Status
Grouped bar chart illustrating the change in mean AHI pre- and post-VOAT among all patients, responders (Group1), and non-responders (Group 2). Responders demonstrated a substantial decrease in AHI, while non-responders paradoxically showed worsening scores.

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CONCLUSIONS

Ventral-only ablation of the tongue (VOAT) demonstrates promise as a minimally invasive, cost-effective adjunct therapy for obstructive sleep apnea hypopnea syndrome (OSAHS).

Key Takeaways:

- 65% reduction in apnea-hypopnea index (AHI) ($p<0.0001$)
  - 71% of patients showed significant improvements from the procedure
  - 29% showed no improvement or worsening
- Significant improvement in ESS scores ($p=0.0006$)
- Improved oxygen saturation, from 81.8% to 87.2% ($p=0.0003$)

Future Directions:

Follow up study underway with over 1,200 VOAT patients to evaluate long-term efficacy in treatment-resistant OSAHS populations. We are exploring VOAT's role in combination therapy for OSAHS, as well as what comorbidities of "Non-responders" group might explain worsening OSAHS (DM II, GERD, etc.)