What is the Role of Soft Palate Surgery in OSA?

Edward M. Weaver, MD, MPH

University of Washington
Harborview Medical Center
VA Puget Sound
Question:
Should we do UPPP?
Answer:

Yes...
Role of Palate Surgery

- Treat palatal obstruction
- When CPAP not successful
- With realistic expectations
Should We Do UPPP?

1. The case against UPPP
2. The case for UPPP
3. A synthesis
Why We Should **Not** Do UPPP

- UPPP rarely cures OSA
Redefining Success in Airway Surgery for Obstructive Sleep Apnea: A Meta Analysis and Synthesis of the Evidence

Adam G Elshaug, BSc(Hons), MPH; John R Moss, MSocSci, BEc, MBBS, FCHSE; Anne Marie Southcott, MBBS(Hons), FRACP; Janet E Hiller, MPH, PhD

1Discipline of Public Health, The University of Adelaide, Australia; 2Respiratory Medicine Unit, Queen Elizabeth Hospital, Woodville, Australia

Study Objectives: The role of upper airway surgery as a treatment for adult obstructive sleep apnea (OSA) remains controversial, with perspectives on treatment efficacy varying considerably. Though debate may occur in the clinical sphere, it is necessary to appreciate the ever-increasing funding and policy focus on cost effectiveness and “efficacy” in health care.

Design: In this review, we examine contemporary evidence that highlights the importance of “highly effective treatment” over “sub-therapeutic treatment” as a necessity to confer improved health outcomes in OSA. We highlight that assumptions of surgical success inherent in most articles fail to assimilate contemporary, clinically significant indicators of success. We performed a literature search and present interpolated meta-analyses data from 18 surgical articles. Statistical meta-analyses highlight how surgical success decreases when new evidence-based criteria of success are applied.

Measurements and Results: Specifically, when the traditional definition is applied (50% reduction in apnea hypopnea index [AHI] and/or ≤ 20) the pooled success rate for Phase I procedures is 55% (45% fail). However, at AHI ≤ 10, success reduces to 31.5% (68.5% fail) and, at AHI ≤ 5, success is reduced to 13% (87% fail). According to these definitions, Phase II success (fail) rates decrease from 86% (14%) to 45% (55%) and 43% (57%), respectively.

Conclusions: The evidence for clinical efficacy must define treatment “success”. We propose all future surgical audits report “objective cure” rates with success based on AHI outcomes of < 5 and/or < 10. We hope this paper serves as a catalyst for debate and consensus.

Keywords: Surgery, sleep apnea, evidence, treatment effectiveness, health outcomes

Citation: Elshaug AG, Moss JR, Southcott A et al. Redefining Success in Airway Surgery for Obstructive Sleep Apnea: A Meta Analysis and Synthesis of the Evidence. SLEEP 2007; 30:461-467
Conclusions: The evidence for clinical efficacy must define treatment “success”. We propose all future surgical audits report “objective cure” rates with success based on AHI outcomes of $\leq 5$ and/or $\leq 10$. We hope this paper serves as a catalyst for debate and consensus.
Surgery Rarely Cures OSA

Figure 1

Level 4

Elshaug, Sleep 2007; 30:461-7
Implication

Surgery should not be offered to treat sleep apnea.

“…surgery should be restricted to controlled clinical trials…”

– http://www.bmj.com/cgi/eletters/336/7634/44
Why We Should Not Do UPPP

- UPPP rarely cures OSA
TRUE!

But...
But…

• No treatment consistently cures OSA

• Surgery usually helps
Follow-up assessment of CPAP efficacy in patients with obstructive sleep apnea using an ambulatory device based on peripheral arterial tonometry

Stephen D. Pittman
Giora Pillar
Richard B. Berry
Atul Malhotra
Mary M. MacDonald
David P. White
## CPAP Success

<table>
<thead>
<tr>
<th>Success:</th>
<th>CPAP Efficacy</th>
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<tr>
<td>AHI ≤</td>
<td></td>
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<tr>
<td>5</td>
<td>27%</td>
</tr>
<tr>
<td>10</td>
<td>61%</td>
</tr>
<tr>
<td>15</td>
<td>81%</td>
</tr>
<tr>
<td>20</td>
<td>87%</td>
</tr>
</tbody>
</table>

Table 2

Pittman, Sleep & Breath 2006;10:123-31
Surgery Helps OSA

Figure 1

Phase I Surgery Success (%): Success Defined as 50% reduction in AHI and/or AHI ≤ 20

