



Speech Therapy for Characteristics of Velopharyngeal Dysfunction (VPD)

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Children with a history of cleft palate are at risk for resonance and speech problems due to velopharyngeal dysfunction (VPD). Characteristics of VPD can also occur in children with no history of cleft palate for a variety of reasons.

Speech therapy is very effective in eliminating compensatory articulation productions through articulation therapy. However, hypernasality, nasal air emission, and weak consonants can be improved or corrected with therapy only under a few limited conditions. Therapy could be considered for these characteristics if they are mild and inconsistent and the child is stimulable for improvement. Therapy is definitely appropriate if these characteristics are due to faulty articulation or mislearning. Finally, therapy is appropriate for patients with these characteristics if they are secondary to oral-motor dysfunction (dysarthria or apraxia).

Although the research continues in an effort to find methods to increase velopharyngeal movement through various "exercises," there tends to be general agreement that physical management, through surgical correction or prosthetics, is still the most effective means to correct velopharyngeal dysfunction. Once the velopharyngeal mechanism is corrected, speech therapy is usually required, since changing structure does not necessarily change the function of the velopharyngeal valve and the articulators.

The speech therapy techniques that are used with resonance disorders or compensatory productions are not very different from the techniques that are used in basic articulation therapy. As with any form of articulation therapy, the goal of therapy is to establish appropriate placement for each speech sound. In this case, it is also important to establish normal oral air pressure and airflow. Fortunately, this usually occurs naturally with a change in placement if the problem is functional.

The following is a description of some specific therapy techniques that can be used with the common characteristics of velopharyngeal dysfunction. These techniques are offered as suggestions only. Further research is needed before the efficacy of techniques to alter resonance can be determined.

Hypernasality

Hypernasality is very difficult, and most often impossible, to correct with therapy since it is usually due to a significant velopharyngeal opening. Therefore, the speech pathologist will rarely, if ever, provide speech therapy for patients with hypernasality. There are some techniques that can encourage oral resonance, however and may be effective with hypernasality secondary to dysarthria.

Therapy Suggestions

- **Auditory Discrimination Training** - Have the child listen to hypernasal speech and then normal oral speech. This can be done by simulating both or by presenting different samples on a tape recorder. The best way to do this however is to use a “listening tube” or straw. With this technique, the child puts one end of the tube at the entrance to a nostril and the other end near his or her ear. When hypernasality occurs, it is very audible and even loud. The child is then asked to try to make adjustments in articulation to reduce or eliminate the sound in his or her ear.
- **Visual Feedback**- The Nasometer¹ is an excellent instrument to provide visual biofeedback regarding resonance. Nasopharyngoscopy can also be used when available.
- **Tactile-Kinesthetic Training** - Have the child try to raise and lower the velum during the production of vowel sounds to produce nasal/oral contrasts. This can increase velar sensation and control. If this is hard, the velum can be mechanically raised with a tongue blade as the child is producing vowel sounds. The vowel “ah” is the best to use since the mouth is most open for that sound. Then have the patient attempt to raise the velum on his own to match that sound. (If there is a significant difference in resonance with elevation using the tongue blade, the patient may be a good candidate for a palatal lift.)
- **Tactile Feedback**- Have the child lightly touch the side of his or her nose to feel for vibration during the production of nasal phonemes. Then ask the child to feel for vibration during the production of oral sounds. If vibration is still felt, have the child try to eliminate this vibration as he or she works on various vowels and voiced pressure phonemes.
- **Lower the Back of the Tongue** - Have the child produce individual vowel sounds, and then words with the back of the tongue down during the production of the vowels. Make sure that the back of the tongue is not abnormally elevated during articulation. To assist with this type of articulation, have the child yawn to forcibly lower the back of the tongue and raise the velum. Then have him produce vowel sounds and anterior consonants, keeping that same movement in mind.
- **Increase Oral Activity and Volume**- Increasing vocal effort has been shown to decrease velopharyngeal orifice size. This may be due to the fact that increasing anterior oral activity increases posterior oral (thus velar) movement. Oral activity and the resultant resonance is the difference between “mumbling” and normal speech. Increased mouth opening can reduce oral resistance and increase oral resonance. Increasing volume also tends to increase overall oral activity. However, the ultimate goal is a normal degree of oral activity and a normal volume level.

