Reconstructive Palatal Techniques for Obstructive Sleep Apnea

B. Tucker Woodson MD
Professor
Department of Otolaryngology, Communication Sciences
Division of Sleep Medicine
Medical College of Wisconsin
Milwaukee, WI USA
Uvulopalatopharyngoplasty Techniques

Method of Simmons

Method of Fairbanks
PRACTICE PARAMETERS FOR SURGERY FOR OSA IN ADULTS

Practice Parameters for the Surgical Modifications of the Upper Airway for Obstructive Sleep Apnea in Adults

Surgical Modifications of the Upper Airway for Obstructive Sleep Apnea in Adults: A Systematic Review and Meta-Analysis

Sean M. Caples, DO¹; James A. Rowley, MD²; Jeffrey R. Prinsell, DMD, MD³; John F. Pallanch, MD⁴; Mohamed B. Elamin, MBBS⁵; Sheri G. Katz, DDS⁶; John D. Harwick, MD⁷

MMA

UPPP

RFTA
Site of UPPP Failure

- Historical concept is that failure is due to multilevel obstruction (problems at other sites)
- Data suggests that failure is due to persistent palatal obstruction

Langin, Chest, 113:111, 1998
Anatomy of UPPP Failure

- Site of failure is proximal to resected Soft Palate
- Major predictor of outcome is presurgical anatomy
Mucosa does not define structure
Determinates of Airway Structure are Facial Skeletal and Soft Tissue Buttresses
Three Maneuvers (Techniques)

• Expansion Sphincter Pharyngoplasty
  – Submucosal
  – Via lateral palatal space

• Palatal Advancement
Surgical Techniques

Expansion Sphincterplasty
Australian Modification (Robinson, MacKay, Carney)

- Key Points: Creation of Palatopharyngeus muscle rotation flap, removal of supratonsillar fat
Palatal Advancement
Friedman Staging  

Otol HNS 2003

- Helpful for Stage 1 .... not for Stage 3
SKUP\textsuperscript{3} randomised controlled trial: polysomnographic results after uvulopalatopharyngoplasty in selected patients with obstructive sleep apnoea

Nanna Browaldh,\textsuperscript{1} Pia Nerfeldt,\textsuperscript{1} Michael Lysdahl,\textsuperscript{2} Johan Bring,\textsuperscript{3} Danielle Friberg\textsuperscript{1}

BMI < 32
Friedman 1,2
Upper Pharynx Phenotypes

Oblique  Intermediate  Vertical
Modified Uvulopalatopharyngoplasty and Coblation Channeling of the Tongue for Obstructive Sleep Apnea: A Multi-Centre Australian Trial

Stuart G. MacKay, M.D.,1,2, A. Simon Carney, M.D.,3,4, Charmaine Woods, Ph.D.,3,4; Nick Antic, Ph.D.,4,5; R. Doug McEvoy, M.D.,4,5

<table>
<thead>
<tr>
<th></th>
<th>Preoperative</th>
<th>Postoperative</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Median</td>
<td>IQR</td>
</tr>
<tr>
<td>AHI</td>
<td>23.1</td>
<td>10.4-36.6</td>
</tr>
<tr>
<td>ESS</td>
<td>10.5</td>
<td>5.5-13.5</td>
</tr>
<tr>
<td>LSaO²</td>
<td>86.0</td>
<td>83.0-89.0</td>
</tr>
<tr>
<td>BMI</td>
<td>27.6</td>
<td>25.2-32.5</td>
</tr>
</tbody>
</table>
Sphincterpharyngoplasty Concept
Muscle Pedicle Elevation

- Elevate to palate
- Stay in deeper plane
- Medial mucosa stays in continuity

Fulcrum
Video Expansion Sphincterplasty with Tonsil
Expansion Sphincterplasty-Submucosal
Australian Modification (2)