(Hendler, Costello et al. 2001)
(Miller, Watson et al. 2002)
(Vilaseca, Morello et al. 2002)
(Finkelstein, Stein et al. 2002)
(Stuck, Maurer et al. 2003)
(Ferguson, Heighway et al. 2003)
(Sorrenti, Piccin et al. 2003)
(Lao, Shnayder et al. 2003)
(Berger, Stein et al. 2003)
(Berger, Stein et al. 2003)
(Riley, Powell et al. 2003)
(Stuck, Starzak et al. 2004)
(Dattilo and Drooger 2004)
(Bowden, Kezirian et al. 2005)

Combined

Proportion (95% confidence interval)

Elshaug, Sleep 2007;30:461-7
Appropriate Goals of Salvage Surgery

• If UPPP is PRIMARY therapy:
  – CURE is an appropriate goal

• If UPPP is SALVAGE therapy:
  – IMPROVEMENT is an appropriate goal
Appropriate Goals of Salvage Surgery

Improve CLINICAL OUTCOMES:

- Mortality risk
- Cardiovascular disease risk
- Motor vehicle accident risk
- Quality of life
UPPP & Death
Mortality in severe sleep apnoea/hypopnoea syndrome patients: impact of treatment

S. Marti*, G. Sampol*, X. Muñoz*, F. Torres#, A. Roca*, P. Lloberes*, T. Sagalés†, P. Quesada‡, F. Morell*


ABSTRACT: The aim of this study was to determine mortality in patients with sleep apnoea/hypopnoea syndrome (SAHS) according to the treatments employed and comorbidity.

An historical cohort of patients with SAHS diagnosed at a university hospital between 1982 and 1992 and followed until 1996 was studied. From a total of 475 SAHS patients, 444 (94%), with a mean±SD apnoea/hypopnoea index at diagnosis of 55±27, were located and included in the study. SAHS treatments employed were: surgery (88), weight loss (134), continuous positive airway pressure (124) and 98 patients were not treated.

By the end of follow-up, 49 patients had died. According to Cox regression analysis, mortality in treated patients was lower than in those not treated, but higher in those with a history of severe chronic obstructive pulmonary disease. Mortality in nontreated patients compared with that of the general population, adjusted for age and sex, showed excessive mortality, which decreased in treated patients. Stratification by age showed a greater mortality rate ratio in patients <50 yrs. These findings were maintained when mortality from cardiovascular causes was compared.

In conclusion, a rise in mortality was found in nontreated sleep apnoea/hypopnoea syndrome patients compared with the general population, whereas mortality in those treated for sleep apnoea/hypopnoea syndrome did not differ significantly from that of the general population.


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Correspondence: S. Martí, Servei de Pneumologia, Hospital General Vall d’Hebron, Passeig Vall d’Hebron, 119–129, 08035 Barcelona, Spain. Fax: 34 932746083 E-mail: smartib@hg.vehebron.es

Keywords: Cardiovascular diseases mortality sleep apnoea syndrome therapeutics

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Accepted after revision: July 12 2002

This study was financed in part by a grant from Agència d’Avaluació de Tecnologia Mèdica (Servei Catala de la Salut).
OSA Survival

Figure 1

Marti, Eur Resp J 2002;20:1511-18
Adjusted* Hazard Ratio of Death

None (N=98)  CPAP (N=124)  UPPP (N=88)

*Adjusted for age, sex, smoking, BMI, AHI, AHT, CHD, COPD.

Adapted from Table 4

Level 2

Marti, Eur Resp J 2002;20:1511-18
UPPP & Cardiovascular Dz
Increased Incidence of Cardiovascular Disease in Middle-aged Men with Obstructive Sleep Apnea
A 7-Year Follow-up

Yuksel Peker, Jan Hedner, Jeanette Norum, Holger Kraiczi, and Jan Carlson

Sleep Laboratory, Department of Pulmonary Medicine, Sahlgrenska University Hospital, Gothenburg, Sweden

