Evidence Table

Clinical Area: Obstructive sleep apnea, surgical treatment.

Study Type: Case Series.
Study Aim: To compare short-term versus long-term results of genioglossus advancement and hyoid myotomy for the treatment of obstructive sleep apnea.

Outcomes
- Primary: Change in respiratory disturbance index (RDI), short and long term lowest oxygen saturation (LSAT), severity of snoring, daytime sleepiness, and body mass index (BMI).

Design
- Number of subjects: N=46.
- Description of study population: The age of the participants ranged from 35-52 years with a mean of 40.1 ± 4.2 years, 82.6% were men, and the mean BMI was 28.9 ± 2.0 kg/m².
- Inclusion criteria: Patients with a primary complaint of snoring and OSA, >5 respiratory disturbances per hour of sleep on their polysomnograph, with both oropharyngeal and hypopharyngeal obstruction, and failure to respond to conservative treatment.
- Exclusion criteria: Not discussed.
- Consecutive patients? Yes.
- Intervention: All patients underwent baseline evaluation by polysomnography, grading of snoring severity on a visual analog scale (VAS), and completed an Epworth sleepiness scale (ESS). Patients with a RDI >40 and LSAT <80% were advised to use CPAP at least 2 weeks prior to surgery, and continue it postoperatively until a polysomnogram was performed. The patients then underwent genioglossus advancement and hyoid myotomy with suspension (GAHM) procedure. Uvulopalatal flap (UPF) was performed as an adjunct surgical procedure for oropharyngeal obstruction.
- Source of outcome data: Polysomnographic studies, VAS, and questionnaire.
- Length of follow-up: 37-46 months with a mean of 39.4 ± 5.7 months.
- Completeness of follow-up: 94% complete for both the short and long-term follow-up.

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? Characteristics were not presented in detail.
- Was the intervention and other aspects of patient care similar for all patients (or for all patients in a defined subgroup)? Yes.
- Was the process of observation likely to affect the outcome? Not for the objective outcomes.
- Did an objective observer assess outcomes and were outcome measurements consistent? Yes.
- Was follow-up duration appropriate? Yes.

**Conclusions regarding validity of methods:**
The study was a relatively small case series with no control or comparison group. It had the advantage however of having objective outcomes and long-term follow-up.

**Results**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Preoperative</th>
<th>Short term follow-up**</th>
<th>Long-term follow-up***</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>RDI*</td>
<td>47.9 ± 8.4</td>
<td>14.2 ± 3.9</td>
<td>18.6 ± 4.1</td>
<td>&lt;0.001†</td>
</tr>
<tr>
<td>LSAT (%)</td>
<td>81.2 ± 2.9</td>
<td>88.8 ± 2.7</td>
<td>87.2 ± 3.1</td>
<td>&lt;0.01‡</td>
</tr>
<tr>
<td>Mean snoring scale (VAS) ††</td>
<td>8.5 ±1.3</td>
<td>1.7 ± 1.4</td>
<td>2.7 ± 1.9</td>
<td>&lt;0.01†</td>
</tr>
<tr>
<td>Daytime sleepiness (ESS) ‡‡</td>
<td>15.9 ±2.7</td>
<td>6.2 +2.3</td>
<td>7.3 +2.7</td>
<td>&lt;0.01‡</td>
</tr>
</tbody>
</table>

* RDI = Respiratory disturbance index, LSAT = lowest oxygen saturation.
**6 months. 78.3% success rate (defined as 50% reduction in RDI and a final RDI of ≤20)
***65.2% success rate (defined as 50% reduction in RDI and a final RDI of ≤20)
† Short term vs. baseline, ‡ Long-term vs. baseline
†† Snoring was eliminated among 43/46 (93.5%) patients at 6 months, 35 (81.4%) had no relapse and 6 (14%) relapsed.
‡‡ six patients had recurrent daytime sleepiness
- Six patients with short-term successful results failed over the long term (mean RDI increased from 14.5 ± 4.7 to 30.1 ±8.4 and mean LSAT dropped from 87.5 ± 1.7% to 81.8 ±3.9%)
- There were significant differences in RDI and BMI values between responders and nonresponders to surgery

**Complications:**

<table>
<thead>
<tr>
<th></th>
<th>n /N</th>
<th>%</th>
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<tbody>
<tr>
<td>Dysphagia*</td>
<td>3/46</td>
<td>6.5</td>
</tr>
<tr>
<td>Aspiration*</td>
<td>4/46</td>
<td>8.7</td>
</tr>
<tr>
<td>Mild-moderate pain**</td>
<td>44/46</td>
<td>95.6</td>
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</table>

**Uvulopalatal flap complications**

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<th>n /N</th>
<th>%</th>
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<tbody>
<tr>
<td>Transient nasal regurgitation</td>
<td>4/46</td>
<td>8.7</td>
</tr>
<tr>
<td>Foreign body sensation</td>
<td>7/46</td>
<td>15.2</td>
</tr>
<tr>
<td>Mild – moderate pain***</td>
<td>46/46</td>
<td>100</td>
</tr>
<tr>
<td>Mild speech problems ***</td>
<td>46/46</td>
<td>100</td>
</tr>
</tbody>
</table>

*Resolved in 3 weeks
**≤7 on the visual analog scale (VAS), lasted for 5-7 days after the procedure.
***≤4 on the visual analog scale (VAS), lasted for 5-7 days after the procedure
Authors’ Conclusions

The authors concluded that genioglossus advancement and hyoid myotomy (GAHM) is effective for the treatment of obstructive sleep apnea, and has long-term results. They noted however, that patients with weight gain are at risk of recurrence.

Reviewer’s Conclusions

The study is a small case series with no control or comparison group. It had the advantage however having objective outcomes and long term follow-up. The results indicate that the procedure was associated with a 78% success rate at six months. This rate dropped to 65% after a long-term follow-up of 3-4 years. The adverse effects of the surgery were short-term, and not serious.