Assessment and Management of VPI

Kathy Sie, MD
Professor, Otolaryngology-Head and Neck Surgery
University of Washington
Director, Childhood Communication Center
Seattle Children’s Hospital

Muscles of the VP mechanism

- Levator veli palatini
- Tensor veli palatini
- M. uvulae
- Palatoglossus
- Palatopharyngeus
- Superior constrictor
Velopharyngeal insufficiency: Overview

- Speech differential diagnosis
- Clinical assessment
- Instrumental assessment
- Treatment options
- Outcomes

VPI: Speech differential diagnosis

- Voice
- Articulation
- Motor speech (dysarthria)
- Oral motor speech (dyspraxia)
- Velopharyngeal function
  - Compensatory misarticulations
  - Sound specific VPI

PARTNER WITH AN SLP!!!
Characterization of VP function

- Description of perceptual exam
- Timing of serial evaluations

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>None</th>
<th>Minimal</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resonance</td>
<td>Normal resonance</td>
<td>Assimilation hypernasality</td>
<td>Mildly hypernasal; more apparent on high vowels</td>
<td>Moderately hypernasal; present in mid and high vowels in spontaneous speech</td>
<td>Severely hypernasal; Low vowels, often accompanied by weak pressure consonants</td>
</tr>
<tr>
<td>Nasal air emissions</td>
<td>Not audible or auscultatory</td>
<td>Auscultatory only</td>
<td>Occasionally audible</td>
<td>Audible</td>
<td>Unobstructed</td>
</tr>
<tr>
<td>Speech volume</td>
<td>Normal</td>
<td>Minimally impaired</td>
<td>Mildly impaired</td>
<td>Impaired</td>
<td>Low speech volume</td>
</tr>
</tbody>
</table>

VPI: Patient assessment

- Explore speech symptoms
  - Spontaneous speech
  - Communication with peers
  - Pressure symptoms; hobbies
  - Predictable communication challenges

- Always ask about airway and sleep symptoms
  - Consider sleep study
  - Consider role of tonsillectomy and/or adenoidectomy

- Past medical history

- Complete head and neck examination
**VPI: Indications for tonsillectomy**

- Recurrent tonsillitis
- Airway obstruction; OSA
- Speech
- Concerns about airway obstruction following pharyngeal flap
  - Wait 6 weeks after tonsillectomy to perform speech procedure
- Concerns about impaired exposure for sphincter pharyngoplasty
VPI: Adenoidectomy

- Young children generally demonstrate veloadenoidal closure
- Removal of adenoids may exacerbate VPI
  - General population 1:2,000
  - Poor velar function or structure
- Superior half (cephalad) adenoidectomy
  - Useful in patients at risk for VPI
- Role of traditional adenoidectomy
  - Patients with known VPI and OSA

VPI: Instrumental assessment

- Nasendoscopy
- Multiview speech fluoroscopy
VPI: Instrumental assessment

- Audio recordings
- Data collection forms

Comparison of NE and MVF:
Gap Area Index

![Graph showing comparison of NE and MVF Gap Area Index](image)
### VPI: Instrumental assessment

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
</table>
| NE         | - Bird’s eye view  
- Direct visualization  
- Assessment of palatal status | - Unable to assess cephalocaudal level of attempted closure |
| MVF AP, lateral views | - Timing issues  
- Compensatory mechanisms (e.g. tongue backing) | - Compression  
- Unable to lateralize asymmetric palatal motion |

### VPI: Nonsurgical treatment options

- **Role of therapy**

- **Intraoral appliances**
VPI: Surgical options

- Palatoplasty
- Sphincter pharyngoplasty
- Pharyngeal flap
- Posterior wall augmentation

Original Seattle treatment algorithm

Levator status
- Transverse: Sphincter pharyngoplasty
- Sagittal: Furlow palatoplasty
Furlow palatoplasty

**Indications**
- Initial palate repair
- Sagittal orientation of the LVP
  - Previously repaired cleft palate
  - SMCP

**Technical considerations**
- Local infiltration of the muscular palate
- Adequate exposure - Dingman mouth gag
- Lateral dissection
- Design of the z-plasty
- Lateral relaxing incisions
Technical considerations

- Flap design
  - Dimensions of the lateral flaps
  - Degree of overlap
  - Position of flaps relative to PTP
  - Maximize muscle in the flaps
- Recipient site
  - Dimensions
  - Relationship to adenoid pad
  - Cephalocaudal position
  - Excise mucosa only
Sphincter pharyngoplasty

- **Caveats**
  - Position of carotid arteries; “the moment of silence”
  - Relationship of PTP to soft palate
  - Cephalocaudal position of recipient bed
  - Amount of tissue removed from the recipient bed
  - Careful mucosal approximation
  - Close the superior incision first
VPI: Follow up and outcomes

- Post-operative medical assessment
  - 1 month
  - Assess sleep symptoms
  - Make recommendations for speech therapy prn
- Post-operative speech assessment
  - 3-6 months
  - Standardized perceptual speech assessment
  - Record speech sample
  - Performed by SLP
- Long term

Furlow palatoplasty:
Surgical outcomes ’05, n=148

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Chi sq</th>
<th>Adj ord logit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (&lt;5y)</td>
<td>0.406</td>
<td>0.927</td>
</tr>
<tr>
<td>Syndrome</td>
<td>0.905</td>
<td>0.321</td>
</tr>
<tr>
<td>Gender</td>
<td>0.082</td>
<td>0.329</td>
</tr>
<tr>
<td>SMCP</td>
<td>0.326</td>
<td>0.578</td>
</tr>
<tr>
<td>Gap size</td>
<td>&lt;0.001</td>
<td>0.013</td>
</tr>
<tr>
<td>Surgeon</td>
<td>0.473</td>
<td>0.481</td>
</tr>
<tr>
<td>Pre VPI</td>
<td>&lt;0.001</td>
<td>0.006</td>
</tr>
</tbody>
</table>
**VPI: Seattle approach**

- **Indications**
  - Large central gap in the velopharyngeal sphincter
  - Requires adequate lateral wall motion to close lateral ports

- **Achievement**
  - Autogenous obturator of the central velopharyngeal area
  - May have some contractile ability to tense soft palate and direct closure force superiorly

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**Pharyngeal Flap**

- Indications
  - Large central gap in the velopharyngeal sphincter
  - Requires adequate lateral wall motion to close lateral ports

- Achievement
  - Autogenous obturator of the central velopharyngeal area
  - May have some contractile ability to tense soft palate and direct closure force superiorly
Management of complications

- Obstruction
  - Wait
  - Medical management
  - CPAP
  - Sphincter release
  - Tracheostomy
- Persistent VPI
  - Differential diagnosis
  - Obturator
  - Augmentation
  - Relocation of sphincter
Velopharyngeal insufficiency

- Partner with SLP
- Complete assessment of patients
- Understand instrumental assessments
- Treatment options
- Follow up
- Complications
CASE PRESENTATIONS

- Tailoring the surgery
- OSA post pharyngeal flap
- Persistent VPI post pharyngeal flap
- OSA post sphincter pharyngoplasty
- Persistent VPI post sphincter pharyngoplasty
Case presentation

- Post tonsillectomy VPI

Case presentation

- Large velopharyngeal gap
Case presentation

- Small gap

Case presentation

- OSA after pharyngeal flap
Case presentation

- Persistent VPI after pharyngeal flap

![Image](image_url)
Case presentation

- Persistent VPI after Furlow palatoplasty

Case presentation

- Persistent VPI after sphincter pharyngoplasty
  - VCFS
Case presentation

- OSA post sphincter pharyngoplasty