Nasal Air Emission

Nasal air emission occurs when there is audible emission of the air stream through the nasal cavity during the production of pressure-sensitive phonemes (plosives, fricative, affricates). Nasal emission, nasal turbulence or rustle, a nasal snort and the accompanying nasal grimace should all be targets of the speech therapy.

Therapy Suggestions

- **Auditory Feedback**- Make the child aware of the nasal air emission. This can be done by simulating this characteristic, or by having the child listen to and identify his own nasal air emission on a tape recorder. Again, the use of a “listening tube” or straw is the best method

for auditory feedback because when nasal air emission occurs, it is heard clearly and even loudly through the tube.



- **Tactile Feedback**- Have the child feel the sides of his nose for vibration during the repetitive production of pressure-sensitive phonemes or during the production of sentences with these sounds (no nasals). Ask the child to carefully produce these sounds or sentences without the vibration.
- **Visual Feedback**- Place an air paddle² under the nares during the production of pressure-sensitive phonemes to help the child to see the nasal air emission. Ask the patient to produce the same sounds without moving the air paddle. Another method is to use a See Scape³. Put the nasal olive in one nostril and ask the patient to try to produce pressure consonants repetitively without allowing the foam stopper to rise in the tube. Note that the foam stopper will rise during the production of nasal phonemes and with nasal breathing at the end of the utterance. The Nasometer¹ can be used to provide visual feedback during speech.



- **Cul de Sac Technique**- Have the child pinch his nostrils during the production of pressure sounds to eliminate the nasal air emission. Have him feel the increase in oral airflow and pressure. Then have him try to produce the sounds in the same way with the nostrils unoccluded
- **Light, Quick Contacts**- Ask the child to produce light, quick contacts during the production of pressure-sensitive phonemes. This helps to eliminate the back-up of air pressure in the nasopharynx and reduces the occurrence of nasal air emission.

Weak Consonants

When there is inadequate intra-oral breath pressure, consonants become very weak in intensity and are occasionally omitted. Therefore, correction involves decreasing nasal air emission (as noted above) and increasing oral air pressure.

Therapy Suggestions

- **Increase Volume and Oral Activity**- Have the child increase volume and oral activity to increase the force of articulation, the oral air pressure and airflow and to increase velar movement.

- Visual Feedback- Place an air paddle² in front of the child's mouth during the production of pressure-sensitive phonemes. Have the child try to produce the sounds with enough pressure to force the air paddle to move.
- Tactile Feedback- Have the child place his hand in front of your mouth as you produce plosives in a forceful manner. Have the child feel the air pressure as you produce each sound. Then have the child place his hand in front of his own mouth to do the same.

Compensatory Articulation Productions

Compensatory articulation productions are usually developed because the normal productions are too difficult to produce and do not result in an adequate acoustic product. Compensatory productions may be easier to produce, and usually result in better use of the airflow and thus, an improvement in intelligibility. Therefore, changing placement to eliminate compensatory productions is not easy in the presence of persistent velopharyngeal dysfunction. If surgical correction of the velopharyngeal dysfunction is planned, it is often better to wait until after the surgery before beginning therapy. If surgery needs to be delayed, therapy can still be done on placement by plugging the nose (Cul de Sac Technique) for better oral air pressure.

On the other hand, if the examiner finds that the patient is stimulable for a change in placement, and this results in an elimination of the nasal air emission, then therapy should be done prior to considering surgical intervention. The abnormal articulation may be a learned variation, rather than a true compensatory error due to velopharyngeal dysfunction.