The incidence of a cardiovascular disease (CVD) was explored in a consecutive sleep clinic cohort of 182 middle-aged men (mean age, 46.8 ± 9.3; range, 30–69 years in 1991) with or without obstructive sleep apnea (OSA). All subjects were free of hypertension or other CVD, pulmonary disease, diabetes mellitus, psychiatric disorder, alcohol dependency, as well as malignancy at baseline. Data were collected via the Swedish Hospital Discharge Register covering a 7-year period before December 31, 1998, as well as questionnaires. Effectiveness of OSA treatment initiated during the period as well as age, body mass index (BMI), systolic blood pressure (SBP), diastolic blood pressure (DBP) at baseline, and smoking habits were controlled. The incidence of at least one CVD was observed in 22 of 60 (36.7%) cases with OSA (overnight oxygen desaturations of 30 or more) compared with in 8 of 122 (6.6%) subjects without OSA (p < 0.001). In a multiple logistic regression model, significant predictors of CVD incidence were OSA at baseline (odds ratio [OR] 4.9; 95% confidence interval [CI], 1.8–13.6) and age (OR 23.4; 95% CI, 2.7–197.5) after adjustment for BMI, SBP, and DBP at baseline. In the OSA group, CVD incidence was observed in 21 of 37 (56.8%) incompletely treated cases compared with in 1 of 15 (6.7%) efficiently treated subjects (p < 0.001). In a multiple regression analysis, efficient treatment was associated with a significant risk reduction for CVD incidence (OR 0.1; 95% CI, 0.0–0.7) after adjustment for age and SBP at baseline in the OSA subjects. We conclude that the risk of developing CVD is increased in middle-aged OSA subjects independently of age, BMI, SBP, DBP, and smoking. Furthermore, efficient treatment of OSA reduces the excess CVD risk and may be considered also in relatively mild OSA without regard to daytime sleepiness.
UPPP & Cardiovascular Dz

Figure 2

Level 2

Peker, AJRCCM 2002;166:159-65

<table>
<thead>
<tr>
<th>Condition</th>
<th>CPAP (%)</th>
<th>UPPP (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incompletely treated OSA (n=37)</td>
<td>64%</td>
<td>50%</td>
</tr>
<tr>
<td>Efficiently treated OSA (n=15)</td>
<td>36%</td>
<td>50%</td>
</tr>
</tbody>
</table>

Cardiovascular disease, Hypertension, Coronary artery disease, Cardiovascular event, Non OSA (n=122)
UPPP & Cardiovascular Dz

Figure 2

Level 2  Peker, AJRCCM 2002;166:159-65

- Cardiovascular disease
- Hypertension
- Coronary artery disease
- Cardiovascular event
- Incompletely treated OSA (n=37)
- Efficiently treated OSA (n=15)
- Non OSA (n=122)

CPAP+UPPP

32%

68%
UPPP & Motor Vehicle Accidents
Does Uvulopalatopharyngoplasty Inhibit Automobile Accidents?

Per-Olle Haraldsson, MD; Christer Carenfelt, MD; Michael Lysdahl, MD; Claes Tingvall, PhD

Patients with rhonchopathy, which includes obstructive sleep apnea syndrome (OSAS), who report sleepy spells at the wheel do poorly on simulated monotonous driving tests and have a twofold to threefold increase in traffic accidents. To assess whether drivers with rhonchopathy (heavy snoring, sleep disturbances, and daytime sleepiness) cause fewer automobile accidents after uvulopalatopharyngoplasty (UPPP), the car accident rate for the first 5 years after surgery was compared to the rate of the 5 years immediately before the operation. Data were collected by means of a self-report questionnaire. Fifty-six patients with rhonchopathy were compared to 142 controls without rhonchopathy who had been subjected to nasal surgery. The response rates were 96% and 94%, respectively. The reported habitual sleepiness while driving had disappeared in 87% ($P<.001$) of drivers who had the problem preoperatively. The accident risk reduction (corrected for mileage) in patients was almost four times greater than the reduction in controls ($P<.001$) after surgery. The relative rate of patients involved in any single-car accident fell by 77% ($P<.05$), and the relative rate of single-car accidents fell by 83% ($P<.001$). It is concluded that drivers with rhonchopathy have an increased risk for car accidents, especially single-car accidents, but that this risk returns to normal after UPPP.
# UPPP & Accidents

<table>
<thead>
<tr>
<th>Accident Type</th>
<th>Relative Risk: OSA/Control</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Before UPPP</td>
</tr>
<tr>
<td>Single-car</td>
<td>9.6</td>
</tr>
</tbody>
</table>

Corrected for driving exposure.  P<0.001.

