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Cognitive changes in patients treated for Obstructive Sleep Apnea with upper airway stimulation, maxillomandibular advancement, or expansion sphincter pharyngoplasty

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SKMC Class of 2022: SI/DH Abstract

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Cognitive changes in patients treated for Obstructive Sleep Apnea with upper airway stimulation, maxillomandibular advancement, or expansion sphincter pharyngoplasty
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Introduction: Obstructive sleep apnea (OSA) is a prevalent diagnosis that has been shown to not only affect sleepiness, but daytime cognitive function — specifically attention, working memory, and executive function. CPAP treatment is troublesome for some patients and it is possible that superior treatment options, specifically novel surgical techniques, are available, though none have been evaluated for their long-term effects on neurocognition. We hypothesize that treating patients with upper airway stimulation surgery (UAS), maxillomandibular advancement surgery (MMA), and expansion sphincter pharyngoplasty surgery (ESP) for OSA produces a significant improvement in cognition from baseline.

Methods: For inclusion in the study, two important criteria must be met: 1) a previous diagnosis of OSA 2) patients have failed CPAP. Exclusion criteria include pediatric population (<18 years of age), and those without ability to complete the NIH Toolbox assessment on an iPad in English. Using the iPad-based NIH Toolbox assessment, the primary outcome of the study is to analyze the effect of UAS, MMA, and ESP treatment on three markers of cognition: the Processing Speed Test, the Inhibitory Control and Attention Test, and Sorting Working Memory Test (15 minutes total).

Results: Data reported below is for one timepoint for nine patients receiving UAS:

- Age=53.8 ± 15.4
- BMI=29.2 ± 4.2
- Depression diagnosis:3/9
- CCI > 0: 5/9

- Age-adjusted national percentiles:
 - Processing speed: 61.4±43.7
 - Inhibitory Control and Attention Test: 59.1±32.3
 - Sorting Working Memory Test: 52.8±23.7

Discussion: The results of this study will give providers additional information in evaluating treatment options for patients with cognitive deficit related to OSA. The gold standard for assessing neurocognitive function is fMRI, as demonstrated by studies done showing improvement in CPAP patients. Success in this study may support further research using fMRI data to support the hypothesis of improvement in cognition.