Clinical Skills for Assessing Velopharyngeal Function

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http://www.choa.org/OurServices/Craniofacial/Programs/Speech/SpeechPathology4.asp

How to Develop Your Non-Instrumental Clinical Skills

How can a speech-language pathologist assess velopharyngeal function without instrumentation?

Many tools for screening velopharyngeal closure are inexpensive and easy to use. The evaluation can be considered as three components:

- Perceptual evaluation
- Clinical screening of velopharyngeal closure
- Oral examination

Can these non-instrumental techniques be applied to other forms of velopharyngeal incompetence (VPI)?

Yes, these techniques can be used to assess velopharyngeal function caused by structural or neurologic disorders. They can be used to distinguish “functional VPI” from structural or neurologic forms.

Perceptual Evaluation

How do I judge velopharyngeal competency when listening to speech?

Think pressure first. The purpose of the velopharyngeal port is to produce oral pressure.

First listen for the oral pressure consonants such as “p,” “b,” “d,” “s,” etc. The presence of these sounds usually suggests some degree of velopharyngeal competence whereas the lack of these sounds may suggest a VPI. Then listen for hypernasality, nasal air escape and compensatory articulation.

What are compensatory articulations?

Compensatory articulations are attempts by the speaker to create pressure consonants despite the loss of air pressure by velopharyngeal incompetence. They are “placement” errors. Because they are low-incident errors, clinicians, experienced with other disorders, do not develop experience to recognize and treat them.

The most common compensatory articulations are:

- Glottal stops
- Pharyngeal fricatives
- Pharyngeal stops
- Posterior nasal fricative (previously labeled a “nasal snort”)
- Anterior nasal fricative (facial grimacing)
- Co-articulation of oral and glottal stop

Can speech output help me judge velopharyngeal competency in a patient noncompliant for testing?

Listen for oral pressure consonants in the child’s speech as suggested above. The presence or absence of certain sounds may suggest adequate or inadequate velopharyngeal functioning. Also, you may be able to observe blowing in young children who are unwilling to speak. The ability to blow a whistle or birthday candles may suggest adequate velopharyngeal functioning. Remember, blowing is not predictive of speech skills, and blowing exercises do not help soft palate function for speech.

Clinical Screening of Velopharyngeal Closure

What are clinical screening tests?

Clinical screening tests assess velopharyngeal closure for the oral sounds and velopharyngeal opening for nasal sounds. Nasal resonance can be detected for the voiced sounds and nasal air emission for the unvoiced sounds.

What is the difference between velopharyngeal closure and velopharyngeal competence?

Velopharyngeal closure is an all-or-none function. Nasal air escape is present or it is not. Velopharyngeal competence refers to the fact that a small amount of nasal air leak may not affect speech. Thus, a speaker may have nasal air leak and lack velopharyngeal closure, but may still have adequate oral pressure for speech sound production.

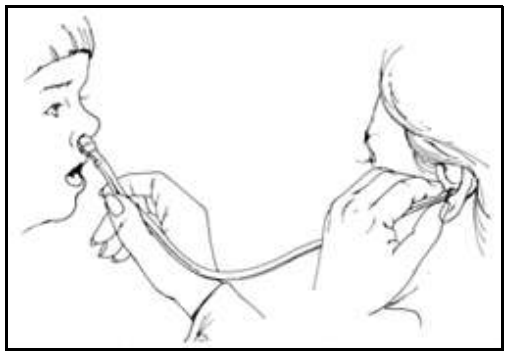
What can we learn from clinical screening tests of velopharyngeal closure?

- We can determine the consistency of closure.
- We can determine what sounds have velopharyngeal closure.
- We can estimate the effort needed for velopharyngeal closure.

When a patient demonstrates hypernasality or nasal air escape or fails screening of velopharyngeal closure, refer to a competent cleft palate team.

What are the clinical screening tests of velopharyngeal closure?
Three inexpensive and easy to use screening instruments are:

SeeScape®



Nasal listening tube or stethoscope

Mirror test

1. The SeeScape® is a commercial device with a length of tubing, attached by an L-shaped connector to a glass tube containing a Styrofoam piston. The end of the tubing is placed at the speaker's most free-breathing nostril and the piston is viewed as the speaker repeats a speech sample containing oral pressure consonants. The lightweight piece of Styrofoam moves up with any nasal air entering the tubing.

2. Listening tube. The nasal listening tube or stethoscope can be made from a simple 18-inch length of tubing, internal diameter of approximately 3/8 inch. One end is held to the patient's nose and the other to the clinician's ear. Listen for inappropriate nasal resonance or nasal air escape.

3. The mirror test: A mirror can be held in position under the nose during an oral speech sample. Fogging of the mirror indicates nasal air escape.

Is the speech sample used in clinical screening important?

The speech sample is very important. When testing velopharyngeal function, the phonemes used should be developmentally appropriate. Early developing sounds are usually the most appropriate. Short phrases or sentences are most appropriate, but single words are also acceptable.

To test for hypernasality, construct speech sample from:

- Oral consonants
- Voiced sounds
- High and low vowels
- Early appearing sounds
- For example, "*Buy baby a bib*."

To test for hyponasality, construct speech sample from:
- Nasal consonants
- Voiced sounds (nasal sounds are voiced)
- Early appearing sounds
- For example, "*Mama made lemon jam*."

To test for nasal air emission, construct speech sample from:
- Oral consonants
- Unvoiced sounds (whispered if necessary—this eliminates the confusing artifact of voicing)
- Early appearing sounds
- For example, "*Papa piped up.*"

How do I assess the effect of VPI on articulation?

Test the aspiration of each pressure sound with nose open, then with nose closed. Increased aspiration (or oral air pressure) with the nose closed suggests VPI is affecting articulation and that managing VPI will improve the quality of articulation. The same is true for fistula.

Visualizing the Velopharyngeal Mechanism by Oral-Facial Examination

What is the innervation to the velopharyngeal mechanism?
- The velopharyngeal mechanism is enervated through the pharyngeal plexus
- Motor primarily by CN X (Vagus)
- Sensory by CN IX (Glossopharyngeal)
- The exception is the Tensor Palatini muscle, which is enervated by CN V (Trigeminal)

What judgments can be made of velopharyngeal function from oral exam?
- The symmetry of elevation
- The placement of velar dimple should be just above uvula, at distal 1/3 and anterior 2/3's of soft palate
- The structure of the velum including bifid uvula, submucous cleft and posterior nasal spine
- Fistula will not affect resonance if below point of velopharyngeal closure
- Submucuous cleft/bifid uvula
- Bifid uvula: the incidence may be as high as 1/70

What are the characteristics of submucous cleft palate?
- Bifid uvula
- Zona pellucida
- Notch into posterior hard palate
- Anterior velar dimple

What judgments cannot be made of velopharyngeal function from oral exam?

- Velopharyngeal closure
- Nasopharynx size
- Pattern of closure

Are there reasons, other than paralysis, that cause the velum not to elevate?

- Nasal vowel — corrected by /ka/
- Gag elicited — breathe through nose
- Prominent adenoids or shallow nasopharynx (speaker will be hyponasal)
- Levator attached anteriorly or on nasal side of velum

Where should I refer a patient who is consistently hypernasal and/or fails screening tests of velopharyngeal closure? This individual should be referred to a cleft palate team.

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adapted from: John E. Riski, Ph.D. Speech Pathology at Children's at Scottish Rite
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