Table V  Level 2  Haraldsson, Laryngoscope 1995;105:657-61
UPPP & Quality of Life
UPPP and Subjective Sleep Apnea Outcomes: The SLEEP Study

Edward M Weaver, MD, MPH (presenter);
B Tucker Woodson, MD; David L Witsell, MD, MHS;
Michael G Stewart, MD, MPH;
Timothy L Smith, MD, MPH; Bevan Yueh, MD, MPH;
Maureen T Hannley, PhD

*\( p < 0.001 \)

```
<table>
<thead>
<tr>
<th>Time from UPPP</th>
<th>FOSQ Score</th>
<th>0 mos</th>
<th>3 mos</th>
<th>6 mos</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 mos</td>
<td>14.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 mos</td>
<td>*17.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 mos</td>
<td>*17.6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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Weaver, OtoHNS 2007;137:P67
Which Is Better?

**Untreated Sleep Apnea**

**Partially Treated Sleep Apnea**
Which Is Better?

Untreated Sleep Apnea

Partially Treated Sleep Apnea
Why We Should Not Do UPPP

• UPPP rarely cures OSA
Why We **Should** Do UPPP

• No treatment cures OSA

• Surgery often last-line therapy
  – CPAP unsuccessful
  – OSA untreated
  – Improvement w/o cure is still a benefit
Why We Should Do UPPP

Significant benefits to:

- Physiology
- Mortality risk
- Cardiovascular dz risk
- Motor vehicle accident risk
- Quality of life
Realistic Expectations

- Improved clinical outcome
- NOT cure
- Difficult acute recovery
- Complications
Complications

- Pain
- Bleeding
- Velopharyngeal Incompetence
- Dysphagia
- Stenosis
- Voice change
- Failure
- Life-threatening complications
Why We Should Not Do UPPP

• UPPP risks too much harm
Effects and Side-Effects of Surgery for Snoring and Obstructive Sleep Apnea – A Systematic Review

Karl A. Franklin, MD, PhD; Heidi Anttila, MSc; Susanna Axelsson, PhD; Thorarinn Gislason, MD, PhD; Paula Maasila, MD, PhD; Kurt I. Myhre, MD; Nina Rehnqvist, MD, PhD

Study Objectives: Many patients undergo surgery for snoring and sleep apnea, although the efficacy and safety of such procedures have not been clearly established. Our aim was systematically to review studies of the efficacy and adverse effects of surgery for snoring and obstructive sleep apnea.

Design: Systematic review.

Measurements: PubMed and Cochrane databases were searched in September 2007. Randomized controlled trials of surgery vs. sham surgery or conservative treatment in adults, with daytime sleepiness, quality of life, apnea-hypopnea index, and snoring as outcomes were included. Observational studies were also reviewed to assess adverse effects. Evidence of effect required at least two studies of medium and high quality reporting the same result.

Results: Four studies of benefits and 45 studies of adverse effects were included. There was no significant effect on daytime sleepiness and quality of life after laser-assisted uvulopalatoplasty and radiofrequency ablation. The apnea-hypopnea index and snoring was reduced in one trial after laser-assisted uvulopalatoplasty but not in another trial. Subjective snoring was reduced in one trial after radiofrequency ablation. No trial investigating the effect of any other surgical modality met the inclusion criteria. Persistent side-effects occurred after uvulopalatopharyngoplasty and uvulopalatoplasty in about half the patients and difficulty in swallowing, globus sensation and voice changes were especially common.

Conclusions: Only a small number of randomized controlled trials with a limited number of patients assessing some surgical modalities for snoring or sleep apnea are available. These studies do not provide any evidence of effect from laser-assisted uvulopalatoplasty or radiofrequency ablation on daytime sleepiness, apnea reduction, quality of life or snoring. We call for research of randomized, controlled trials of surgery other than uvulopalatopharyngoplasty and uvulopalatoplasty, as they are related to a high risk of long-term side-effects, especially difficulty swallowing.

Keywords: Sleep apnea syndromes, snoring, surgery, adverse effects, meta-analysis

Citation: Franklin KA; Anttila H; Axelsson S; Gislason T; Maasila P; Myhre KI; Rehnqvist N. Effects and side-effects of surgery for snoring and obstructive sleep apnea – a systematic review. SLEEP 2009;32(1):27-36.
Conclusions:

We call for research of randomized, controlled trials of surgery other than uvulopalatopharyngoplasty and uvulopalatoplasty, as they are related to a high risk of long-term side-effects, especially difficulty swallowing.
**Table 4—Side-Effects After Uvulopalatopharyngoplasty**

<table>
<thead>
<tr>
<th>Persistent side-effects</th>
<th>Author</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hagert 2000</td>
<td>62%</td>
</tr>
<tr>
<td></td>
<td>Grontved 2000</td>
<td>42%</td>
</tr>
<tr>
