



Obstructive Sleep Apnea and Early Weight Loss among Adolescents that Undergo Bariatric Surgery at Children's Hospital Colorado



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Background

- Adult literature demonstrates strong effects of bariatric surgery in ameliorating obstructive sleep apnea (OSA).³ However, these data are scarce in pediatric literature.^{4,5}
- Adolescent obesity and associated OSA in this group are increasing in prevalence (estimated >20% and 45-60% respectively).¹ Comparatively, as high as 69-86% of adults seeking bariatric surgery have comorbid OSA.²
- Adolescent obesity and OSA cause significant morbidity (medical, psychosocial) and mortality to those affected.^{4,5}

Objective

To quantify the prevalence of OSA and examine the effect of surgical intervention in a growing population of adolescents seeking bariatric surgery.

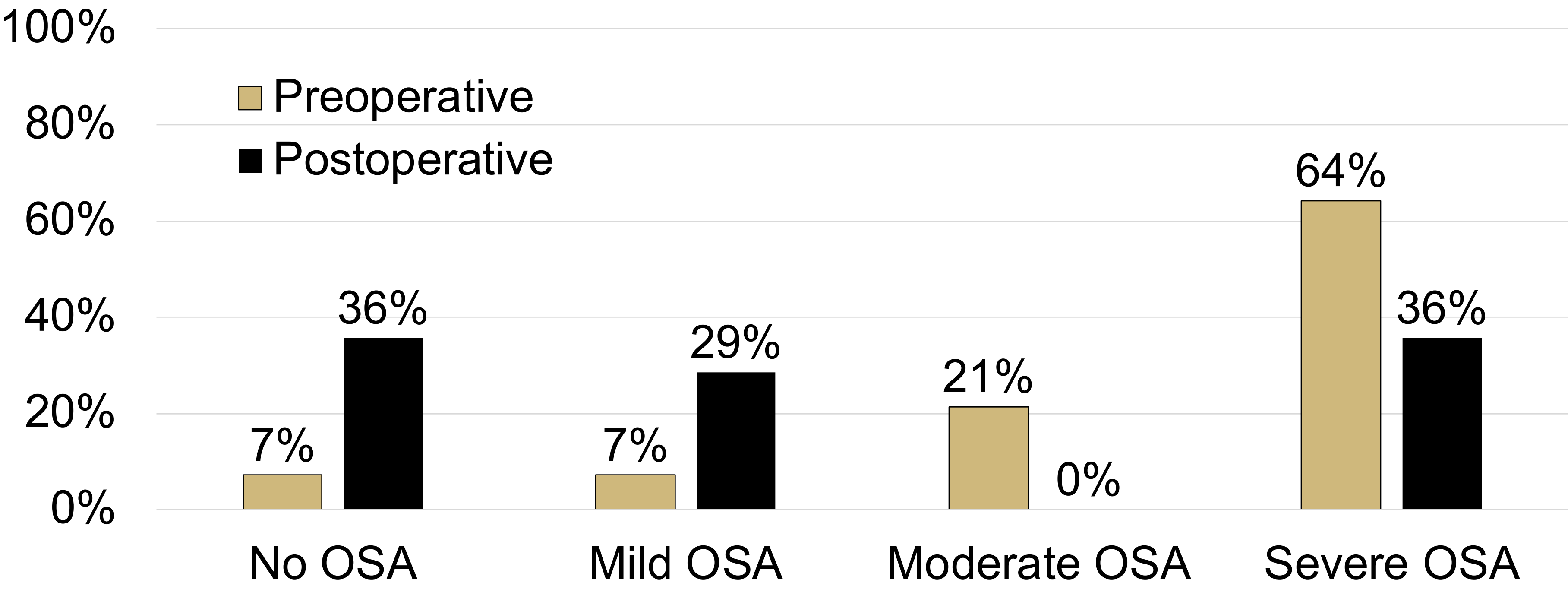
Methods

- A retrospective chart review of an electronic medical records system at a tertiary referral center (CHCO) was performed.
- Between 2017-2019, 83 adolescents enrolled in the bariatric surgery program were identified, of whom 70 met inclusion criteria which included availability of presurgical polysomnography results.
- A total of 12 adolescents had pre-and postoperative polysomnography (PSG) results.
- Demographic and clinical variables including age, sex, race, comorbidities, PSG results, and measures of weight/BMI at multiple time points were abstracted.
- Pediatric OSA criteria were applied to PSG results to determine prevalence and severity of OSA. [OAH1 <1: No OSA; <5: mild OSA; <10: moderate OSA; 10+: severe OSA]^{1,4,5,6}
- Statistical Analysis
 - Chi-squared and Mann-Whitney test for nonparametric data were used to compare baseline characteristics and surgical outcomes between patients with and without preoperative OSA.
 - Subsequent analysis with student T-test and Chi-squared was performed to assess differences in characteristics between patients who did or did not resolve OSA postoperatively.

77% of adolescents' pre-surgery had OSA by PSG, with 44% demonstrating severe disease.

3-months post-surgery 58% of OSA cases were resolved or reduced in severity score by PSG and 85% had at least halved OAH1.

