TREATMENT OF VELOPHARYNGEAL INADEQUACY

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What is Velopharyngeal Inadequacy (VPI)?

- Velopharyngeal insufficiency results when the soft palate (velum), during constriction, fails to elevate and retract against the stationary posterior pharyngeal wall.

Dworkin, Marunick, Krouse, 2004
Causes of VPI

VPI flow chart compiled from the following sources: Johns, Rohrich & Awada, 2003 and Peterson-Falzone, Karnell, Hardin-Jones, & Trost-Cardamone, 2005
Speech Characteristics of VPI

- Abnormal tone or resonance resulting in excessive nasality = hypernasality
- Consonant weakness
- Consonants produced further back in oral cavity (pharynx, glottis, nasopharynx)

(Sell & Ma, 1996)
Assessment for VPI

- Oral Mechanism Exam
- Screening
  - Procedure
    - Request client to count from 60 to 80.
    - Multiple production of following words: puppy, house, push, jelly, peach, etc…
  - Hypernasal resonance auditorily evident

Dworkin, Marunick, Krouse, 2004
Deep Testing VP Anatomy and Physiology

- Step 1 General Survey
  - Client tilts head back slightly, open mouth wide. Clinician shines flashlight on VP region and appraises VP at rest

- Step 2 Velar Activity
  - Client opens mouth wide and says /a/ for as long as steadily as possible

- Step 3 Gag Reflex
  - Client opens mouth, tongue depressor is used to elicit a gag reflex

- Step 4 Speech Task
  - Client repeats stimuli while a laryngeal mirror is periodically placed beneath the most patent nostril to detect nasal airflow.

Dworkin, Marunick, Krouse, 2004
Main Methods of Treatment for VPI

1. Surgical
   • Pharyngoplasty

2. Prosthetics
   • Appliance added to aid in velar closure

3. Therapy Treatment 😊
   • Muscle rehabilitation techniques
## Active Exercises: Strength & Stretching/ROM Training

<table>
<thead>
<tr>
<th>Strength</th>
<th>Stretching/ROM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Nonspeech Oral Motor</td>
<td>1. Phonetic-Based Treatment</td>
</tr>
<tr>
<td>2. Speech Production Exercises</td>
<td>2. Biofeedback</td>
</tr>
</tbody>
</table>
1. Nonspeech Oral Motor Exercises:

- **Participants**
  - 13 subjects diagnosed with VPI divided into 3 treatment groups

- **Methodology**
  - Group 1: Practiced blowing exercises on a manometer
  - Group 2: Performed sucking exercises with a straw or used a meter that measured pressure
  - Group 3: Practiced swallowing exercises while monitoring thyroid excursion with their index finger.

**All groups received articulation therapy in conjunction with nonspeech oral motor exercises**

Massengill, 1968, Ruscello, 2008
Results of Nonspeech Oral Motor

- Only group 3 appeared to improve velopharyngeal training.
- However, because all groups received articulation training, it cannot be specified whether the oral motor exercises or articulation training improved VP closure.

Massengill, 1968, Ruscello, 2008
What is CPAP?

- CPAP → Continuous Positive Airway Pressure
- Has been and is currently being used to treat patients with sleep apnea.
- Works basically the same way for speech treatment except individual are talking with the mask instead of sleeping.
- Kuehn et al. performed 2 studies. Each resulting in enhanced VP movement in some subjects

Kuehn et al. 2002
2. Speech Production Exercises: CPAP

- **Participants**
  - Forty-three subjects born with cleft palate (3-23 years old) diagnosed with hypernasality

- **Methodology**
  - Eight weeks of 6 days per week speech exercises increasing from 10 to 24 minutes, speaking against transnasal CPAP increasing 4 to 8.5 H2O

- **Results**
  - Resistance training showed a net overall reduction in speech hypernasality, although responses were variable.

Kuehn et al. 2002
3. Phonetic Based Treatment

- Variable results

- Study by Shelton et al. found that subjects improved articulator placement without improving velar closure (1969 as cited in Ruscello, 2008)

- Works best under specific circumstances:
  - VPI is mild and inconsistent
  - Associated with a motor speech disorder (dysarthria)
  - Surgery has already been performed (Kummer & Lee, 1996)

- Phonologic approach to therapy may be more beneficial
Phonologic versus Phonetic Treatment

- Study by Pamplona, Ysunza & Espinosa (1999)
- Included children with VPI due to cleft palates and children with compensatory articulation disorder (CAD), ages 3-7
- Control group = phonetic-based speech therapy
- Experimental group = phonologic-based treatment
- Patients were treated until CAD was corrected
- Results:
  - Phonetic – 30.07 months (mean)
  - Phonologic – 14.5 months (mean)
- Further study must be conducted on other groups with VPI
4. Biofeedback

- “Provides learners with ongoing physiological performance information that is typically not available to them or has not reached a level of conscious introspection.” (Ruscello, 2008, p. 298)
- Uses instrumentation for visual biofeedback
  - Nasometer (Kummer & Lee, 1999)
  - Videopharyngoscopy (Ysunza et al., 1997)
- Uses speech treatment to improve:
  - ROM
  - Skill development
  - Strength (mildly)
- One of the most effective forms of treatment to date
Visual Biofeedback Study

- Study by Ysunza, Pamplona, Femat, Mayer, & Garcia-Velasco (1997)
- 17 patients with VPI, CA, and NMLPW
- Patients received visual biofeedback through videonasopharyngoscopy
- After 12 weeks: NMLPW was corrected
- After 6 months: CA corrected
- Post-surgery: VPI corrected or reduced with aid from biofeedback
Passive Exercises: Sensory stimulation

- Currently used to maintain function of muscles NOT treat VPI

- 2 main forms:
  1. Electrical Stimulation
     - Demonstrated benefits in reducing hypernasality and improving velar movement
     - Study by Yules & Chase (1969)
  2. Tactile Stimulation
     - Demonstrated minimal improvements in speech
     - Study by Tash et al. (1971)
Conclusion

- Biofeedback and CPAP are currently the most successful forms of treatment for VPI besides surgery or prosthetic use.
- In order for these techniques to be successful, clients must have structural capability to form velopharyngeal closure for speech.
- SLPs must be aware that a small proportion of clients will benefit from treatment alone.
- SLPs must work in collaboration with other professionals.
References