Sleep Therapy

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Excess Body Weight and OSA

- Cross sectional associations with neck morphology, general obesity, and central obesity cross-sectionally associated with OSA in multiple studies
- No consensus on particular body habitus phenotype in OSA pathophysiology
- Meaurements of body habitus may have varying degrees of accuracy making “a most important “ body habitus in association with OSA unclear

AJRCCM 2002;165:1217-1239

OSA Prevalence

TABLE 1. PREVALENCE OF OBSTRUCTIVE SLEEP APNEA FROM THREE STUDIES WITH SIMILAR DESIGN AND METHODOLOGY

Study Location	n	Age Range (*years*)	Estimated Prevalence of AHI ≥ 5 events/hour (% [95% CI])		Estimated Prevalence of AHI ≥ 15 events/hour (% [95% CI])	
			Men	Women	Men	Women
Wisconsin*	626	30–60	24 (19–28)	9 (6–12)	9 (6–11)	4 (2–7)
Pennsylvania†	1,741	20–99	17 (15–20)	Not given	7 (6–9)	2 (2–3)
Spain‡	400	30–70	26 (20–32)	28 (20–35)	14 (10–18)	7 (3–11)

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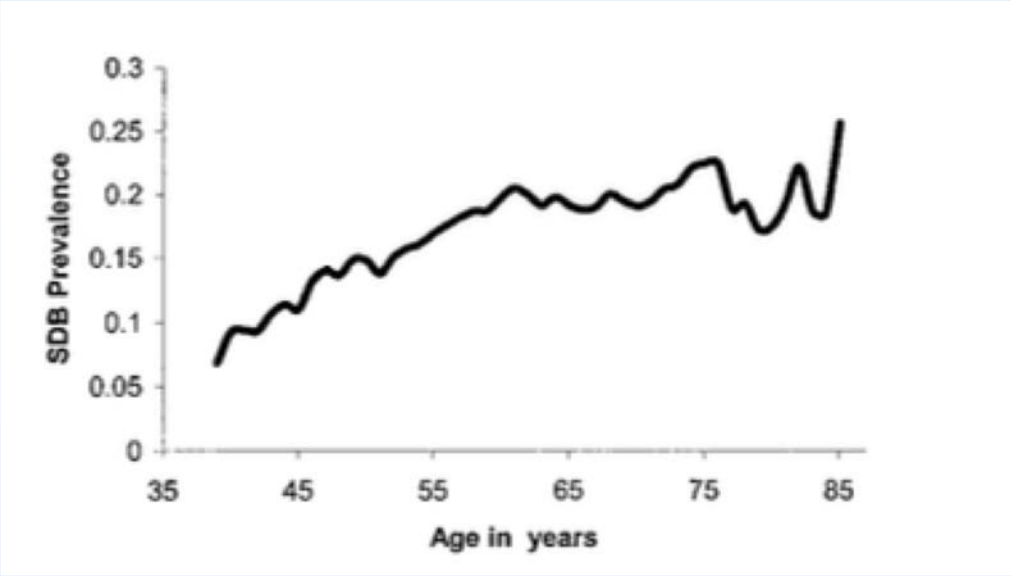
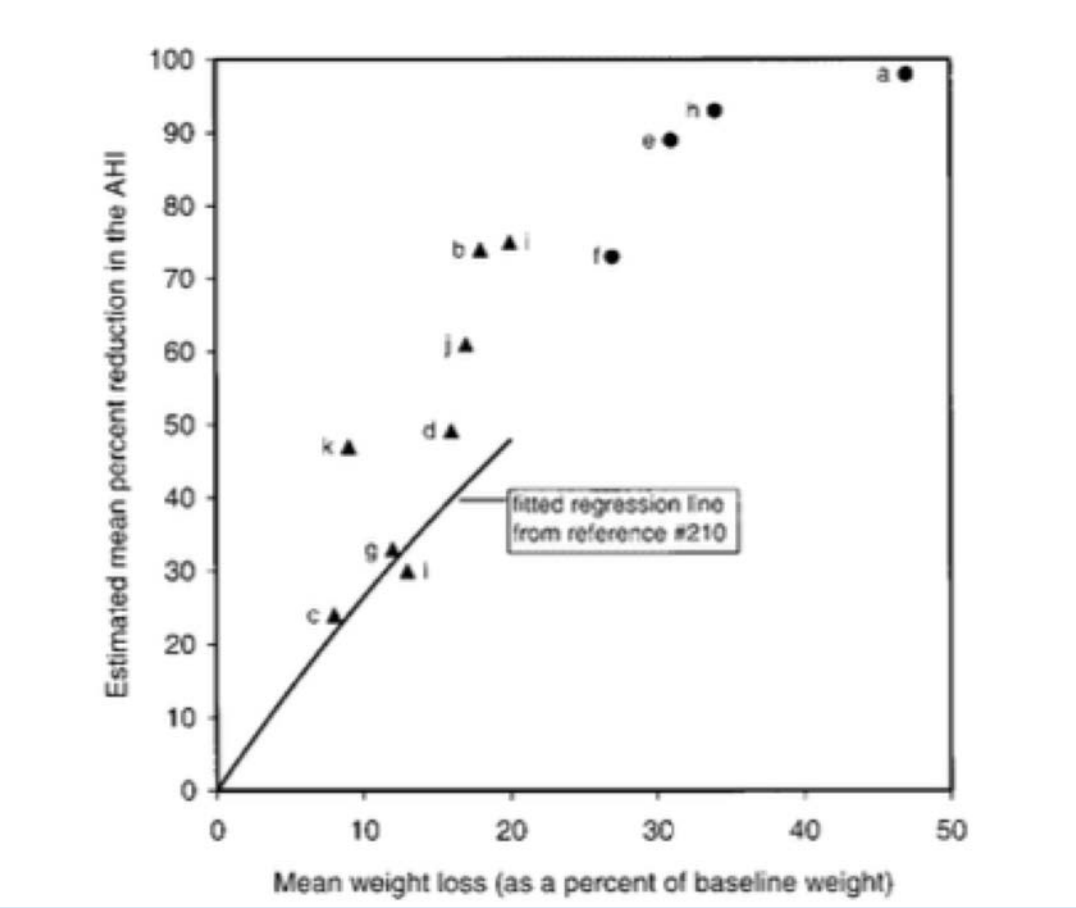
Sleep Disordered Breathing and Age



