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# Not your grandfather's UPPP: pharyngoplasty in modern sleep surgery

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## Overview

- Obstructive Sleep Apnea
- OSA Surgical Procedures and Outcomes
- Surgical Evaluation

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## Anatomic Evaluation is Key

Effective surgery directed at site(s) of obstruction

- Nose
- Palate
- Hypopharynx, aka Tongue Region/ Retroglossal/ Retrolingual

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## OSA Surgical Treatment Options

Uvulopalatopharyngoplasty Expansion sphincter pharyngoplasty Lateral pharyngoplasty Australian modified palatopharyngoplasty Uvulopalatal flap Relocation pharyngoplasty Z-Palatoplasty Barbed reposition pharyngoplasty Palatal advancement	Tongue radiofrequency Genioglossus advancement Mortised genioplasty Tongue radiofrequency Midline glossectomy Hyoid suspension Tongue suspension/stabilization Partial epiglottectomy Epiglottis Stiffening Operation Hypoglossal nerve stimulation Upper Airway Stimulation (Inspire) Maxillomandibular advancement
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## Palate Procedures

- Uvulopalatopharyngoplasty
- Expansion sphincter pharyngoplasty
- Lateral pharyngoplasty
- Australian modified palatopharyngoplasty
- Uvulopalatal flap
- Relocation pharyngoplasty
- Z-Palatoplasty
- Barbed reposition pharyngoplasty
- Palatal advancement

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### Palatine Tonsil Size

**#1 factor associated with sleep surgery outcomes**

(Degree of Tonsils Blockage)	Ratio of the Tonsil in the Oropharynx
Degree 0	Tonsils in the Fossa
Degree 1	Tonsil occupies less than 25% of the Oropharynx
Degree 2	Tonsil occupies from 25 to 50% of the Oropharynx
Degree 3	Tonsil occupies from 50 to 75% of the Oropharynx
Degree 4	Tonsil occupies more than 75% of the Oropharynx

**Brodsky Ped Clinics 1989**

**Friedman Oto-HNS 2002**

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### DISE and Surgical Outcomes

**Green Laryngoscope 2018**

**Are DISE findings associated with surgical outcomes?**

**Multicenter study of DISE**

**14 centers, n = 275; 0-2+ T; no previous surgery (x tonsillectomy)**

**Blinded review of DISE videos by 4 surgeons**

**Tonsil size vs. response (p=0.008):**

0	31% (32/102)
1+	41% (43/104)
2+	55% (38/69)

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### Uvulopalatopharyngoplasty (UPPP)

Labels: Hard Palate (Bone), Soft Palate, Uvula, Tonsil

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### THE EFFICACY OF SURGICAL MODIFICATIONS OF THE UPPER AIRWAY IN ADULTS WITH OSA SYNDROME

#### The Efficacy of Surgical Modifications of the Upper Airway in Adults With Obstructive Sleep Apnea Syndrome

*An American Sleep Disorders Association Review*

Aaron E. Sher<sup>1</sup>, Kenneth B. Schechtman<sup>2</sup> and Jay F. Piccirilli<sup>3</sup>

**Summary:** This paper, which has been reviewed and approved by the Board of Directors of the American Sleep Disorders Association, provides the background for the Standards of Practice Committee's parameters for the practice of sleep medicine in North America. The intent of this paper is to provide an overview of the surgical treatment of obstructive sleep apnea syndrome, to provide the basis for the American Sleep Disorders Association's practice parameters on this subject and to share our findings of meta-analysis of previously published studies regarding uvulopalatopharyngoplasty. We searched MEDLINE from January 1986 through April 1993, with an update in February 1995, to provide a review of the application of surgical modifications of the upper airway to treat adults with obstructive sleep apnea syndrome. Operations to treat obstructive sleep apnea syndrome include nasal septal reconstruction; uvulopalatopharyngoplasty; uvulopalatopharyngotomies; laser midline glossectomy; lingual-plasty; inferior sagittal mandibular osteotomy and genioglossal advancement, with hyoid myotomy and suspension (the entire process is referred to as GAHM); maxillomandibular osteotomy and advancement, and tracheotomy. Papers included in metaanalysis provided preoperative and postoperative AHI and success rates. Analysis of the uvulopalatopharyngoplasty papers revealed that this procedure is, at best, effective in treating less than 50% of patients with obstructive sleep apnea syndrome. The site of pharyngeal narrowing or collapse, although identified by different and unvalidated methods, has a marked effect on the probability of success of uvulopalatopharyngoplasty. Patients who achieve a favorable response after uvulopalatopharyngoplasty tend to have severe obstructive sleep apnea that does not respond to CPAP. For patients who demonstrate retrolingual narrowing or collapse, other surgical modifications have been described, such as lingual-plasty, GAHM, and maxillomandibular osteotomy and advancement. The studies to support the use of the surgical treatment of obstructive sleep apnea syndrome contain biases related to small sample size, limited follow-up, and patient selection.