- Tends to leave tonsil fossa mucosal defect
- Tensionless closure, may try periosteal stitch
Lateral Palatal Space - Supratonsillar Fat
Palatal Process
Palatine Bone
Palate Anatomy from Nasopharynx
Palatal Advancement
Randomized controlled trial (RCT)
Sphincter PPP vs UPPP (n = 45)
- Friedman Stage 2
- AHI
  - $44.2 \pm 10.2$ to $12.0 \pm 6.6$
  - versus
  - $38.1 \pm 6.6$ to $19.6 \pm 7.9$ events/h
- Lsat improved
- Clinical “success” 78.2% versus 45.5%
- Mean 8 month follow up
Modified Uvulopalatopharyngoplasty and Coblation Channeling of the Tongue for Obstructive Sleep Apnea: A Multi-Centre Australian Trial

Stuart G. MacKay, M.D. 1,2, A. Simon Carney, M.D. 3,4, Charmaine Woods, Ph.D. 3,4, Nick Antic, Ph.D. 4,5; R. Doug McEvoy, M.D. 4,5;

<table>
<thead>
<tr>
<th></th>
<th>Preoperative</th>
<th>Postoperative</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Median</td>
<td>IQR</td>
</tr>
<tr>
<td>AHI</td>
<td>23.1</td>
<td>10.4-36.6</td>
</tr>
<tr>
<td>ESS</td>
<td>10.5</td>
<td>5.5-13.5</td>
</tr>
<tr>
<td>LSaO₂</td>
<td>86.0</td>
<td>83.0-89.0</td>
</tr>
<tr>
<td>BMI</td>
<td>27.6</td>
<td>25.2-32.5</td>
</tr>
</tbody>
</table>
Transpalatal Advancement Pharyngoplasty Outcomes Compared With Uvulopalatopharyngoplasty

B. Tucker Woodson, MD, Sam Robinson, MB, BS, FRACS, Hyun J. Lim, PhD, Milwaukee, Wisconsin

<table>
<thead>
<tr>
<th>Demographic group</th>
<th>Palatal advancement (n = 30)</th>
<th>UPPP (n = 44)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-AHI</td>
<td>48.3 (24.6)</td>
<td>47.9 (30.0)</td>
<td>NS</td>
</tr>
<tr>
<td>Age</td>
<td>48.2 (8.3)</td>
<td>45.5 (10.0)</td>
<td>NS</td>
</tr>
<tr>
<td>Body mass index</td>
<td>31.1 (4.6)</td>
<td>32.7 (6.4)</td>
<td>NS</td>
</tr>
<tr>
<td>Tongue procedure</td>
<td>20</td>
<td>18</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Gender (F:M)</td>
<td>7:23</td>
<td>4:40</td>
<td>NS</td>
</tr>
</tbody>
</table>

Apnea hypopnea index for palatal advancement compared with UUPPP

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Pre-AHI</th>
<th>Post-AHI</th>
<th>Change in AHI</th>
<th>P value, pre vs. post</th>
<th>P value between groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPPP (n = 44)</td>
<td>47.9 (30.0)</td>
<td>30.9 (24.2)</td>
<td>17.1 (30.1)</td>
<td>&lt;0.000</td>
<td></td>
</tr>
<tr>
<td>Palatal advancement (n = 30)</td>
<td>48.3 (24.6)</td>
<td>19.8 (16.8)</td>
<td>28.5 (25.6)</td>
<td>&lt;0.000</td>
<td>&lt;0.02</td>
</tr>
</tbody>
</table>
Upper airway reconstructive surgery long-term quality-of-life outcomes compared with CPAP for adult obstructive sleep apnea

Sam Robinson, MB, FRACS, Michael Chia, MB, FRACP,

**Figure 4** Respiratory Disturbance Index (RDI) pre- and post-operatively (mean ± 95% CI).
Summary

• Upper Pharynx is major contributor to OSA surgical failure
• Adult Friedman Stage 1 is rare
• Lateral pharyngeal wall and palatal genu can be modified with outcomes likely superior to traditional techniques