AJRCCM 2002:1217-1239

Weight Loss and Estimated Reduction in AHI



AJRCCM 220;165:1217-1239

Perioperative Safety in the Longitudinal Assessment of Bariatric Surgery

- Composite end points of 30 day major adverse outcome (including death, venous thromboembolism; percutaneous, endoscopic, or operative re-intervention and failure to be discharged from the hospital)
- OSA , prior DVT/PE or impaired functional status each independently associated with an increased risk of composite end point

NEJM 2009;361(5):445-454

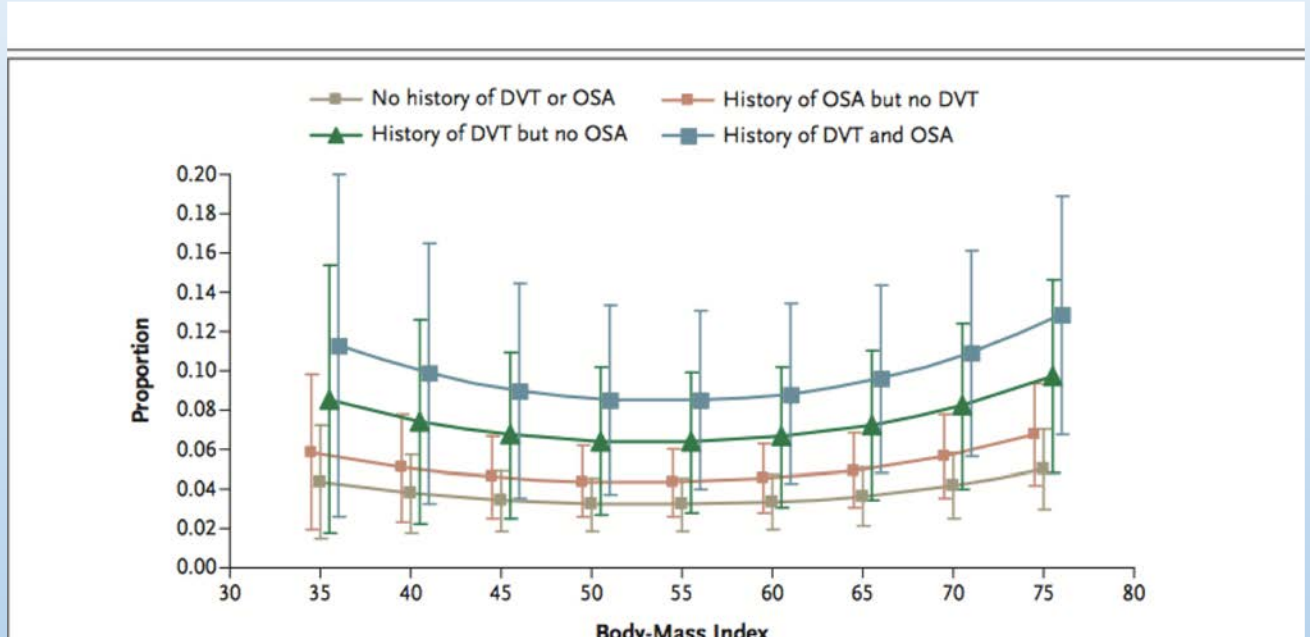
Adverse Outcomes 30 Days Post Bariatric Surgery (N = 4,610)

