Evidence Table

Clinical Area: **Obstructive sleep apnea, surgical treatment.**
Reference: **Jacobowitz O. palatal and tongue base surgery for surgical treatment of obstructive sleep apnea. A prospective study. *Otolaryngol Head Neck Surg* 2006;135:258-264.**

Study Type: Case Series.
Study Aim: To assess the effect of concurrent uvulopalatopharyngoplasty (UPPP) and hypopharyngeal procedures in obstructive sleep apnea patients with diffuse airway narrowing.

Outcomes

- *Primary*: Operative success defined as post-operative apnea/hypopnea index (AHI) < 20 with at least 50% reduction from preoperative level.

Design

- *Number of subjects:* N=48 included, 37 had complete records and were entered in the analysis.
- *Description of study population:* The mean age of the participants was 47.6 $\pm$ 12.1 years, 78% were men, and the mean BMI was 29.9 $\pm$4.1 kg/m^2.
- *Inclusion criteria:* Patients with a primary complaint of snoring, various degrees of daytime sleepiness, and intolerance to CPAP therapy.
- *Exclusion criteria:* Friedman* stages 1 or 4, or upcoming surgery for OSA.
- *Consecutive patients?* Not discussed.
- *Intervention*: All patients underwent baseline evaluation including polysomnograpyhy, full head and neck examination, fiberoptic evaluation, cephalometric radiography, endoscopy, and a questionnaire to assess snoring, and Epworth sleepiness scale (ESS). Patients were classified according to Friedman staging, and a combination of surgical procedures was performed based on the clinical evaluation. Most patients underwent concurrent UPPP with genioglossus advancement or a tongue base radiofrequency (TBRF) session. Hyoid suspension with UPPP was used among patients with retrolingual airway narrowing due to epiglottic retropositioning or presence of >75% hypopharyngeal lateral wall collapse. TBRF was added based on subjective appearance of tongue base on fiberoptic exam.
- *Source of outcome data*: Polysomnographic studies, and questionnaire.
- *Length of follow-up:* Not discussed but the authors indicate that subjective assessments were made at a mean of 10 months postoperatively.
- *Completeness of follow-up:* Records were complete for 37 (77%) of the 48 patients who underwent the surgery.

*Stage 1: Tonsillar hypertrophy with low tongue position and easily visualized oropharynx, stages 2 & 3: have small tonsils or high tongue positions, and stage 4: patients were morbidly obese or with profound retrognathia.

Validity

- *Is the study type appropriate for the question(s) being asked?* No, a randomized controlled trial would be more appropriate.
- *Were patients similar with respect to baseline characteristics?* Not discussed.
- *Was the intervention and other aspects of patient care similar for all patients (or for all patients in a defined subgroup)?* No, different combinations of surgeries were performed.
- *Was the process of observation likely to affect the outcome?* Yes, for the subjective outcomes.
- *Did an objective observer assess outcomes and were outcome measurements consistent?* For Polysomnographic studies.
- *Was follow-up duration appropriate?* The authors did not discuss the duration of follow-up.

- **Conclusions regarding validity of methods:**

The study was a small case series with no control or comparison group. Multiple procedures were performed in various combinations, and the numbers were too small to compare the outcomes of each.

Results

All 37 patients included in the analysis underwent UPPP.
23 /37 patients underwent genioglossus advancement (GGA).
16/37 patients underwent hyoid suspension (7 of these cases also underwent GGA)
27/37 patients underwent tongue base radiofrequency treatment (this was concurrent with other hypopharyngeal procedures among 22 patients)

- Successful outcome*

No	%
28	76

* Defined as post-operative apnea/hypopnea index (AHI) < 20 with at least 50% reduction from preoperative level. This was achieved in 61% of Friedman stage 2 patients, and 89% of those in stage 3.

Number and rate of patients with
Symptoms at baseline and postoperatively

Symptoms	*Pre-operative*		*Post-operative**		*P value*
	No	*%*	*No*	*%*	
Snoring	37	100	8	24	--
Nocturnal nasal congestion	21	57	9	29	--
Daytime sleepiness	29	78	7	19	--
Poor attention/memory	24	65	8	22	--
Depression/irritability	22	59	8	22	--
Epworth score (mean)	12.1± 4.9		6.7± 3.7		<0.001

* After a mean of 10 months

-- P value was not provided.

*Polysomnographic values at baseline and postoperatively**

	Pre-operative	*Post-operative*	*P value*
Polysomnographic outcomes			
Apnea/hypopnea index (*AHI)***	46.5 ± 24.8	14.9 ± 16.8	<0.001
*Apnea index (AI)***	24.1 ± 24.7	6.6 ± 9.9	<0.001
*Lowest oxygen saturation (LSAT)***	79.0 ± 7.4	82.8 ± 7.1	0.012

* After a mean of 7 months

**Apnea hypopnea index, apnea index, and lowest oxygen saturation

Complications:	n /N	%
Tonsillar fossa hemorrhage	2/37	5.4
Temporary oronasal reflux*	3/37	8.1
Seroma	1/37	2.7
Wound infection	1/37	2.7
Lip Hypothesia	1/37	2.7
Respiratory depression (brief intubation)	1/37	2.7

Authors' Conclusions

The authors concluded that combined palatal and hypopharyngeal surgery seems effective in reducing symptoms and apnea/hypopnea index in obstructive sleep apnea among patients with diffuse airway narrowing and severely elevated AHI who are intolerant to CPAP.

Reviewer's Conclusions

The study is a small case series that provides the lowest grade of evidence. Its results show that the surgical interventions were successful among 76% of cases, and were associated with significant decrease in symptoms and apnea/hypopnea and apnea indices among the participants. Several procedures with various combinations were performed, and due to the small number of participants no comparisons were made between the different combinations to determine which had the most favorable outcomes.