<td>Difficulty swallowing</td>
<td>Hagert 2000</td>
<td>35%</td>
</tr>
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<td></td>
<td>Grontved 2000</td>
<td>13%</td>
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<td></td>
<td>Lysdahl 2002</td>
<td>36%</td>
</tr>
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<td></td>
<td>Jäghagen 2004</td>
<td>29%</td>
</tr>
<tr>
<td>Voice changes</td>
<td>Hagert 2000</td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td>Grontved 2000</td>
<td>7%</td>
</tr>
<tr>
<td>Taste disturbances</td>
<td>Hagert 2000</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>Li 2006</td>
<td>1%</td>
</tr>
<tr>
<td>Author</td>
<td>Operation</td>
<td>Death case numbers</td>
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<td>-------------------</td>
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<td>--------------------</td>
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<tr>
<td>Esclamado 1989&lt;sup&gt;23&lt;/sup&gt; USA</td>
<td>UPPP</td>
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<td>Harmon 1989&lt;sup&gt;24&lt;/sup&gt; USA</td>
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<tr>
<td>Fairbanks 1990&lt;sup&gt;57&lt;/sup&gt; USA</td>
<td>UPPP</td>
<td>16</td>
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<tr>
<td>Carenfelt 1993&lt;sup&gt;58&lt;/sup&gt; Sweden</td>
<td>UPPP</td>
<td>3</td>
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<tr>
<td></td>
<td>LAUP</td>
<td></td>
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<tr>
<td>Haavisto 1994&lt;sup&gt;60&lt;/sup&gt; Finland</td>
<td>UPPP</td>
<td>1</td>
</tr>
<tr>
<td>Lee 1997&lt;sup&gt;62&lt;/sup&gt; UK</td>
<td>UPPP or LAUP</td>
<td>6</td>
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<tr>
<td>Kezirian 2004&lt;sup&gt;21&lt;/sup&gt; USA</td>
<td>UPPP</td>
<td>7</td>
</tr>
</tbody>
</table>
Why We Should Not Do UPPP

- UPPP risks too much harm
FALSE!
Benefits Outweigh Harms

• When compared head-to-head
  – Swallowing difficulty
  – Quality of life
  – Mortality risk
Swallowing Difficulty

- Relatively few of these patients regretted UPPP
  - Swallowing difficulty often temporary
  - Patients adapted or not bothered
  - Benefits outweighed harm
  - Patients informed
Table 4—Side-Effects After Uvulopalatopharyngoplasty

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<td>7%</td>
</tr>
<tr>
<td></td>
<td>Li 2006&lt;sup&gt;54&lt;/sup&gt;</td>
<td>1%</td>
</tr>
</tbody>
</table>
Side Effects After Surgical Treatment of Snoring

- Survey 415 patients after snoring surgery
- 62% had side effect: globus (40%), regurgitation, taste, smell, voice.
- Significant improvement over time

Hagert, J ORL 2000; 22:76-80
Complaints and Satisfaction After Uvulopalatopharyngoplasty

AKSEL M. GRØNTVED and PEER KARUP

From the Ear, Nose and Throat Department F, Odense University Hospital, Odense, Denmark


A questionnaire administered 2 years after classical laser uvulopalatopharyngoplasty (UPPP) showed that 42% of 69 patients had complaints. Most of the complaints, however, were comparatively minor. The most frequent complaint was a tendency to nasal regurgitation (13%), although only two patients needed treatment. Other complaints were pharyngeal hypersensation (10%), swallowing problems (9%) and speech disturbances (7%). Fourteen per cent of the 69 patients were not satisfied with the effect of the operation. In the group with complaints, 25% were dissatisfied with the result of the operation, whereas only 8% of those with no complaints were dissatisfied (p < 0.05). Continued snoring after UPPP was closely correlated to dissatisfaction with the general result (p < 0.01). It is very important to carry out follow-up after UPPP because complaints and dissatisfaction are common. Every effort should be made to reduce the tendency to nasal regurgitation. The results are relatively good and the procedure justified in cases of severe snoring and continuous positive airway pressure (CPAP)-resistant obstructive sleep apnoea (OSA). The severity and number of complaints were found to be acceptable in this difficult treatable entity. Key words: complications, questionnaire, results, sleep apnoea, snoring.

- LAUP
- Most complaints minor
- 14% dissatisfied

Level 4 
Gronstved, Acta Oto 2000; S543:190-2
Complaints and Satisfaction After Uvulopalatopharyngoplasty

AKSEL M. GRØNTVED and PEER KARUP

From the Ear, Nose and Throat Department F, Odense University Hospital, Odense, Denmark

The general results and the rate and degrees of complaints in this series were considered acceptable when compared to the seriousness and complexity of this difficult entity.
Uvulopalatopharyngoplasty Versus Laser Uvulopalatoplasty: Prospective Long-term Follow-up of Self-reported Symptoms