Table 2. Adverse Outcomes within 30 Days after Surgery, According to Surgical Procedure.

Outcome	Total (N=4610)*	Laparoscopic Adjustable Gastric Banding (N=1198)	Laparoscopic Roux-en-Y Gastric Bypass (N=2975)	Open Roux-en-Y Gastric Bypass (N=437)	P Value†
			number (percent)		
Death	15 (0.3)	0	6 (0.2)	9 (2.1)	<0.001
Deep-vein thrombosis or venous thromboembolism	20 (0.4)	3 (0.3)	12 (0.4)	5 (1.1)	0.05
Tracheal reintubation	20 (0.4)	2 (0.2)	12 (0.4)	6 (1.4)	0.004
Endoscopy	51 (1.1)	1 (0.1)	45 (1.5)	5 (1.1)	<0.001
Operation					
Tracheostomy	11 (0.2)	0	6 (0.2)	5 (1.1)	0.001
Placement of percutaneous drain	16 (0.3)	0	13 (0.4)	3 (0.7)	0.48
Abdominal operation	118 (2.6)	9 (0.8)	94 (3.2)	15 (3.4)	<0.001
Failure to be discharged by day 30	17 (0.4)	0	13 (0.4)	4 (0.9)	0.02
Composite end point‡	189 (4.1)	12 (1.0)	143 (4.8)	34 (7.8)	<0.0001

NEJM 2009:361:445-454

Adverse Outcomes in Bariatric Surgery by Risk Factor (OSA Third Curve)



BMI	30 to <40	40 to <45	45 to <50	50 to <55	55 to <60	60 to <65	65 to <70	70 to <75	≥75	Total
No. of patients	623	1304	1156	722	417	205	90	52	38	4607
No. of events	23	51	30	25	29	13	5	4	9	189
Event rate (%)	3.7	3.9	2.6	3.5	7.0	6.3	5.6	7.7	23.7	4.1

Figure 2. Predicted Probabilities of Adverse Outcomes, According to a History of Deep-Vein Thrombosis or Venous Thromboembolism (DVT) or Obstructive Sleep Apnea (OSA).

NEJM 2009:361(5):445-454

Impact of Treatment with Continuous Positive Airway Pressure (CPAP) on Weight in Obstructive Sleep Apnea

- Objective: Determine the impact of continuous positive airway pressure (CPAP) on weight change in persons with obstructive sleep apnea (OSA).

- The Apnea Positive Pressure Long-term Efficacy Study (APPLES) was a 6-month, randomized, double-blinded sham-controlled multicenter clinical trial conducted at 5 sites in the United States. Of 1,105 participants with an apnea hypopnea index ≥ 10 events/ hour initially randomized, 812 had body weight measured at baseline and after 6 months of study.

