

# Primary Care Perspectives on Surgical Interventions for Obstructive Sleep Apnea

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## Abstract

The main source of diagnosis and treatment of OSA is through primary care, namely family medicine. Since the family medicine physician is typically the main source of medical knowledge for most patients, the knowledge base of family medicine residents on surgical treatment options to address OSA should be considered of paramount importance. The lack of knowledge regarding surgical treatment options limits patient care and favorable treatment outcomes. The purpose of this project is to assess the knowledge base of family medicine residents in ACGME accredited programs in the surgical treatment options available for management of Obstructive Sleep Apnea to further provide training institutions information on modifying resident education in the fields related to sleep medicine. This project was conducted by providing a 20-question survey to family medicine residents at ACGME accredited programs. A total of 28 responses were received from family medicine residents throughout the United States. Residents generally feel comfortable in screening patients for OSA. However, there is a distinct knowledge gap regarding the surgical treatment options available to patients. More integrated educational opportunities through grand rounds, collaborative rotations, or even CME lectures can address these knowledge gaps and thus improve patient care.

**Keywords:** Obstructive Sleep Apnea Family Medicine Orthognathic Surgery Maxillomandibular Advancement

## 1. Introduction

Sleep apnea is a condition which results in episodic cessation of breathing during sleep. The two types of sleep apnea are obstructive sleep apnea and central sleep apnea. Obstructive sleep apnea (OSA), which is much more common than central sleep apnea, occurs when there is an obstruction in the airway which causes cessation

of breathing. The severity of OSA is defined via the Apnea-Hypopnea index (AHI), defined as the number of apneas or hypopneas per hour of sleep. Mild OSA is defined as AHI of 5-15 events per hour, moderate OSA as AHI of 15-30 events per hour, and severe OSA as AHI of greater than 30 events per hour. The estimated prevalence of OSA in North America is 15 to 30 percent in males and 10 to 15 percent in females (5). OSA has been

connected to several health conditions, including hypertension, diabetes, cardiovascular disease, and stroke. There are several treatment options available for patients diagnosed with OSA. Non-surgical treatment options include lifestyle modifications, weight loss, positional treatment, continuous positive airway pressure, or oral appliances. The most common oral appliance is a mandibular advancement device. These devices can be effective in treating OSA and they are FDA-approved for treatment of mild or moderate OSA, but they can also cause unwanted side effects. The most common side effect is temporomandibular joint dysfunction and pain. Others include damage to teeth, xerostomia, hypersalivation, or tooth pain (6). The long-standing gold standard for treatment of obstructive sleep apnea by most providers, namely those in the primary care field, is continuous positive airway pressure (CPAP). The main hurdle with the CPAP has long been patient compliance. Xerostomia, claustrophobia, and aerophagia, among other factors, can deter patients from wearing the device long enough for the therapeutic effects to be demonstrated (1). A comprehensive systematic literature review showed that over a twenty-year period, the non-adherence rate of the CPAP was 34.1% (2). The study further added that there was no significant improvement over that time frame and that behavioral intervention improved adherence rates only by about 1 hour per night on average (2). Over the years, a variety of surgical treatments have been explored to expand and/or tighten the upper airway anatomy, with the most commonly used options including uvulopalatopharyngoplasty (UPPP), insertion of a hypoglossal nerve stimulator, and maxillomandibular advancement (MMA). The hypoglossal nerve stimulator procedure has a reported success rate of about 80% (7), while MMA has a reported success rate above 85% (4). The reasons as to why surgical interventions are inconsistently seldom explored as viable treatment options for most Obstructive Sleep Apnea (OSA) patients has long been debated, but it is feasible to assume that someone reasons could simply be the minimal exposure primary care providers receive during residency or provider biases. Often analytical bias is rooted in

resistance to updated clinical practice, proven by evidence based, peer-reviewed literature (9). This leads to poorer health outcomes. While the full dissection of this pathway is expectedly complex, the solution always stems from provider education. A provider's knowledge based on available treatment options, i.e., health literacy, can be correlated to patient compliance and reduced morbidity (3). This reality suggests that although various non-surgical interventions have long been the main or sole avenue explored in the primary care realm for patient care, an understanding of the surgical interventions available during training years of family medicine providers could provide patients with more suitable treatment options and favorable outcomes with improvement in quality of life.