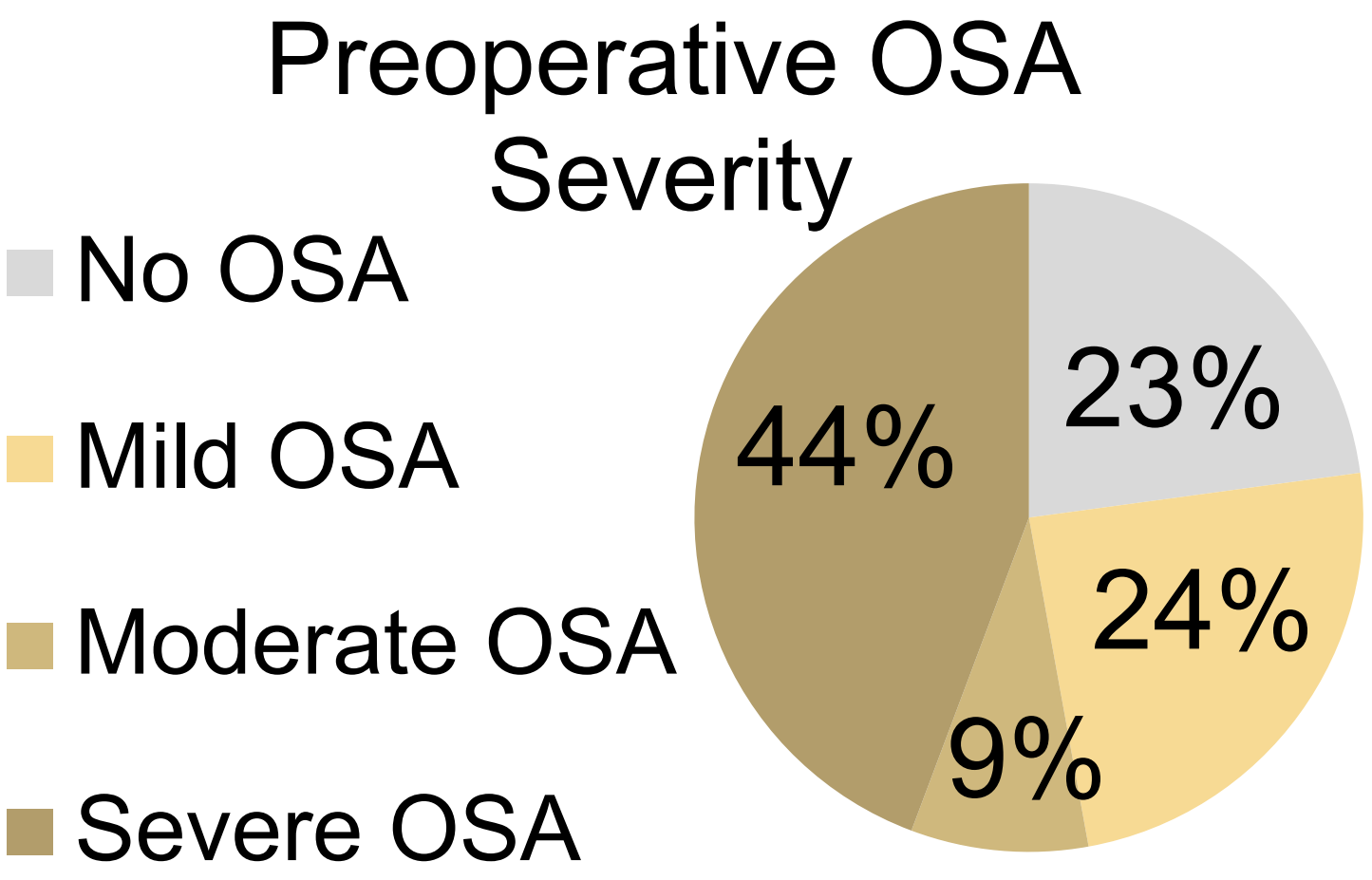
Postoperative Change in OSA Severity



Participants Characteristics

	OSA (N=54)	No OSA (N=16)		OSA (N=54)	No OSA (N=16)
Baseline Comorbidities			Age (years)	17.25±2.11	15.96 ±1.40
	Hypertension	16 (30%)			
	PCOS	11 (20%)	Females (n,%)	38 (70%)	12 (75%)
	T2D	12 (22%)			
	Anxiety	17 (31%)	Hispanic (n,%)	26 (48%)	7 (44%)
Mental Health	Depression	25 (46%)			
			White (n,%)	39 (72%)	12 (75%)
	Prior Counseling	34 (63%)	Public Insurance (n,%)	38 (70%)	10 (63%)
	Current Counseling	14 (26%)			
	On Medications	13 (24%)	Home-schooled	6 (11%)	2 (13%)
Family History	Reported SI	3 (6%)			
			Grade		
	Obesity	37 (69%)	7 th -8 th	4 (8%)	3 (19%)
	OSA	18 (33%)	9 th -12 th	39 (72%)	12 (75%)
	T2D	42 (78%)	HS graduate	11 (20%)	1 (6%)
PCOS					

Results



- No significant differences seen in race, gender, BMI, or comorbidities according to diagnosis of OSA.
- Of 12 patients with preoperative and postoperative PSG, 58% resolved their OSA an average of ~5 months post-surgery.
- Average preoperative BMI for patients with resolved OSA was 45.5 vs 56.8 in those who did not have resolution of OSA (p=0.03).
- Average change in BMI from pre- to post-operative sleep study -21.9% in resolved group vs -13.9% in unresolved group (p=0.12).

Conclusions

- Prevalence of OSA in adolescents seeking bariatric surgery at CHCO is in line with that of adults seeking bariatric surgery, and higher than the general obese adolescent population.⁵
- Resolution/reduction of OSA following bariatric surgery is robust and rapid.
- Limitations of this study were retrospective design and small number of patients who had post-MBS PSG.
- Future direction:
 - Continue to grow sample size as Colorado's bariatric surgery program progresses.
 - Investigate long-term maintenance of OSA resolution and assess predictive factors for successful resolution.
 - Assess associated health outcomes following bariatric surgery in each cohort.

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