JCSM 2013;9(10):989-993

Impact of Treatment with Continuous Positive Airway Pressure (CPAP) on Weight in Obstructive Sleep Apnea

- **Intervention:** CPAP or Sham CPAP.
  measurements: Body weight, height, hours of CPAP or Sham CPAP use, Epworth Sleepiness Scale score.
  Results: Participants randomized to CPAP gained 0.35 ± 5.01 kg, whereas those on Sham CPAP lost 0.70 ± 4.03 kg (mean ± SD, p = 0.001). Amount of weight gain with CPAP was related to hours of device adherence, **with each hour per night of use predicting a 0.42 kg increase in weight**. This association was not noted in the Sham CPAP group. **CPAP participants who used their device ≥ 4 h per night on ≥ 70% of nights gained the most weight over 6 months** in comparison to non-adherent CPAP participants (1.0 ± 5.3 vs. -0.3 ± 5.0 kg, p = 0.014).

JCSM 2013:9(10):989-993

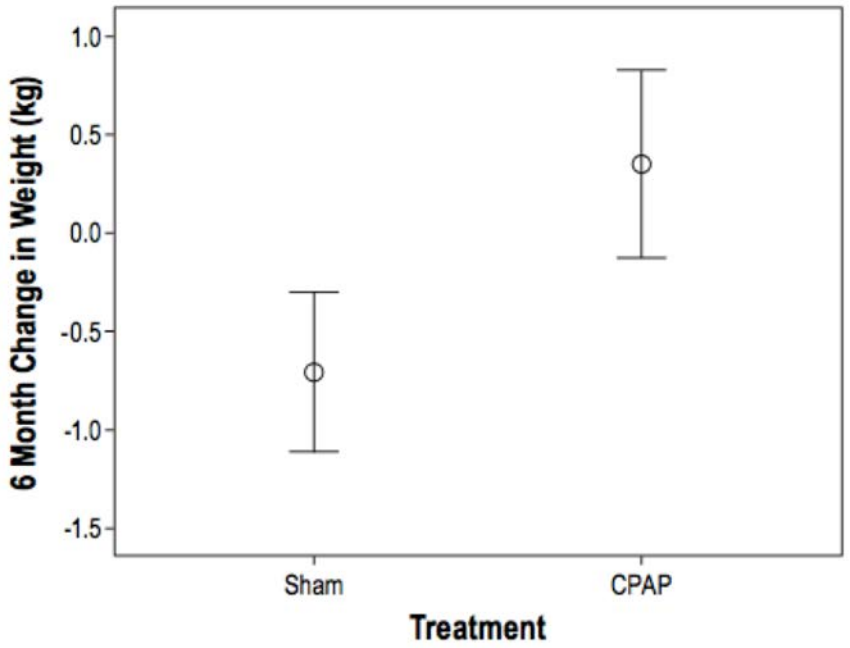
Impact of Treatment with Continuous Positive Airway Pressure (CPAP) on Weight in Obstructive Sleep Apnea

- **Conclusions:** OSA patients using CPAP may gain a modest amount of weight with the greatest weight gain found in those most compliant with CPAP.

JCSM 2013:9(10):989-993

Impact of Treatment with Continuous Positive Airway Pressure (CPAP) on Weight in Obstructive Sleep Apnea

Figure 1—Weight change over 6 months in CPAP and Sham CPAP groups



Mean weight change in CPAP = 0.35 ± 5.01 kg vs. Sham = -0.71 ± 4.03 kg, p = 0.001. N = 425 (CPAP) and 387 (Sham).

JCSM 2013:13(9):989-993

Directions and Collaborations with Bariatric and Sleep Medicine

- Sleep Disordered Breathing Collaboration Summit sponsored by AASM November 2018 and Dr. Dan Eisenberg representing ASMBS
- Multiple areas in discussion for consensus and optimal patient care and efficiency

Possible Collaborative Directions

- Defining when and how OSA screening occurs
- In the era of home sleep apnea testing and auto titrating CPAP with remote data download and programming access should a home study and auto titrating CPAP be the working pre-operative model in conjunction with support from the Sleep Center ?
- Given issues in weight gain with CPAP should any CPAP accommodation time be necessary preoperatively?
- Should post operative Bariatric Surgery care routinely trigger a follow up home sleep study in reassessment after maximum weight loss?