Sher, Sleep 1996;19:156-177

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### Modified Expansion Sphincter Pharyngoplasty, aka Functional Expansion Pharyngoplasty

**US (Woodson) and Italy (Campanini/Sorrenti)**

Labels: Hard Palate (Bone), Soft Palate, Palatopharyngeus m., Palatoglossus m., Superior Pharyngeal Constrictor m.

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### Expansion Sphincter Pharyngoplasty

**Pang and Woodson 2007**

**RCT; n=45 (23 ESP, 22 UPPP)**

**Tonsil 1+ or 2+**

**BMI < 30**

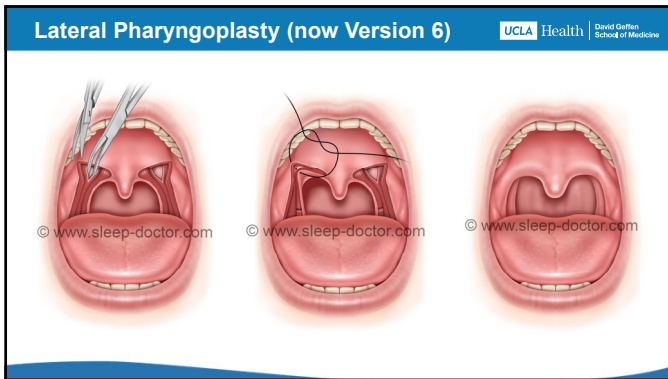
**"Type I Fujita and lateral wall collapse on [Muller's m.]"**

**Results: decreased lateral wall collapse with Muller's m.**

	ESP	UPPP
Preoperative AHI	44.2 ± 10.2	38.1 ± 8.6
Postoperative AHI	12.0 ± 6.6	19.6 ± 7.9
P value	<0.005	<0.05
Success rate	82.60%	68.18%
AHI reduction 50% and <20		

	ESP	UPPP
Preoperative AHI	44.2 ± 10.2	38.1 ± 8.6
Postoperative AHI	12.0 ± 6.6	19.6 ± 7.9
P value	<0.005	<0.05
Success rate	79.20%	48.50%
AHI reduction 50% and <15		

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**Lateral Pharyngoplasty Outcomes** UCLA Health | David Goffin School of Medicine

Cahali SLEEP 2004 (Version 2)  
 RCT: LP (15) vs. UPPP (12)  
 MMP 3/4, + tonsils, FOE suggesting palate only

	BMI	AHI Pre	AHI Post
LP	29.3	42	16*
UPPP	30.1	35	30

Improvement in airway dimensions (awake CT neck before and after surgery)

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**Australian Modified Palatopharyngoplasty** MacKay J Clin Sleep Med 2013 UCLA Health | David Goffin School of Medicine

Three diagrams illustrating the Australian modified palatopharyngoplasty procedure. The first diagram labels the Hard Palate (Bone), Soft Palate, Uvula, and Tonsil. The second shows the surgical incision and dissection. The third shows the final result. Each diagram is watermarked with 'www.sleep-doctor.com'.

SAMS RCT (MacKay JAMA 2020) of Australian palatopharyngoplasty and tongue radiofrequency vs. observation: AHI 47.9 to 20.8 vs. 45.3 to 34.5 events/hour.

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**DISE, Palate Shape, and Surgery** UCLA Health

Comesso Oto-HNS 2024

Is palate shape associated with upper airway surgery outcomes?

Palate Shape: Woodson 2014  
 3 blinded reviewers

Palate shape not associated with overall surgical outcomes (n=209)  
 For isolated soft palate surgery (n=76), GenuAP narrowing (Score 3) associated with poorer outcomes  
 OR 0.44 (95% CI 0.20, 0.99)

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**What Do I Do?: Structure-Based Approach** UCLA Health | David Goffin School of Medicine

- Velum/Palate: UPPP ± tonsillectomy; Other palate procedures (Australian, ESP, and LP)
- Oro LW: ? Hyoid suspension, ESP, LP, MAD, MMA
- Tongue: Genioglossus advancement; Tongue RF; Tongue stabilization; Tongue resection (BMI >30/32); Upper Airway Stimulation (BMI <32/35/40; multi)
- Epiglottis: Hyoid suspension vs. ESO vs. Epiglottectomy
- Maxillofacial: MMA

Counseling patients key: BMI, AHI, mandible (SNB), ?age

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**Conclusions** UCLA Health | David Geffen School of Medicine

**Palate surgery techniques combine tissue resection, repositioning, and/or stiffening**

**Few (although some are RCTs) direct comparisons of techniques, but repositioning appears better outcomes**

**My experience is repositioning has fewer side effects**

**Goal for the future: improving matching of palate procedures to anatomy**

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