Therapy Suggestions

Glottal stops as a substitution for plosives:

- Have the child whisper the syllable, which will prevent vocal fold adduction for a glottal stop.
- Have the child produce voiced and voiceless plosives slowly, followed by an aspirate /h/ before the vowel to eliminate the glottal stop (i.e. p-ha for pa).
- Modify voice onset time by delaying the voicing on the voiced plosive, or by delaying voicing on the vowel that follows a voiceless plosive (which is similar to the technique above).
- Have the child place feel his or her neck during the production of a glottal stop and then a prolonged vowel or nasal consonant. Have the child try to produce the plosive without the “jerk” of the glottal stop.

Pharyngeal plosives as a substitution for plosives:

- Work on the placement of bilabial and lingual-alveolar plosives first. Ask the child to produce a yawn to get the base of the tongue down and the velum up. Have the child use anterior articulation with a posterior yawn movement to produce the sounds. Once these are mastered, work on velar plosives.
- Establish placement for velar plosives by starting with an /ng/. Then have the child push with the back of the tongue to produce the plosive.
- Work on an upward movement of the back of the tongue, rather than a posterior movement during production.

Pharyngeal fricatives or posterior nasal fricatives as a substitution for sibilant sounds:

- Have the child produce fricative sounds with the nostrils occluded and then open to get the feel for oral rather than pharyngeal airflow.

- Work on /s/ by having the child produce a hard /t/ with the teeth closed. Increase the duration of the production until it becomes /ts/ and then /tssss/. Finally, eliminate the /t/ component.
- Work on the /sh/ sound by having the child produce a big sigh with the teeth closed and lips rounded. Try to increase the force of oral air pressure. Work on the /ch/ sound by going from a /t/ with the teeth closed or trying a loud sneeze sound with the teeth closed. Once this sound is mastered, work on the /j/ by adding voicing.
- Place a straw at the point of the central incisors. Encourage the child to produce the sound with airflow through the straw.

For a nasal /l/ or ng/l substitution:

- Ask the child to produce a yawn to get the base of the tongue down and the velum up. With the yawn, have the tongue tip go up to produce the /l/. Gradually eliminate the use of the yawn.

For mid-dorsum palatal stops (palatal-dorsals):

- Have the patient bite on a tongue blade so that it is between the canine or molar teeth. Make sure it is back far enough to depress the middle part of the tongue in order to prevent a dorsal production. Have the child produce lingual-alveolar sounds in front of the tongue blade and velar sounds behind the tongue blade.

General Principles to Remember

- **DO NOT USE BLOWING OR SUCKING EXERCISES!** These exercises will only improve blowing and sucking (maybe), but not speech! In working on placement, use general articulation procedures.
- Success of therapy often depends on the frequency and intensity of therapy. Elicit as many responses in each therapy session as possible.
- Even if the VPD is corrected surgically, the child may still need therapy. It is important to remember that changing structure does not necessarily change function. The child may need to be taught appropriate articulatory placement and oral airflow.
- Continue therapy as long as the child is making progress. If the child is not responding to the therapy and continues to have characteristics of VPD, refer the child to a craniofacial anomaly team for further evaluation of velopharyngeal function. Surgical intervention or revision may be necessary.

¹ The Nasometer (Kay Elemetrics Corp, 2 Bridgewater Lane, Lincoln Park, NJ 07035) is an instrument that measures acoustic energy emitted through the nasal cavity and oral cavity during the production of speech. The ratio of oral acoustic energy over total (oral plus nasal) acoustic energy is calculated and displayed on the screen in real time.

² An air paddle is a paddle shape that is cut from a piece of paper.

³ See Scape is a product of PRO-ED, 8700 Shoal Creek Boulevard, Austin, Texas 78757-6897.

For more information, please refer to:

Kummer AW. Cleft Palate and Craniofacial Anomalies: Effects on Speech and Resonance. Albany, NY: Delmar- Thomson Learning, 2001. ISBN 0-7693-0077-4