## 2. Project Aim

The purpose of this project was to assess the knowledge base of family medicine residents in ACGME accredited programs in the surgical treatment options available for management of OSA. Because primary care commonly manages OSA, the information gathered in this study can be used to further provide training institutions information on modifying resident education in the fields related to sleep medicine.

## 3. Methods

This study received IRB approval from UT Health San Antonio (#20220372NRR). A 20-question survey was created to assess family medicine residents' knowledge about the surgical options for treatment of obstructive sleep apnea. The survey questions were designed to elicit both demographic information as well as understanding of treatment options for obstructive sleep apnea. Invitations were sent via email to family medicine residents across the United States to complete the 20-question online survey using Qualtrics. Follow up invitations were sent to maximize the survey response rate. Participation in the survey was voluntary and uncompensated, and completion of the survey indicated consent. The data was then analyzed

through descriptive statistics using Microsoft Excel.

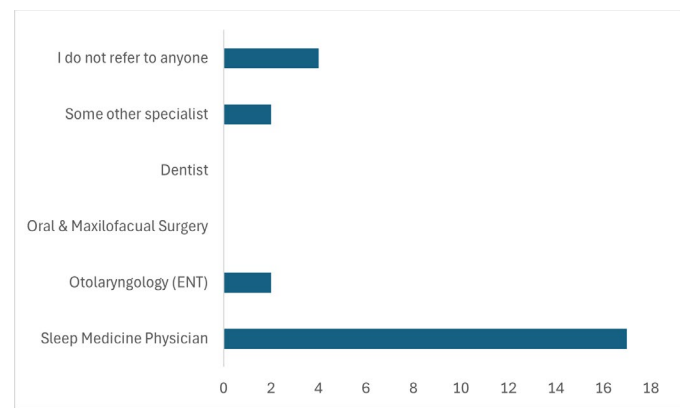
**4. Results**

A total of 28 responses, as seen in Table 1, were received from family medicine residents in programs located throughout the United States, from the Pacific Northwest to the Southwest, to the Northeast. More than half of the responses (53%) were from residents in their first year of training, while the others represented second- and third-year residents. Ages ranged from 26-53, with an average age of 30.5 years (SD = 5.7). Females represented 64% of respondents. Hispanic was the most common reported ethnicity with 36%.

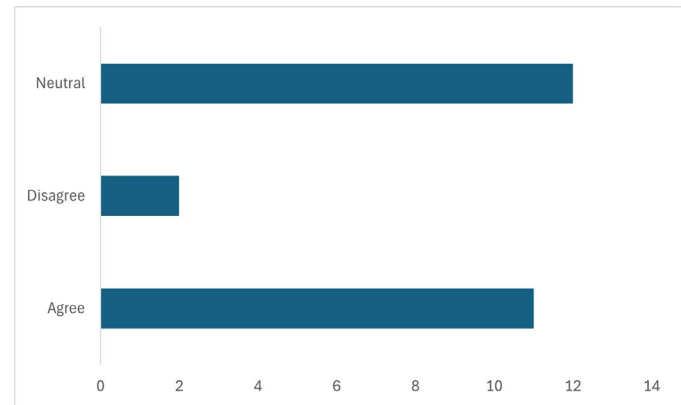
**Table 1**  
*Participant Demographics*

Demographic	%	N = 28
PGY		
1	53.5	15
2	14.3	4
3	32.1	9
Gender		
Male	35.7	10
Female	64.3	18
Hispanic	37.5	10
Race		
White	21.4	6
Black or African American	21.4	6
Asian/Pacific Islander	10.7	3
Other	5.9	3
Family Medicine Program Region		
Northeast	21.4	6
Southeast	21.4	6
Pacific Northwest	3.6	1
Southwest	50.0	14
Midwest	3.6	1
	<i>M (SD)</i>	<i>Range in Years</i>
Age	30.6 (5.7)	26 - 53