MICHAEL LYSDAHL and P.-O. HARALDSSON

From the Division of Anaesthesia and Intensive Care, Respiratory Unit, Danderyd Hospital, Stockholm, Sweden and Department of Otorhinolaryngology—Head & Neck Surgery, Karolinska Hospital, Stockholm, Sweden


No study to date has prospectively compared the results of uvulopalatopharyngoplasty (UPPP) and CO$_2$ laser palatal surgery. This study investigates and compares outcomes in 121 consecutive patients suffering from rhonchopathy, the majority of whom reported apneas. Sixty-one patients underwent UPPP and 60 laser uvulopalatoplasty (LUPP). Patients were requested to assess the frequency of symptoms associated with obstructive sleep apnea syndrome prior to surgery, at 3-month follow-up and 5–8 years postoperatively. All symptoms were significantly improved for the two patient groups, both short and long term (p < 0.01) although short-term results were generally better. However, UPPP was superior to LUPP in terms of all clinical effect parameters. Although patients treated with UPPP had more severe symptoms preoperatively they also had a better long-term outcome. Side-effects such as minor swallowing disturbances were frequent, using either surgical modality, but few patients were bothered if surgery was successful. Key words: excessive daytime sleepiness, laser surgery, obstructive sleep apnea syndrome, snoring, traffic.

- UPPP or LAUP
- Most complaints minor
- Half of swallowing disturbances resolved
- 12% regretted surgery
Side-effects, such as swallowing disturbances, were frequent using either surgical modality, but few patients were bothered if surgery was successful.
Prediction and Risk of Dysphagia after Uvulopalatopharyngoplasty and Uvulopalatoplasty

EVA LEVRING JÄGHAGEN¹, DIANA BERGGREN², ÅKE DAHLQVIST² and ANNIKA ISBERG¹

From the Departments of ¹Odontology, Oral and Maxillofacial Radiology and ²Clinical Science, Otorhinolaryngology, Umeå University, Umeå, Sweden


Objective — To test the hypothesis that preoperative asymptomatic pharyngeal swallowing dysfunction predisposes for the development of symptoms of dysphagia after uvulopalatopharyngoplasty (UPPP) and uvulopalatoplasty (UPP).

Material and Methods — A total of 42 patients who snored were scheduled to undergo UPPP (n = 20) or UPP (n = 22). UPP was performed using either a CO₂ laser or a conventional steel scalpel. Preoperatively and 1 year postoperatively all patients were examined videoradiographically to assess pharyngeal swallowing function. They also completed a questionnaire pre and postoperatively concerning their snoring problems and swallowing function as well as the outcome of surgery.

Results — Preoperatively, 7 (17%) patients reported dysphagia. Pharyngeal swallowing dysfunction was demonstrated in 6/7 patients with preoperative dysphagia while pharyngeal swallowing dysfunction was evident preoperatively in 18/35 non-dysphagic patients. Of the 35 patients without preoperative dysphagia, 10 (29%) developed dysphagia after surgery. There was no significant risk of development of postoperative dysphagia for patients with compared to patients without preoperative pharyngeal swallowing dysfunction. Only one of the seven patients with preoperative dysphagia experienced worsening of the problem. A total of 93% of the patients reported a decrease in snoring and 95% reported a decrease in daytime sleepiness.

Conclusions — Preoperative pharyngeal swallowing dysfunction was not proven to predict the development of dysphagia after UPPP or UPP. The surgical method did not influence the frequency of postoperatively acquired dysphagia. The results do not indicate that patients with preoperative dysphagia should be excluded from treatment with UPPP or UPP. Key words: eating disorders, pharynx, prospective study, sleep apnea, snoring, surgery, videoradiography.

• UPPP or UPP
• 29% w/o pre-op dysphagia developed dysphagia
• 0% regretted surgery

Level 4 Jaghagen, Acta Oto 2004; 124:1197-1203
Prediction and Risk of Dysphagia after Uvulopalatopharyngoplasty and Uvulopalatoplasty

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The patients who developed postoperative dysphagia reported that the positive effect on snoring and daytime sleepiness outweighed the swallowing complication.
Taste disturbance after uvulopalatopharyngoplasty for obstructive sleep apnea

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OBJECTIVES: This study investigated factors that may attribute to taste disturbance (TD) following uvulopalatopharyngoplasty (UPPP) for obstructive sleep apnea (OSA).

STUDY DESIGN: This longitudinal intervention study enrolled 108 patients who received UPPP for OSA. Patients who reported TD in the postoperative questionnaire were examined using the three-drop-method gustatory function test (GFT).