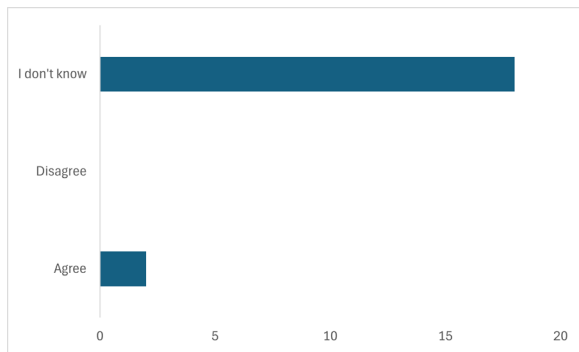
While the residents did demonstrate a baseline understanding for some of the most common screening assessments used for OSA, they were deficient in the application of those assessments from a surgical perspective in relation to outcomes and parameters of success. This aspect is important as knowledge of success rates can factor into a patient’s willingness to be referred to a surgeon.



**Figure 1.** OSA Referral Point



**Figure 2.** Resident Preparedness of Screening Patients with OSA



**Figure 3.** Knowledge of MMA Surgeries being Performed within Hospital

## 5. Discussion

Our survey results indicate that while family medicine residents generally feel comfortable in screening patients for OSA, they do not have adequate knowledge of the surgical options available to their patients. When asked about familiarity with soft tissue surgical treatments, the majority of the respondents answered that none of the procedures were familiar to them. Additionally, most of the respondents indicated they had never heard of maxillomandibular advancement (MMA) surgery or were only somewhat aware of MMA as a treatment option for OSA. This is particularly concerning because maxillomandibular advancement surgery has been shown to have a success rate above 85% (4). This does not mean that every patient diagnosed with OSA should undergo MMA surgery; however, it does demonstrate the expected outcome in the appropriately selected patient. When considering treatment for patients with OSA, it is important to consider all available options. Non-surgical treatment such as oral appliances or CPAP can be effective in a significant percentage of the population, and CPAP should continue to be the gold standard for non-surgical management. However, many patients cannot tolerate CPAP or do not achieve adequate improvement in their symptoms. It is in these patients that surgery should be considered as a potential treatment option. While it may not be necessary for a family medicine physician to have a comprehensive knowledge of surgical procedures, he or she

should be acutely aware of all treatment options available to facilitate referral to the appropriate provider. Therefore, each family medicine residency should integrate into its curriculum the full range of treatment options for OSA. This starts with medical modalities like positive airway pressure but should then include surgical options for patients inadequately treated by, or intolerant of, PAP. A limitation of this study was sample size. While the participant reach was throughout the U.S., the response rate was low. This could be due to not incentives given to the residents to complete the study. Even with the low response rate, our study demonstrated a gap in knowledge of family medicine residents with basic concepts associated with surgical intervention with OSA. An additional limitation is that 53% of the participants who completed the survey were first year Family Medicine residents, which may not be representative of Family Medicine residents at all three years in training (14% were PGY2s and 32% were PGY3s). While the specific long-term ramifications for this modality are not yet known, the literature would suggest that generally speaking, particularly in areas considered rural, resource constraints along with fragmented communication with healthcare providers often become disproportionately harmful to rural health systems (8). Consider the rural health system that may not have an surgeon on staff to help educate on the options available to OSA patients in the local community. When those clinicians are unaware of the full range of treatment options, their patients will miss out on a potentially curative solution if they are forced to continue using the CPAP which can be rendered ineffective due to non-compliance (1). In geographic or socioeconomic settings where specialists are oftentimes scarce, the responsibility falls on primary care clinicians to be the conduit of knowledge for patients. To improve health literacy and decrease bias further educational opportunities are needed (10). More integrated educational avenues through grand rounds, collaborative rotations, or even CME lectures are just some of the ways to address these knowledge gaps and thus improve patient care.

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