RESULTS: The GFT revealed that 5 patients (4.6%) reporting TD lost at least one of the four basic tastes 3 months after surgery. Deficiency of sweet sense was the most common type of TD (80%). The use of electrocautery for developing the uvulopalatal flap was the only significant predictor that may attribute to TD (odds ratio: 14.1). Repeating the GFT 9 months after operation showed a restoration of tastes in 4 patients.

CONCLUSIONS: Development of the uvulopalatal flap using electrocautery may increase the likelihood of postoperative TD. Patients with taste disturbance after UPPP may eventually recover their taste function over time.

- UPPP
- 3 mos: 5% w/ taste loss
- 9 mos: 1% w/ taste loss
- Significant improvement over time

Li, OtoHNS 2006; 134:985-90
Quality of Life

- Two studies
- Both showed net improvement
UPPP and Subjective Sleep Apnea Outcomes: The SLEEP Study
Edward M Weaver, MD, MPH (presenter);
B Tucker Woodson, MD; David L Witsell, MD, MHS;
Michael G Stewart, MD, MPH;
Timothy L Smith, MD, MPH; Bevan Yueh, MD, MPH;
Maureen T Hannley, PhD

*p<0.001
Quality of life assessment of treatment with dental appliance or UPPP in patients with mild to moderate obstructive sleep apnoea. A prospective randomized 1-year follow-up study

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SUMMARY The objectives of this study were: to evaluate the change in the three quality of life (QOL) dimensions of vitality, contentment and sleep before intervention and 1 year after treatment with a dental appliance or uvulopalatopharyngoplasty (UPPP); to compare the effect of treatment between these two treatment groups on these three dimensions; and to determine the relation between the QOL scores and somnographic values. Ninety-five patients with mild to moderate obstructive sleep apnoea (OSA) (AI > 5) were randomly allocated to either a dental appliance or UPPP treatment group. Seven patients withdrew after randomization but before treatment, leaving 88 patients eligible for treatment. The patients were examined using somnography and administered the Minor Symptoms Evaluation-Profile (MSF-P), a QOL questionnaire, before and 1 year after intervention. Thirty-seven patients in the dental appliance group and 43 in the UPPP group completed the 1-year follow-up. The mean values for the three dimensions vitality, contentment and sleep improved significantly 1 year after intervention in the dental appliance and UPPP groups. No difference in the QOL scores at baseline was noted between the groups. One year after intervention the UPPP group showed significantly more contentment than the dental appliance group. In contrast, vitality and sleep dimensions did not differ between the two treatment groups. No significant correlations were observed between the QOL scores and somnographic values. In conclusion, quality of life improved significantly in the dental appliance and UPPP groups 1 year after intervention. However, the dental appliance group showed a lower level of contentment than the UPPP group, even though the somnographic values were superior in the former group.
# Minor Symptoms Evaluation Profile

$UPPP \ n = 43$

Before to 12 months after

<table>
<thead>
<tr>
<th></th>
<th>Mean diff. (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitality</td>
<td>9.7 (5.0–14.4)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Contentment</td>
<td>10.2 (6.0–14.4)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Sleep</td>
<td>22.6 (16.9–28.3)</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>
Mortality Risk

• Overall survival improved
  – Low 30-day mortality risk (low risk of harm)
  – Improved long-term benefit (large benefit)
  – Immediate net benefit
Incidence of Serious Complications After Uvulopalatopharyngoplasty

Eric J. Kezirian, MD, MPH; Edward M. Weaver, MD, MPH; Bevan Yueh, MD, MPH; Richard A. Deyo, MD, MPH; Shukri F. Khuri, MD; Jennifer Daley, MD; William Henderson, PhD

Objectives: Uvulopalatopharyngoplasty (UPPP) is the most common surgical treatment for obstructive sleep apnea (OSA). Anatomic and physiologic abnormalities associated with OSA can make perioperative management difficult. Only single-site case series provide current estimates of the incidence of perioperative complications, with a pooled crude serious complication rate of 3.5% and a crude mortality rate of 0.4%. The primary objective of this study was to calculate the incidence of perioperative morbidity and mortality in a large, multisite cohort of UPPP patients. Study Design: Prospective cohort study of adults undergoing inpatient UPPP with or without other concurrent procedures Methods: The serious complication and 30-day mortality rates were calculated from the Department of Veterans Affairs (VA) National Surgical Quality Improvement Program database of prospectively collected outcomes of all VA inpatient surgeries nationally 1991 to 2001. Serious complications were defined by 15 specific life-threatening complications. Deaths were captured whether the patient was in the hospital or discharged. Results: Veteran patients (n = 3130) had a mean age of 50 years and were predominantly male (97%). The serious nonfatal complication rate was 1.5% (47/3130) (95% confidence interval [CI] 1.1% - 1.9%). The 30-day mortality rate was 0.2% (7/3130) (95% CI 0.1%, 0.4%). There was no significant effect of year of surgery or patient age on the risk of serious complication or death. Conclusion: The incidence of serious nonfatal complications and 30-day mortality after UPPP are 1.5% and 0.2%, respectively, in a large cohort of UPPP patients at veteran hospitals. Key Words: obstructive sleep apnea, complications, mortality, palate surgery, uvulopalatopharyngoplasty, veterans, VA.

Laryngoscope, 114:450–453, 2004

30-d Mortality Rate: 7/3130 = 0.2% (95% CI 0.1%, 0.4%)
Mortality of Veterans with Sleep Apnea: Untreated versus Treated
Weaver EM,1,2,3 Maynard C,2,3,6 You B1,2,3,6
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Introduction: Untreated obstructive sleep apnea (OSA) appears to increase mortality. The effect of treatment on mortality rate is unclear because most previous reports analyzed small samples and did not adequately control for comorbidity. We sought to determine whether providing a continuous positive airway pressure (CPAP) device or performing uvulopalatopharyngoplasty (UPPP) is associated with a decreased mortality rate relative to providing no treatment for OSA, in a large cohort with control for comorbidity.

Methods: This retrospective inception cohort study included all patients diagnosed with OSA in any Veteran Affairs (VA) inpatient facility 1991-2001 or outpatient facility 1997-2001. Subjects were identified by ICD9 diagnostic codes in the VA inpatient and outpatient treatment files. Treatment status (None, CPAP, UPPP, or tracheotomy) was determined by ICD9 or CPT procedure codes in these databases. Patients without a code for CPAP, UPPP, or tracheotomy were considered untreated. Patients undergoing tracheotomy were not included in this analysis, because indications for tracheotomy could not be determined. CPAP patients were provided a CPAP device, but usage data were not available. Sleep apnea severity data were not available. The Charlson Comorbidity Index was calculated from ICD-9 diagnostic codes from the year prior to inception into the cohort. Mortality data were extracted from VA Death Files. Survival time was calculated from the date of first diagnosis of OSA to date of death or 9/30/2002. Treatment groups were compared on mortality hazard with Cox regression, adjusting for age, sex, race, comorbidity, and year of OSA diagnosis.

Results: The cohort consisted of 149,267 veterans, age 57+/-12 (mean+-SD) years, 97% male. By September 2002, 16,967 of 116,678 untreated patients (14.5%), 32,630 of 28,612 CPAP patients (11.4%), and 736 of 3,977 UPPP patients (9.9%) were dead (untreated vs treated, p<0.001). From the date of OSA diagnosis, untreated patients survived 3.6+/-2.3 years, CPAP patients survived 4.6+/-2.5 years, and UPPP patients survived 5.3+/-2.5 years (untreated vs treated, p<0.001). After adjusting for the variables listed, untreated patients had 1.9 (95% CI 1.8-2.0, p<0.001) times greater hazard of dying at any time relative to treated patients. UPPP patients had a lesser mortality rate (p=0.006), longer survival (p<0.001), and lesser hazard of death (adjusted hazard ratio 0.57, 95% CI 0.39-0.81, p=0.002) relative to CPAP patients.

Conclusion: Treatment with CPAP or UPPP confers a survival advantage over no treatment, after adjustment for age, sex, race, comorbidity, and year of OSA diagnosis. One cannot draw conclusions about the relative efficacy of CPAP and UPPP because CPAP usage data were not available.
Surgery Survival

Kaplan-Meier survival estimates, by therapy

UPPP = 3,977
CPAP = 28,612
No Tx = 116,678

Weaver, Sleep 2004;27:A208
Surgery Survival

1 month

Level 2

Weaver, Sleep 2004;27:A208
Which Is Worse?

Risk of Surgery

Risk of Untreated Sleep Apnea
Which Is Worse?

Risk of Surgery

Risk of Untreated Sleep Apnea
Why We Should Not Do UPPP

- UPPP risks too much harm
Why We Should Do UPPP

Benefits outweigh harms:

• Symptoms
• Quality of life
• Mortality risk
Role of Palate Surgery

- Treat palatal obstruction
- When CPAP not successful
- With realistic expectations
  - Benefits
  - Potential harms
What is the Role of Soft Palate Surgery for OSA?

REFERENCES CITED IN SYLLABUS


ADDITIONAL SUPPORTING REFERENCES NOT CITED IN SYLLABUS


